



MOTOROLA
SOLUTIONS

MT JULIET, CITY OF

Proposal

ASTRO D-Series TDMA Upgrades

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7/16/2026

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PS-000229432

Motorola Solutions, Inc

**MOTOROLA SOLUTIONS**

Motorola Solutions, Inc
500 W Monroe Street, Ste 4400
Chicago, IL 60661-37

07-2026

City of Mt. Juliet
1019 Charlie Daniels Parkway
Mt. Juliet, TN 37122

RE: ASTRO D-Series TDMA Upgrades

Dear Director Adam Williams,

Motorola Solutions, Inc (Motorola Solutions) appreciates the opportunity to provide the City of Mt. Juliet quality communications equipment and services. Motorola Solutions' project team has taken great care to propose a solution to address your operational objectives.

- D-Series Repeater Upgrade
- Upgrade Existing Prime Site to Virtual Prime
- FDMA to TDMA with 4-Channel TDMA Expansion
- Radio Management
- RF Antenna & Line Replacement
- Project Management, Implementation, and Standard Warranty

Motorola Solutions' proposal shall be governed by the terms and conditions of the Tennessee Statewide Contract No. 424. The City of Mt. Juliet may accept by signing the contractual documentation section of this proposal. Pricing will remain valid for 60 days from the date of this proposal.

Any questions the City of Mt. Juliet has regarding this proposal can be directed to Brian Lorenz, at 615-428-0541 or brian.lorenz@motorolasolutions.com. We thank you for the opportunity to present our proposed solution, and we hope to strengthen our relationship by implementing this project.

Sincerely,

A handwritten signature in blue ink, appearing to read 'Kristin Donovan'.

Kristin Donovan
Territory Vice President

Motorola Solutions, Inc





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Solution Summary

Driving Your Success

In response to the City of Mt. Juliet's request, Motorola Solutions, Inc. (Motorola Solutions) is pleased to present the following firm proposal for replacing the City's legacy G-series GTR 8000 ESS RF site equipment with the new D-series M12 Multi-carrier RF site. The D-series Multi-carrier M12 is Motorola Solution's ASTRO NEXT generation RF site for P25 mission-critical Land Mobile Radio (LMR) systems.

Additionally, this proposal includes upgrading the simulcast cell from FDMA to TDMA operation and the addition of four (4) new RF base station channels for the simulcast cell, bringing the total trunking channels to nine (9). TDMA allows for two (2) trunked talkpaths per channel, increasing the simultaneous call capacity from four (4) FDMA talkpaths today to sixteen (16) talkpaths with TDMA.

This proposal includes two (2) new D-series Multi-carrier RF simulcast sub-sites. Each D-series RF site will feature one (1) FDMA control channel and eight (8) TDMA and Dynamic Channel Assignment (DCA) trunking channels. The DCA feature allows a trunking RF site channel to switch dynamically between FDMA and TDMA modes of operation. The D-series RF sites will utilize new lower jumpers with 4:3:10 connectors and a new Tower Top Amplifier (TTA) to support the D-Series RF site receive system, providing improved inbound coverage performance. The existing transmit and receive antennas and transmission lines will be utilized. The MC Edge Remote Terminal Unit (RTU) is provided as the next-generation platform replacement for the SDM 3000, ensuring robust site level monitoring of site equipment.

A Dynamic Transcoding server and Dynamic Talkgroup system licenses have been included to support the mix of FDMA and TDMA users between the METRO simulcast cell and the Mt. Juliet simulcast cell.

To support the growth of Mt. Juliet's subscriber fleet Radio Management On Premise has been included. The Radio Management server and client PC will greatly increase the total number of subscribers the radio system administrators are able to manage, providing database storage and tracking of subscriber codeplugs and allowing programming jobs to be pushed out to the radios through various different programming media.

Key Products and Benefits

- **Dynamic Transcoding:** Enables communication between FDMA and TDMA radios, allowing all sites and radios to participate in a call regardless of the originating call type.
- **Dynamic Talkgroup Assignment:** Seamless communication for systems with mixed FDMA and TDMA fleets of radio users by automatically assigning talkgroups as FDMA or TDMA modes, depending on the capabilities of the affiliated subscribers without requiring any user intervention.
- **D-Series ASTRO DBR M12 P25 Radio Site:** Integrates key ASTRO radio site components into a single unit, minimizing downtime and providing ease of operation while allowing for cybersecurity updates.



Motorola Solutions has included the required software and licenses to support expanding from (5) Channels to (9) Channels. No additional hardware is required to support this channel expansion. The D-series platform supports channel expansion, frequency changes, and upgrades via software. Most updates and enhancements can be applied remotely if desired.

- **Radio Management On Premise:** Streamlined management of Mt. Juliet's subscriber fleet. This enhancement will provide one (1) RM server and one (1) desktop processor client. RM allows for the system's radio subscriber manager to create programming jobs which can then be pushed out to the whole fleet or targeted radios.

A Solution That is More Than the Sum of its Parts

The devices and applications in this proposal are part of an integrated ecosystem of technology that allows seamless collaboration across different systems and networks. It transforms streams of complex data into life-saving, mission-critical information - improving response times, increasing efficiency, and driving better outcomes for your end-users, your agency, and your community.

The site locations specified in this proposal are detailed below.

Site Location Table

Site Name	Existing Site Type	Proposed	Latitude	Longitude
Mundy	G Prime, G RF Subsite	D-Series VPrime, RF Subsite	36.1748	-86.4767
York	G RF Subsite	D-Series RF Subsite	36.2443	-86.4991
Mt Juliet Dispatch	Dispatch	Dispatch+Radio Management	36.2220	-86.5125
METRO Core	Zone Core	Core+Dynamic Transcoding	36.1301	-86.7911



Solution Description

D-Series M12 P25 Radio Site

Mission-critical communications is paramount to your needs and modern radio sites are a key component to delivering on that need. Available in either an open rack or cabinet configuration, the DBR M12 Radio Site integrates the key ASTRO radio site components into a single, easy to deploy unit. Built on the flexibility of modern hardware and software architectures, the DBR M12 is designed to minimize downtime, and provide ease of operation while allowing for cybersecurity updates.

The DBR M12 contains the site processors, transceivers, RF distribution systems and DC power distribution for up to 12 carriers (up to 11 FDMA and 22 TDMA talkpaths excluding the FDMA control channel) in a single rack. The DBR M12 can support both 700 MHz and 800 MHz frequency bands. Channels from each band can be integrated into the same cabinet, sharing one antenna or be directed to separate antennas. The DBR M12 is supported on ASTRO 25 Systems starting with the A2021.x release.

AC Power System – The AC power system is a modular design. Utilizing an N+1 redundancy scheme, the number of modules is sized to meet the power needs of each DBR M12 configuration. The loss of an AC circuit to the DBR M12 unit will not result in the loss of channel capacity.

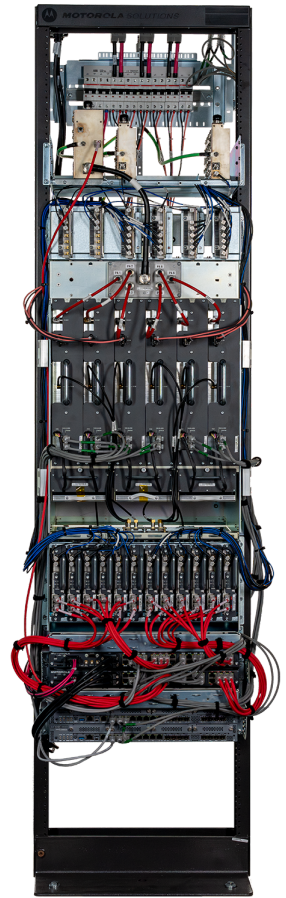
Improving Uptime

The DBR M12 is designed to minimize downtime from failure, maintenance or site updates. The DBR M12 can dynamically allocate resources across available hardware, thereby improving resiliency and overall uptime. Critical functions are deployed in pairs so that a redundant component can take over functions if needed. The major hardware components of the DBR M12 are hot swappable to ensure repairs cause minimum disruptions.

Simplifying Ownership

Offering up to 12 carriers per rack, the DBR M12 can reduce the impact on space-constrained sites and ease channel expansions within the capacity of the unit. The built-in Radio Frequency Distribution System (RFDS) of multicouplers, preselectors and filters connects the DBR M12 to the receive and transmit antennas. With a narrow adjacent frequency spacing requirement of only 50 kHz, the DBR M12 offers greater flexibility than typical 150 kHz equipment, easing frequency acquisition where spectrum availability is an issue.

The DSC 8500 Site Processor provides a single point of connectivity for all of the DBR M12 components at the site. Configuration, fault management, and software upgrades are managed at the site level, rather than addressing each component individually. This provides a streamlined, intuitive user experience.



Modernizing Cybersecurity

The DBR M12 is designed to offer protection against an ever-evolving threat landscape following recommendations of the NIST Cybersecurity Framework guidelines to help identify and detect cyber-attacks, and then how to respond, prevent and recover from such events.

- Hardened Operating System (Red Hat Enterprise Linux)
 - a. STIG-compliant hardening, aligned to defense-grade security standards.
 - b. Predictable, quarterly patching cycles with Security Update Service (SUS) / Remote Security Update Service (RSUS) coverage to keep your defense proactive and current.
- Access Control and Auditability
 - a. Comprehensive logging and auditable trails for all configuration changes, supporting strict compliance and forensic analysis.
 - b. Proactive security with system alarms that alert administrators to misconfigured settings, such as unchanged default passwords.
- Data Resilience and Integrity
 - a. Hardware-secured protection for cryptographic keys and secrets via the Trusted Platform Module (TPM), designed to prevent unauthorized access.
 - b. Built-in support for VLANs providing network segmentation, limiting lateral movement in the event of a breach.
- Future-Ready Platform for Evolving Threats
 - a. This robust platform readily accommodates the integration of new security features and capabilities.

D-Series Virtualized Prime Site

The Motorola Solutions Virtualized Prime Site (VPS) is the next generation Simulcast/Voting Prime Site for ASTRO 25 trunking systems. In this new platform, Site Controller and Comparator voting applications are virtualized onto a common device called the DSC 8000. The result is fault management and configuration capabilities that are consolidated into a centralized location which aids implementation and maintenance.

How It Works

Simulcast operation relies on the ability to choose the best received signal from multiple sites and re-transmit without causing interference. The ASTRO Virtualized Prime Site is an on-premise configuration that compares real-time audio from multiple sites and aggregates the highest quality audio frames to pass on. It then passes audio to each simulcast transmitter to ensure the best quality audio is received at the subscriber radio. Software virtualization enables one hardware unit to simultaneously run multiple virtual applications, creating a high-availability architecture in a user friendly form factor.

In many areas, the high demand for channels means narrow-band radio frequencies are hard to obtain. The use of simulcast can allow CITY OF GERMANTOWN to efficiently reuse frequencies at adjacent sites, giving radio users the channel capacity and wide-area coverage.



Benefits of a Virtualized Prime Site

Built for ASTRO trunking systems, the Virtualized Prime Site helps support dependable radio coverage with an equipment architecture designed for administrative convenience. Virtualization also enables software-only expandability in most instances. For example, when adding channels to a simulcast sub-system the Prime Site only needs to add voting software licenses to expand the capacity up to 18 carriers on a single pair of DSC 8000's, or up to 30 when equipped with a second pair. As no additional hardware is required for most expansions, these expansions can be conducted remotely. This fully redundant platform offers a new, web-based configuration tool and access to critical applications for more advanced support without the need for additional hardware. With less equipment to maintain, less power consumed, and a smaller physical footprint, the Virtualized Simulcast Prime Site lowers Customer's cost of ownership.

The proposed Virtualized Simulcast Prime Site supports the following features and configurations:

- FDMA and TDMA Trunking Voice Calls.
- Local, Full Redundancy.
- Up to 18 Channels/Carriers
- Up to 32 Remote Sub-sites

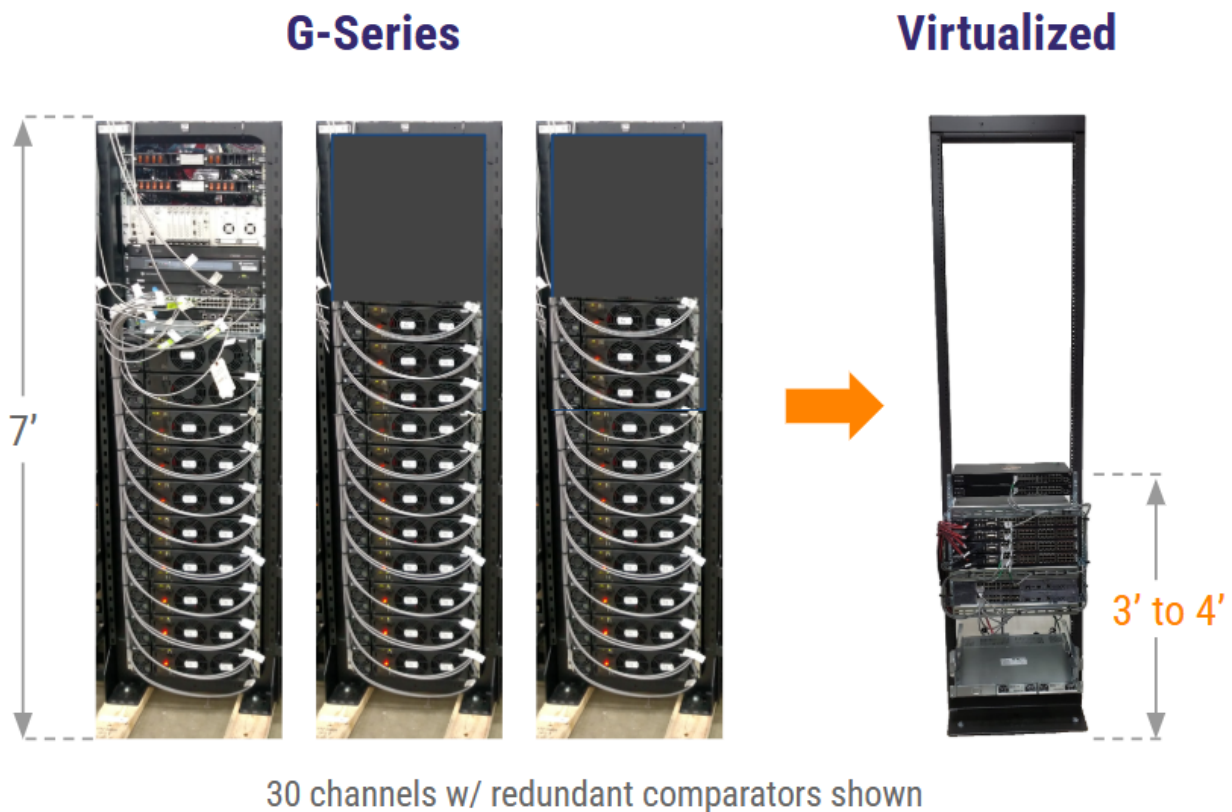


Figure: G Series Prime vs Virtualized Prime

Power Requirements

The new Prime Site will require (2) NEMA 5-20R outlets above the new Prime Site equipment rack wired to (2) 20A breakers in the AC breaker panel.

Dynamic Transcoding

TDMA and FDMA Users Efficiently Operate Together on the Same System

Dynamic Transcoding enables communication between FDMA and TDMA. Because the call type is determined on a site-by-site basis, more sites can operate in TDMA – even in a mixed fleet of FDMA and TDMA radios. This means you get a more efficient use of channels and frequencies, and all sites and radios can participate in a call regardless of the originating call type.

Dynamic transcoders reside in each zone core, translating between FDMA and TDMA audio formats. Each site operates in the best mode based on the channel resources available and capabilities of the radios at that site. Radio users communicate without a console patch or the need to downgrade the call. Radio users from TDMA-only and FDMA-only sites are able to join a Dynamic Talkgroup without changing the call type at either site.

If all TDMA resources at a site are busy, the call can still go through because ASTRO 25 with transcoding will switch the call at that site to available FDMA resources, rather than wait for TDMA resources at that site to free up. When TDMA resources do free up, subsequent calls will switch back to TDMA at that site, improving efficiency.

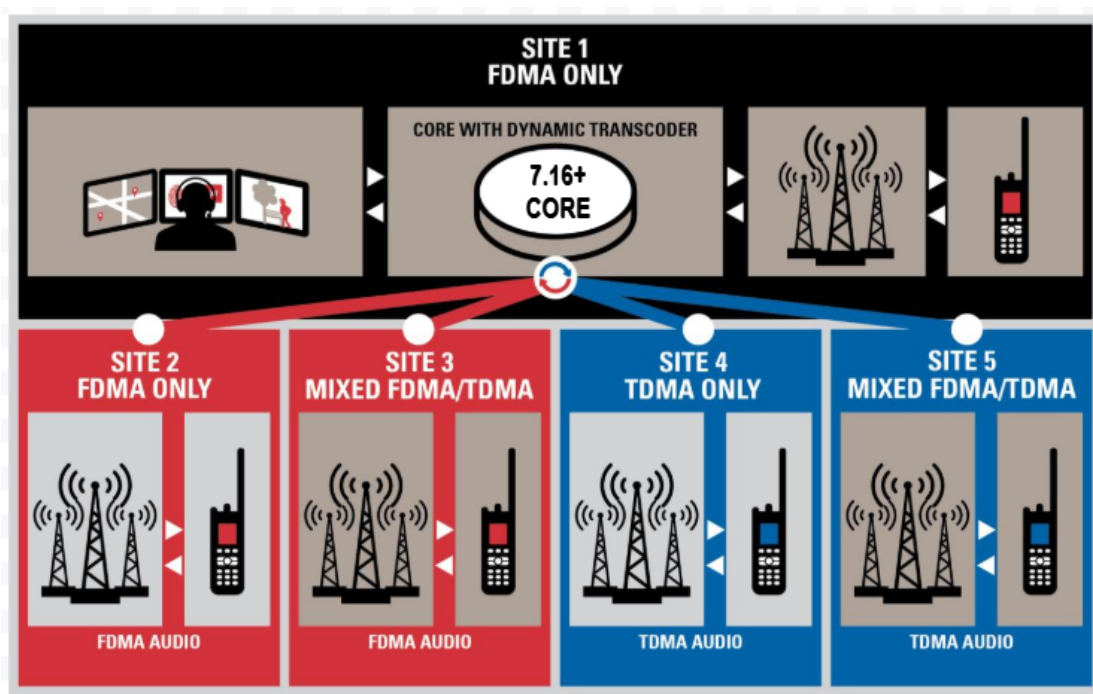


Figure: Dynamic Transcoding Solution Overview

Radio Management On Premise

On-premises Radio Management is a software solution that simplifies the process of provisioning radios through batch programming. Instead of updating radios one at a time, Radio Management allows you to push the updates to groups of subscribers, dramatically reducing the time required for radio configuration. For radio technicians who are managing ever-more complex radios and data sets, this is an advantageous approach to deploying, maintaining, and updating the whole fleet.

Keeps radios in the field - Deploying new radios or reprogramming radios for a new LMR system require multiple radio codeplug updates, as needs are defined or as a migration happens. With Radio Management, there is no need to schedule time to get radios into the shops for updates, saving countless days and keeping field personnel in the field.

Makes it easy to manage and update codeplugs - Radio Management provides a database of codeplugs, so it's easy to view each radio's programming, identify changes, and apply them in bulk as needed. The database helps plan changes in an organized way, rather than manually working with multiple spreadsheets.

Facilitates pushing new codeplugs to radios - Administrators can push all updates to radio programming by sending the command, and all radios get updated as they connect to Radio Management (whether tethered or through Wi-Fi or OTAP). The database indicates which radios have not updated their codeplugs, and administrators can reach out to those field personnel to help them get their radios updated.

Provides a locally-owned solution that can be easily managed with other IT assets - Radio Management can run on your network and be managed alongside your other IT assets for hardware and software maintenance, security, and backup.

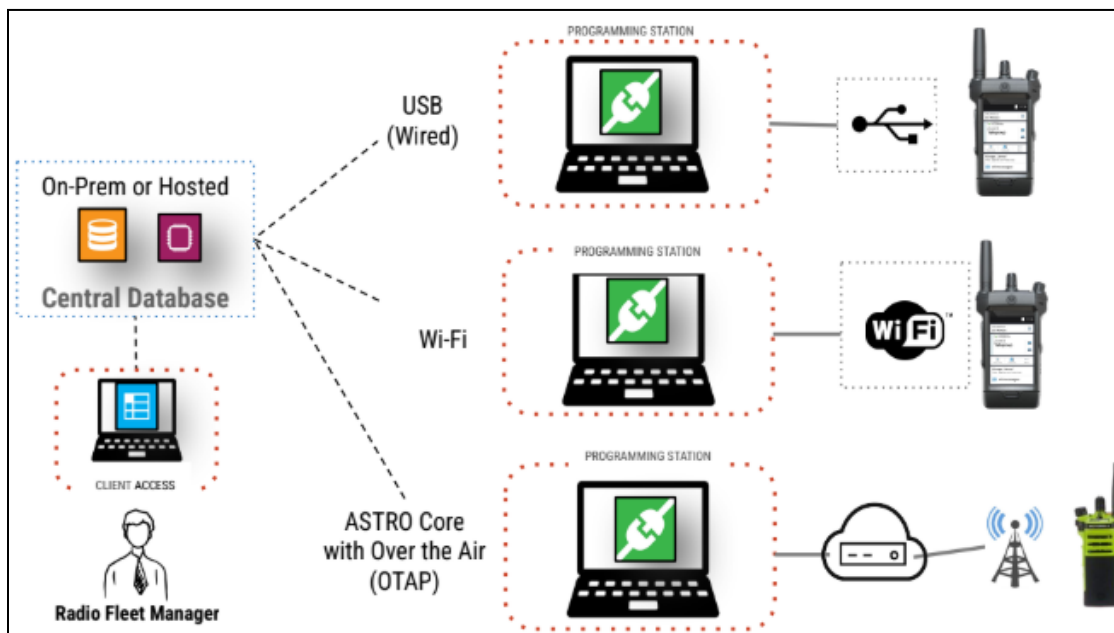


Figure: Radio Management On Premise Solution Overview

MC-EDGE Intelligent Gateway

The MC-EDGE® is an intelligent gateway designed for IoT applications. It is a general-purpose Remote Terminal Unit (RTU) enabling users to remotely control and monitor end node devices.

The MC-EDGE replaces the legacy SDM 3000 device for similar applications as a Network Fault Management (NFM) Remote Terminal Unit (RTU) at ASTRO RF sites.

The MC-EDGE device comprises a CPU Host board, a plug-in board and supports up to 16 SPE I/O modules while five out of them can be CAN bus I/O expansion modules. The device is enclosed in a compact, protective plastic housing. The CPU front panel provides easy access to connectors and ports. It includes a power LED, status LEDs for onboard DI/DOs, and status LEDs on the communication ports.



Figure: MC Edge Remote Terminal Unit (RTU)

The I/O module front panel includes terminal block connectors for sensor/device wire connection. There are 5 plug-in board options for each MC-EDGE configuration. Each plug-in board has a panel with different entrances.

The MC-EDGE can be used to report remote site digital sensor states and analog sensor values to the ASTRO Unified Event Manager (UEM) fault management application. The UEM can control digital outputs to activate equipment at remote sites. The MC-EDGE NFM is able to monitor analog inputs, useful for applications such as monitoring fuel tank levels or making analog environmental measurements.

Tower Top Amplifier (TTA)

The D-Series RF sites provide improved inbound coverage performance compared to G-series. Utilizing legacy, end of life, older TTA models can reduce the improvement advantage experienced by field users. Due to the field age and legacy models utilized at the York and Mundy RF sites Motorola Solutions has included our newest preferred TTA platform for use with the D-series RF sites.

The Filtronic SSG Tower Top Amplifier (TTA) system improves base radio performance for ASTRO P25 mission-critical Public Safety RF systems by increasing receiver sensitivity and wide-area coverage. It balances performance between mobile and handheld users increasing portable subscriber radio unit coverage. The architecture includes a dual compact, tower-mounted TTA and a shelter-based control and monitoring unit connected by antenna feedlines. The TTA utilizes a redundant quadrature design with two low-noise amplifiers and an automatic failover mechanism to ensure continuous operation.

- Provides increased gain, lower noise figure, and 4:3:10 connections
- USA manufacture and applications support
- Complies with Motorola Solutions TTA revised 2018 specification
- Low noise figure across standard operating gain levels
- Control Unit: Intuitive graphic user interface. Native DC powered.



Figure: Filtronic Diversity TTA and Control Unit

Proposed Equipment

Motorola Solutions is proposing the following equipment for the ASTRO system solution.

METRO ASTRO Core

- **ASTRO Core Licensing**
 - 2 TDMA Site License
 - 2 Dynamic Talkgroup Site Assignment License
 - 500 Radio User Licenses / 500 Visiting Radio Users Licenses
- **Dynamic Transcoding**
 - 1 Dynamic Transcoding Server and Core Licenses

Mundy RF Sub-Site

D-series Virtualized Prime Site

- **1 D-series Virtualized Prime Site**
 - 2 DSC 8000 with Rubidium
 - 9 Simulcast Voting Carrier Licenses
 - 8 TDMA Licenses (N-1)
 - 2 SRX1500 Prime Access Routers
 - 2 Prime Backhaul Switches
 - 1 Dual AC Power Supply
- **GNSS Antenna System**
 - 2 GNSS Receiver Antennas
 - 2 Runs of GNSS Cables
 - 2 Surge Protection Devices
 - 2 Sets of GNSS Mounting Hardware

D-Series Multi-Carrier RF Site

- **1 D-series M12 Multicarrier Rack**
 - 9 Channels, 2 DSC 8500 with Rubidium
 - 1 (4-6) Splitter
 - 6 Multicarrier Power Amplifiers (MCPA)
 - 1 AC Power Supply (6 AC Modules)
 - 1 Site Router
- **GNSS Antenna System**
 - 2 GNSS Receiver Antennas and Mounting Hardware
 - 2 Runs of GNSS Cables and Surge Protection
- **Radio Frequency Distribution System**
 - 1 Tx Antenna and 1-1/4" Transmission Line and Connectors
 - 2 Rx Antenna and (2) 7/8" Transmission Line and Connectors
 - 1 TTA Test Line 1/2" and Connectors
 - 1 Diversity Tower Top Amplifier (TTA) with AC Power Supply
 - Lower Connectors, Jumpers, and Surge Protection
- **Network Rack**
 - 1 MC Edge Remote Terminal Unit (RTU)
 - 1 7.5' Rack with Power Distribution



York RF Sub-Site

D-Series Multi-Carrier RF Site

- **1 D-series M12 Multicarrier Rack**
 - 9 Channels, 2 DSC 8500 with Rubidium
 - 1 (4-6) Splitter
 - 6 Multicarrier Power Amplifiers (MCPA)
 - 1 AC Power Supply (6 AC Modules)
 - 1 Site Router
- **GNSS Antenna System**
 - 2 GNSS Receiver Antennas and Mounting Hardware
 - 2 Runs of GNSS Cables and Surge Protection
- **Radio Frequency Distribution System**
 - 1 Tx Antenna and 1-1/4" Transmission Line and Connectors
 - 2 Rx Antenna and (2) 7/8" Transmission Line and Connectors
 - 1 TTA Test Line 1/2" and Connectors
 - 1 Diversity Tower Top Amplifier (TTA) with AC Power Supply
 - Lower Connectors, Jumpers, and Surge Protection
- **Network Rack**
 - 1 MC Edge Remote Terminal Unit (RTU)
 - 1 7.5' Rack with Power Distribution

Mt. Juliet Dispatch

- **Radio Management**
 - 1 Radio Management (RM) Server (On Prem)
 - 1 RM Job Processor Desktop Programming Station PC
 - 500 Device Licenses (First 100 are included at no cost)
 - 2 APX Portable and 2 APX Mobile Programming cables
 - 1 (7) Port USB Hub

Equipment Spares

- D-series critical equipment spares have been included to support the new platform equipment.
 - 1 FRU: DSC 8000 AC power supply
 - 1 FRU: DSC 8500 W/ RUBIDIUM
 - 1 FRU: XCVR 7/800 MHZ
 - 1 FRU: 4-6 WAY SPLITTER 800 MHZ
 - 1 FRU: DBR MCPA 800 MHZ
 - 1 FRU: DBR MCPA FAN KIT
 - 1 7/800 MHZ, TTA SYSTEM, ESS, 4.3-10, DIVERSITY



Preliminary Migration Plan

High-Level Cutover Plan: G-Series Prime to Virtualized Prime

This cutover plan will describe converting the Customer's system from its existing G-Series Prime Site to a Virtualized (DSC 8000-based) Prime Site. Further details will be discussed and customized with Customer's input at Design Review.

Timeframes are approximate and also allow for coordination between the customer and Motorola based on system activity.

Preparation Work

- New Prime Site installed in parallel to existing G-Series Site equipment.
- MPLS connectivity and configuration established to the new Prime Site, but separate from the live ASTRO network.
- Physical ports activated in an operationally "up" state, with the IP interface in a "down" state, ready for cutover.

Day of Cutover: Pre-Cutover Tasks (~30 min window)

These cutover tasks will be executed prior to and as close to the cutover event as possible. In addition to the purpose of verification, certain tasks are intended to hasten the cutover event and reduce downtime.

- Confirm states of new DSC 8000s
- Prepare the Unified Event Manager (UEM)

Day of Cutover: Live-Cutover and Post-Cutover Tasks (~1 hour window)

- Dispatchers switch to backup RF control stations and confirm operation with test calls.
- Begin work on existing and new Prime site logical interfaces that results in site-trunking followed by "Out of Range" for radio users.
- Turns up the new logical interfaces at the new Virtualized Prime Site. The site will come back up in failsoft and then quickly transition to site-trunking followed by wide-area trunking.
- Discovers new equipment in UEM.
- Watch for abnormalities.
- Confirm at dispatch that normal communications have been restored.
- Dispatch resumes normal operation using consoles.
- Performs UNC and UEM updates and verifications.
- End of cutover.



Day of Cutover: Test Procedure (~3 hour window)

The agreed upon test procedure shall be executed in a 3-hour timeframe on the cutover date at a time convenient to the customer. The purpose of these tests are to ensure that the locally redundant Prime Redundant Access Router and DSC 8000 will automatically be invoked upon failure of the primary Prime Access Router or DSC 8000.

When this test is executed, end users will experience approximately 30 seconds of temporary capacity reduction.

Decommissioning (If Applicable)

After an agreed upon timeframe, the MPLS services and legacy prime site devices can be decommissioned.

High-Level Cutover Plan: GTR to DBR

This is a high level, preliminary cutover plan based on Motorola's recommendation and best practices. If modifications to this plan are required it can be completed and memorialized during the contract design review (CDR) phase of the project implementation. Cutover will be done on a site-by-site basis and this plan will apply to each site being upgraded. The new D-Series M12 site can co-exist and operate with existing G-Series sites within the system.

The proposed D-Series M12 configuration will re-use the existing site network equipment and antenna/systems. It will also maintain the same Site ID and IP plan of the existing site. This will allow for minimal system impact and down time.

Preparation Work

- New D-Series M12 installed in parallel to existing G-Series Site equipment.
- Initial configuration complete on M12 for site specific identifiers, frequencies, and any operational features/requirements.
- Prepare antenna line jumpers as needed for connection to D-Series equipment, as the connector types are likely different.
- Floor plans and rack placement have been identified for each shelter.

Day of Cutover: Pre-Cutover Tasks (~30 min window)

These cutover tasks will be executed prior to and as close to the cutover event as possible. In addition to the purpose of verification, certain tasks are intended to hasten the cutover event and reduce downtime.

- Confirm states of new DSC 8500s
- Prepare the Unified Event Manager (UEM)

Day of Cutover: Live-Cutover and Post-Cutover Tasks (~4 hour window)

- Dispatchers inform field users of site outage and any expected coverage impact.
- Disconnect antenna from G series equipment.



- The output power will be measured at the top of the G-Series rack as a base line for the existing equipment. After installation and optimization, power will be measured at the top of the rack for D-Series M12 equipment to confirm equal or higher power.
- Sweep antenna system. A report will be generated based on these sweeps and any abnormalities will be highlighted. As needed, recommendations will be provided for any remediations.
- Connect antenna lines to D-Series equipment.
- Move the LAN connection on the existing site router(s) from the G series equipment to the new D-Series M12 equipment.
- Motorola discovers new equipment in UEM.
- Confirm that the site is operational and test that all channels are functional.
- Motorola watches for abnormalities.
- Dispatchers to test and confirm normal communications have been restored.
- Dispatchers report to field users that the system is back to normal state.
- Motorola performs UNC and UEM updates and verifications.
- End of cutover.

Decommissioning

After an agreed upon timeframe, the legacy G series equipment will be powered down and removed from the site.



Backhaul Requirements

Below are the minimum service provider requirements to ensure reliable Ethernet connectivity for mission-critical ASTRO P25 systems. This information should be provided to the service provider.

General

- RJ45: CAT-5 minimum for cabling / Fiber SFP: Contact Motorola Solutions engineering for deployment
- Port Speed and Duplex: 100 Mbps, Full Duplex, No Autonegotiate
- Circuit must be port-based, point-to-point L2 service that passes frame sizes up to 1572 bytes (plus any bytes for tags applied by the service provider)
- Class of service: "Real-time"
- Must pass LLDP frames
- Service level agreements should be specified and agreed upon
 - Motorola Solution's standard for Availability: > 99.999% or "5 Nines"

Bandwidth

The bandwidth referenced is the minimum required to ensure performance of a fully utilized site. The port speed and/or internal backhaul network may need to be greater to ensure the jitter specification is met.

- Minimum Recommended: 5 Mbps

Tolerance to Backhaul Network Congestion or Outage

- Site Links: 2 seconds

Latency

Latency or IP Packet Transfer Delay is defined per RFC 2681.

- 10 ms

Jitter

The measurement method for jitter is based on RFC 3393 (Section 2.4) and ITU-T Recommendation Y.1541.

- 5 ms

Packet Loss

- IP Packet loss rate 0.01%

Quality of Service (QoS) Mechanisms

Two (2) QoS levels are required. The following QoS mechanisms are supported:

- Layer 3 (ToS or DSCP).



Design Assumptions

This budgetary proposal is based on the following list of assumptions:

- This design is based on the ASTRO 25 system release, 2024.1.
- The customer will be responsible for providing accessibility to the site during installation.
- Customer provided Ethernet site connectivity will meet the requirements specified in Backhaul Requirements section.
 - No backhaul connectivity has been included in this proposal.
- The customer will provide adequate power, HVAC systems, and rack space to support the new equipment as per R56 Standards.
 - This proposal does not include any modifications to the main power or backup power infrastructure at the detailed site locations.
 - All sites have been designed to operate as AC power and will utilize the existing UPS systems on site.
 - This proposal assumes there is floor space for the new rack(s) in each of the existing RF site locations. This floor space is needed for temporary installation during the transition.
- All existing towers (Mundy and York) will have adequate space and size to support the antenna network requirements of the system described.
 - Any site, civil, or tower upgrade requirements due to the equipment included in this proposal are the responsibility of the customer. Motorola Solutions is not responsible for delays or costs associated with site development, architecture, and engineering.
- Cable Support: Existing cable support facilities (e.g., waveguide ladders, ice bridges, entry ports) will be used for supporting the new antenna cables.
- Approved local, State, or Federal permits as may be required for the installation and operation of the proposed equipment are the responsibility of the customer.
- It is not possible for G-series and D-series repeaters to reside on the same logical ASTRO site, sharing the same ASTRO Site ID. During the transition from G-series repeaters to D-series repeaters, there will be a short period of downtime during the cutover, leading to a brief loss of coverage from the site undergoing conversion. Motorola Solutions will take steps to minimize the impact of any downtime.
- Motorola Solutions has not included a coverage guarantee or guaranteed Coverage Acceptance Testing (CATP) as a part of this firm proposal.
- During the implementation of the new DBR M12 trunked repeaters, Motorola Solutions will ensure that a given site does not exceed its currently licensed ERP.
- Approved frequency licensing and coordination is assumed. The customer is responsible for updates to the current FCC license
 - Motorola Solutions can assist with planning and coordination of frequency licensing.
- Motorola Solutions will take inventory and recycle any G-series radio equipment.
 - Any remaining networking equipment not supported on the new ASTRO release will be recycled.



- Networking equipment supported for operation can be retained as spares.
- This proposal assumes METRO Nashville approval for the addition of the Dynamic Transcoding Server located at the METRO Compton Core Site.
- Dynamic Transcoding functionality is included for the METRO Compton Core only. A second Dynamic Transcoding server would be required to support DSR operations at the DSR core in Williamson County.

RADIO MANAGEMENT

- No radio subscriber programming has been included in this proposal.
- Each radio will require a one time programming touch in order to add the subscriber unit to the Radio Management deployment.
- Subscriber radio units desired to utilize programming over WIFI are assumed to have the required options and features in the radio.
 - No flashcode upgrades have been provided.
- This proposal assumes one central programming location for the On Premise Radio Management deployment.
- This proposal assumes Mt. Juliet has networking capacity to support the proposed equipment to be located at Mt. Juliet dispatch center.
- To enable device discovery and programming, the local network hosting the Device Programmer and Wi-Fi router needs to support the following
 - IGMP supported in Network Router (device discovery)
 - Multicast DNS via UDP Port 5353 (device discovery)
 - HTTP/TCP Port 8443 allowed (listening for jobs from server)
 - DP and radios on the same subnet (device programming).
- Radio Management Port Requirements - Radio Management uses various TCP and UDP ports to communicate between components and sometimes to configure devices. The following table describes the ports that Radio Management uses and the conditions under which the ports must be opened in the corporate or computer firewall.
 - NOTICE: As port 443 is now the default port setting, port conflicts can occur when RM system components are deployed on a computer running other services concurrently.
 - See TCP and UDP Ports for Radio Management Table Below:



RM Component	Protocol and Ports	Firewall Settings	Comments
RM Server	TCP: 8675, 3416, 443	Open in the corporate firewall and the RM Server.	Required for Radio Management to work in a distributed environment. If only HTTPS is used, then the only open port required is 443.
	TCP: 49202, 49205-49210, 50003, 51020 – 51030, 65534	Open in the corporate firewall and the RM Server.	RM uses port selection to communicate through any of these TCP ports. Can be changed in the Settings of the RM Server Utility.
Presence Notifier (PN)	TCP:3000 for clear, 50000 for secure	Open in the corporate firewall and computer in which a DP configured for OTAP is installed	Can be changed in the Settings of the RM Device Monitor Utility.
DP Wireless programming (DNS-SD)	UDP: 5353	Open in the corporate firewall in which a DP configured for wireless programming is installed	Multicast must be enabled on the network using wireless programming
DP IP Programming	TCP: 50000 - 50100	Open in the corporate firewall and computers in which a DP for IP Programming is installed	Can be changed in the Settings of the RM Device Monitor Utility.
RM Client	TCP: 80, 443	Open in the corporate firewall and RM client computer	Cannot be changed. Only needed when licensing features in the RM Client.



Implementation Statement of Work

Overview

This Statement of Work (SOW) describes the deliverables to be furnished to the City of Mt. Juliet. The tasks described herein will be performed by Motorola Solutions, its subcontractors, and City of Mt. Juliet 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 Motorola Solutions and City of Mt. Juliet during the project implementation. Specifically, this SOW provides:

- A description of the responsibilities for Motorola Solutions and the City of Mt. Juliet.
- A preliminary implementation timeline.
- The assumptions taken into consideration during the development of this project.

This SOW provides the most current understanding of the work required by all parties to ensure a successful project implementation. In particular, Motorola Solutions 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, and any other change orders that may occur during the execution of the project.

Responsibility Matrix

Motorola will use a phased approach for successfully implementing the City of Mt. Juliet's system.

These phases are broken down by:

- Project Initiation
- System Installation
- System Optimization And Testing

Tasks	Motorola Solutions	City of Mt. Juliet
PROJECT INITIATION		
Contract Finalization and Team Creation		



Tasks	Motorola Solutions	City of Mt. Juliet
Execute contract and distribute contract documents.	X	X
Assign resources.	X	X
Schedule project kickoff meeting.	X	X
Deliverable: Signed contract, defined project team, and scheduled project kickoff meeting.		
Project Administration		
Ensure that project team members attend all meetings relevant to their role on the project.	X	X
Set up the project in the Motorola Solutions information system.	X	
Record and distribute project status meeting minutes.	X	
Maintain responsibility for third-party services contracted by Motorola Solutions.	X	
Complete assigned project tasks according to the project schedule.	X	X
Submit project milestone completion documents.	X	
Upon completion of tasks, approve project milestone completion documents within 7 to 10 business days.		X
Conduct all project work Monday thru Friday, 8 a.m. to 5:00 p.m. local time with the exception of Motorola Solutions' and the City of Mt. Juliet's holidays.	X	
Deliverable: Completed and approved project milestones throughout the project.		
Project Kickoff		
Introduce team, review roles, and decision authority.	X	X
Present project scope and objectives.	X	
Review SOW responsibilities and project schedule.	X	X
Schedule Design Review. City of Mt. Juliet Design Review will take place within 14 days of contract execution.	X	X
Deliverable: Completed project kickoff and scheduled Design Review.		
Design Review		



Tasks	Motorola Solutions	City of Mt. Juliet
Review the City of Mt. Juliet's operational requirements.	X	X
Present the system design and operational requirements for the solution.	X	
Present the preliminary installation plan.	X	
Present preliminary cutover plan and methods to document final cutover process.	X	
Present configuration and details of sites required by system design.	X	
Validate that City of Mt. Juliet sites can accommodate proposed equipment.		X
Provide all approvals required to add the proposed equipment at the proposed sites		X
Review safety, security, and site access procedures.	X	
Present equipment layout plans and system design drawings.	X	
Provide backhaul performance specifications and demarcation points.	X	
Provide heat load and power requirements for new equipment.	X	
Provide information on existing system interfaces.		X
Provide frequency and radio information for each site.		X
Assume liability and responsibility for providing all information necessary for complete installation.		X
Assume responsibility for issues outside of Motorola Solutions' control.		X
Complete the required forms required for frequency coordination and licensing.	X	
Ensure that frequency availability and licensing meet project requirements, and pay licensing and frequency coordination fees.		X
Review and update design documents, including System Description, Statement of Work, Project Schedule, and Acceptance Test Plan, based on Design Review agreements.	X	
Provide minimum acceptable performance specifications for the City of Mt. Juliet provided hardware, software, LAN, WAN, and internet connectivity.	X	
Execute Change Order in accordance with all material changes to the Contract	X	



Tasks	Motorola Solutions	City of Mt. Juliet
resulting from the Design Review.		
Deliverable: Finalized design documentation based upon “frozen” design, along with any relevant Change Order documentation.		
SYSTEM INSTALLATION		
Equipment Order and Manufacturing		
Create equipment order and reconcile to contract.	X	
Manufacture Motorola Solutions-provided equipment necessary for the system based on equipment order.	X	
Procure non-Motorola Solutions equipment necessary for the system.	X	
Deliverable: Equipment procured and ready for shipment.		
Equipment Shipment and Storage		
Provide a secure, temperature-controlled location for solution equipment.	X	
Pack and ship solution equipment to the identified, or site locations.	X	
Receive solution equipment.	X	
Inventory solution equipment.	X	
Deliverable: Solution equipment received and ready for installation		
Virtualized Prime Site Installation and Configuration		
Install fixed equipment contained in the equipment list and system description.	X	
Provide backhaul connectivity and associated equipment for all sites to meet latency, jitter, and capacity requirements. These may include dedicated phone circuits, microwave links, or other types of connectivity.		X
Provision and wiring of additional AC circuits/feeds/breakers/receptacles, and cover any upgrade of the amperage of the utility service into the proposed facility, where needed.		X
Install and terminate all network cables between site routers and network demarcation points, including microwave, leased lines, and Ethernet.	X	



Tasks	Motorola Solutions	City of Mt. Juliet
Configure the ASTRO 25 system to support the proposed equipment.	X	
Integrate the MC Edge equipment with the new equipment at the demarcation points defined in the design documents.	X	
Perform functionality test of the prime site as described in the FATP section.	X	
Document and provide test results.	X	
Review and approve test results.		X
Remove, transport, and dispose of outdated equipment.	X	
Deliverable: Prime site equipment installation completed.		
D-Series Remote Site Installation and Configuration		
Install fixed equipment contained in the equipment list and system description.	X	
Verify backhaul connectivity and associated equipment (such as MPLS) for all sites to meet latency, jitter, and capacity requirements. These may include dedicated phone circuits, microwave links, or other types of connectivity.	X	
Provision and wiring of additional AC circuits/feeds/breakers/receptacles, and cover any upgrade of the amperage of the utility service into the proposed facility, where needed.		X
Install and terminate all network cables between site routers and network demarcation points, including microwave, leased lines, and Ethernet.	X	
Prepare drawings showing the layout of new and existing equipment.	X	
Configure the ASTRO 25 system to support the new RF sites.	X	
Integrate the new RF equipment into the system to ensure proper operation.	X	
Integrate the MC Edge equipment with the existing punch block at the site.	X	
Perform functionality test of the RF site as described in the FATP section.	X	
Document and provide test results.	X	
Review and approve test results.		X
Transport and dispose of outdated equipment.		X



Tasks	Motorola Solutions	City of Mt. Juliet
Perform an antenna system performance assessment through sweeping the lines in their current installed configuration. Provide a written report on antenna sweeps.	X	
Perform improvements or modifications to antenna systems, as required by the MSI evaluation.		X
Perform Antenna and Transmission Line Sweep. Provide a written report on antenna sweeps.	X	
Deliverable: Remote site equipment installation completed.		
SYSTEM OPTIMIZATION AND TESTING		
R56 Site Audit		
Perform R56 site-installation quality-audits, verifying proper physical installation and operational configurations.	X	
Create site evaluation report to verify site meets or exceeds requirements, as defined in Motorola Solutions' R56 Standards and Guidelines for Communication Sites.	X	
Deliverable: R56 Standards and Guidelines for Communication Sites audits completed successfully.		
Solution Optimization		
Verify that all equipment is operating properly and that all electrical and signal levels are set accurately.	X	
Verify that all audio and data levels are at factory settings.	X	
Verify communication interfaces between devices for proper operation.	X	
Ensure that functionality meets manufacturers' specifications and complies with the final configuration established during design review or system staging.	X	
Reconfigure and optimize 3rd party equipment that is not part of the Motorola Solutions scope of work.		X
Deliverable: Completion of System Optimization.		
Functional Acceptance Testing		
Verify the operational functionality and features of the solution supplied by Motorola Solutions, as contracted.	X	



Tasks	Motorola Solutions	City of Mt. Juliet
Witness the functional testing.		X
Document all issues that arise during the acceptance tests.	X	
If any major task for the system as contractually described fails during the City of Mt. Juliet acceptance testing or beneficial use, repeat that particular task after Motorola Solutions determines that corrective action has been taken.	X	
Resolve any minor task failures before Final System Acceptance.	X	
Document the results of the acceptance tests and present for review.	X	
Review and approve final acceptance test results.		X
Resolve any minor task failures before Final System Acceptance.	X	
Deliverable: Completion of functional testing and approval by the City of Mt. Juliet.		
Cutover		
Finalize Cutover Plan.	X	X
Calibrate and tune existing mobile and portable radios to ensure good working order.		X
Provide Motorola Solutions with user radio information for input into the system database and activation, as required.		X
Provide programming of user radios and related services (i.e. template building, re-tuning, testing, and installations), as needed, during cutover period.	X	
Conduct a cutover meeting with relevant personnel to address both how to mitigate technical and communication problem impacts to the users during cutover and during the general operation of the system.	X	
Notify the personnel affected by the cutover of the date and time planned for the cutover.		X
Provide ongoing communication with users regarding the project and schedule.	X	X
Cutover users and ensure that user radios are operating on the system.		X
Resolve punch list items, documented during the Acceptance Testing phase, in order to meet all the criteria for final system acceptance.	X	



Tasks	Motorola Solutions	City of Mt. Juliet
Assist Motorola Solutions with resolution of identified punch list items by providing support, such as access to the sites, equipment and system, and approval of the resolved punch list items.		X
Deliverable: Migration to new system completed, and punch list items resolved.		
Finalize Documentation and System Acceptance		
Provide manufacturer's installation material, part list and other related material to the City of Mt. Juliet upon project completion.	X	
Provide an electronic as-built system. This will include the following: Site Block Diagrams. Site Floor Plans. Site Equipment Rack Configurations. Antenna Network Drawings for RF Sites (where applicable). ATP Test Checklists. Functional Acceptance Test Plan Test Sheets and Results. Equipment Inventory List. Console Programming Template (where applicable). Drawings will be delivered in Adobe PDF format.	X	
Receive and approve documentation.		X
Execute Final Project Acceptance.	X	X
Deliverable: All required documents are provided and approved. Final Project Acceptance.		

Assumptions

The following assumptions remain in need of review and verification as of the submission of this proposal. These assumptions affect the scope of responsibilities to ensure ancillary systems and facilities are fully



prepared to support the solution contained in this proposal. Motorola will work with the City of Mt. Juliet to determine the validity of these assumptions and determine the increased scope for which Motorola and/or City of Mt. Juliet is responsible. Should the City of Mt. Juliet prefer Motorola to assume responsibility for the increased scope, Motorola will prepare and submit to the City of Mt. Juliet a revised proposal or change order reflecting the revised scope, cost, and project implementation.

- A Performance Bond is not required.
- Union Labor is not required.
- Prevailing Wages are not required.
- All existing sites or equipment locations will have sufficient space available for the system described as required/specified by R56.
- All existing sites or equipment locations will have adequate electrical power in the proper phase and voltage, and site grounding to support the requirements of the system described.
 - a. Electrician services are not included.
- All existing towers will have adequate space and size to support the antenna network requirements of the system described.
 - a. Any tower upgrade requirements are the responsibility of the City of Mt. Juliet.
- Any site/location upgrades or modifications are the responsibility of the City of Mt. Juliet.
- All Communication Sites can be accessed with a 4 wheel drive vehicle. Anything beyond the use of a 4 wheel drive vehicle will require a change order to capture the additional cost.
- Interfacing to 3rd party equipment or applications is not a part of this proposal.
- Approved FCC licensing is the responsibility of the City of Mt. Juliet.
- 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 Mt. Juliet.
- Any required system interconnections not specifically outlined here will be provided by the City of Mt. Juliet. This may include dedicated phone circuits, microwave links, or other types of connectivity.
- Training is not ☒ included in this proposal.
- 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 the City of Mt. Juliet's system experience interference, Motorola Solutions can be contracted to investigate the source and recommend solutions to mitigate the issue.
- All sites are assumed to be land-accessible and no special transportation such as helicopter and the like is required to gain site access.
- Motorola Solutions will not perform any work on non-Motorola Solutions owned equipment.
- Subscriber Reprogramming Efforts are not part of the scope of work
- Any City of Mt. Juliet-owned equipment or site/location upgrades or modifications are the responsibility of the City of Mt. Juliet.
- Virtualized Prime Site Migration Assumptions:
 - a. Assumes the new VPrime site equipment will reuse the existing TRAK equipment.
 - b. The existing site has adequate electrical power in the proper phase and voltage, and the site



grounding is sufficient to support the system's requirements. If additional grounding or electrical work is necessary, a change order may be executed.

- i. Two (2) 20A outlets are required for the new Prime Site rack at each location.
 - ii. One (1) additional 15A outlet is required for the new backhaul switch at each location.
- c. No training is included.
- D-Series RF Site Migration Assumptions:
 - a. Assumes the new D-series RF site equipment will reuse the existing TRAK equipment.
 - b. Sufficient space exists at each trunking RF site to allow for the addition of the new D-Series P25 radio site rack(s) while the existing equipment continues operation. Lack of sufficient space will require a temporary shelter or temporary placement of equipment to accommodate the new radio equipment. This may increase the outage at the site during cutover.
 - c. All Communication Sites can be accessed with a 4-wheel drive vehicle. Anything beyond the use of a 4-wheel drive vehicle will require a change order to capture the additional cost.
 - d. Interfacing to 3rd party equipment or applications is not a part of this proposal.
 - e. No training is included.
 - f. No fleetmapping services are included in this proposal.
 - g. There is no coverage guarantee, nor any coverage measurements included in this proposal.

Field Acceptance Plan

Virtualized Prime Site Migrations - Field Acceptance Test Plan

Acceptance Test Plan

- The following tests will be conducted on the ASTRO 25 Virtual Prime Sites to demonstrate the functionality and performance:
- Failure of Prime Access Router or Site Link
- Primary VPS DSC 1 Failure
- Primary VPS DSC 2 Failure
- Intraprime Link Failure
- DSC 1 and DSC 2 Failure at the Primary VPS (With Geo-Prime Option)
- GPS Antenna Failure

Excluded Testing

- Component Level Testing: Each component of the system undergoes testing at the point of manufacture of that component. The FAT is concerned with testing overall system level functionality and performance and component level testing (e.g., measuring BTS receiver sensitivity) is not



replicated during the FAT.

- EMC Compliance: EMC regulatory compliance has been established at component level, and the FAT will not measure EMC behavior.
- Capacity or Loaded System Performance: Testing to ensure that the system meets its capacity and loaded system performance requirements is conducted during Motorola's product development process using specialized system loading and simulation tools. It is not replicated during an FAT.

D-Series RF Site Migrations - Field Acceptance Test Plan

Equipment Tested

- The following tests will be conducted on the ASTRO 25 D Series Base Station to demonstrate the functionality and performance:
- Loss of Network Connection of DBR MCPA
- Loss of Network Connection of DBR XCVR
- Loss of DBR MCPA
- Loss of DBR XCVR
- Single DSC Failure
- Output Power Verification - The output power will be measured at the top of the rack as a base line for the existing equipment. After installation and optimization, power will be measured at the top of the rack for DBR equipment to confirm equal or higher power.

Excluded Testing

- Component Level Testing: Each component of the system undergoes testing at the point of manufacture of that component. The FAT is concerned with testing overall system level functionality and performance and component level testing is not replicated during the FAT.
- EMC Compliance: EMC regulatory compliance has been established at component level, and the FAT will not measure EMC behavior.
- Coverage Acceptance Testing is excluded. Upon request from the City of Mt. Juliet, Motorola can provide a quote for Coverage Acceptance Testing based on the scope of testing (type of test, service area, testing criteria etc.) desired.
- Capacity or Loaded System Performance: Testing to ensure that the system meets its capacity and loaded system performance requirements is conducted during Motorola's product development process using specialized system loading and simulation tools. It is not replicated during an FAT.



Preliminary Project Schedule

Motorola's preliminary schedule indicates total project implementation to be approximately 12 months pending supply chain availability at time of purchase. This preliminary schedule is included for informational purposes only and assumes that all responsibilities as defined above are completed, as required. If site improvements or site approvals are needed these must be completed prior to equipment shipping to the field.



Civil Statement of Work

Overview

Motorola Solutions offers a tailored site development solution for the Mt. Juliet's project, which includes a high-level summary of civil scope, proposed architectural and engineering services, and a site development scope of work for each site proposed.

Civil Scope High Level Summary

Site Name	Mundy	York SC
Site Acquisition	Customer Responsibility	Customer Responsibility
A&E, Drawings, Regulatory	Included	Included
Permitting	Cost Plus 10%	Cost Plus 10%
Zoning	Not Included	Not Included
Existing or New Tower Type/Height	Existing	Existing
Existing or New Shelter Type/Size	Existing	Existing
Existing or New Fuel Tank Type/Size	Existing	Existing
Existing or New Generator Type/Size	Existing	Existing
RF Antenna Installation	2 Stick, 1 TTA	2 Stick, 1 TTA



Proposed A/E (Civil Design) Services

A/E Scope Proposed	Mundy	York SC
Site design visit to collect pertinent information from the sites	X	X
Prepare record drawings of the site showing the as-built information	X	X
Conduct Limited NEPA compliance/FCC checklist	X	X
Structural Analysis	X	X



Mundy



Site Information					
Ground Elevation (Ft./M.)	Latitude	Longitude	Site Owner	EXISTING Tower Ht. (Ft.)	EXISTING Tower Type
468 M	36 10 29.3 N	86 28 26.1 W	City Owned	245 ft	Self-supported Tower
Site Improvements					
Access Road			Compound/ Expansion Size		
Width (Ft.)	Length (Ft.)	Clearing Type	Width (Ft.)	Length (Ft.)	Clearing Type
N/A	N/A	N/A	N/A	N/A	N/A
Ice Bridge	EXISTING Shelter			Fuel Tank	
Length (Ft.)	Type	Width (Ft.)	Length (Ft.)	Gal.	Type
N/A	N/A	N/A	N/A	N/A	N/A
Generator		Electrical Circuits			
Transfer Switch	Type	Amps/Volts	Type	Cable (Ft.)	
N/A	N/A	N/A	N/A	N/A	
Antenna: RF		Antenna: TTA			MW Dish:
2 Stick,		1			N/A
RF Lines (Linear Ft.)					
1/2-inch	7/8-inch	1-1/4-inch	1-5/8-inch	EW63	
295	295	275	N/A	N/A	

York SC



Site Information					
Ground Elevation (Ft./M.)	Latitude	Longitude	Site Owner	EXISTING Tower Ht. (Ft.)	EXISTING Tower Type
466 M	3614 39.5 N	86 29 56.8 W	Power Company	180 ft	Self-supported Tower
Site Improvements					
Access Road			Compound/ Expansion Size		
Width (Ft.)	Length (Ft.)	Clearing Type	Width (Ft.)	Length (Ft.)	Clearing Type
N/A	N/A	N/A	N/A	N/A	N/A
Ice Bridge	EXISTING Shelter			Fuel Tank	
Length (Ft.)	Type	Width (Ft.)	Length (Ft.)	Gal.	Type
N/A	N/A	N/A	N/A	N/A	N/A
Generator		Electrical Circuits			
Transfer Switch	Type	Amps/Volts	Type	Cable (Ft.)	
N/A	N/A	N/A	N/A	N/A	
Antenna: RF		Antenna: TTA			MW Dish:
2 Stick,		1			N/A
RF Lines (Linear Ft.)					
1/2-inch	7/8-inch	1-1/4-inch	1-5/8-inch	EW63	
230	230	210	N/A	N/A	

General Customer Responsibilities

Provide personnel to observe construction progress and testing of site equipment according to the schedule provided by Motorola.

As applicable (based on local jurisdictional authority), the Customer will be responsible for any installation or up-grades of the electrical system in order to comply with NFPA 70, Article 708

As required, provide property deed or lease agreement, and boundary survey, along with existing as-built drawings of the site and site components to Motorola for conducting site engineering.

SITE ACQUISITION

Provide property deed or lease agreement, and boundary survey, along with existing as-built drawings of the site and site components to Motorola for conducting site engineering.

Provide a right of entry letter from the site owner for Motorola to conduct field investigations.

Maintain existing access road in order to provide clear and stable entry to the site for heavy-duty construction vehicles, cement trucks and cranes. Sufficient space must be available at the site for these vehicles to maneuver under their own power, without assistance from other equipment.

EXISTING STRUCTURE RESPONSIBILITIES

Arrange for space on the structure for installation of new antennas at the proposed heights on designated existing antenna-mounting structures.



General Site Development Assumptions

No prevailing wage, certified payroll, mandatory union workers or mandatory minority workers are required for this work

All work is assumed to be done during normal business hours as dictated by time zone (Monday thru Friday, 7:30 a.m. to 5:00 p.m.).

All recurring and non-recurring utility costs [including, but not limited to, generator fuel (except first fill), electrical, Telco] will be borne by the Customer or site owner.

All utility installations shall be coordinated and paid for by the site owner and located at jointly agreed to location within or around the new communications shelter or equipment room.

The site will have adequate electrical service. Utility transformer, transformer upgrades, line, or pole extensions have not been included.

Pricing has been based on National codes such as IBC or BOCA. Local codes or jurisdictional requirements have not been considered in this proposal.

Hazardous materials are not present at the work location. Testing and removal of hazardous materials, found during site investigations, construction or equipment installation will be the responsibility of the customer.

A maximum of 30 days will be required for obtaining approved building permits from time of submission.

No access road or staging area improvements are required for the heavy construction equipment which could include concrete trucks, drill rigs, semi tractors and trailers, and cranes.

If extremely harsh or difficult weather conditions delay the site work for more than a week, Motorola will seek excusable delays rather than risk job site safety.



EXISTING TOWER ASSUMPTIONS

The existing ground system and soil resistivity at the site is sufficient to achieve resistance of 10 ohms or less. Communication site grounding will be designed and installed per Motorola's R56 standards.

The existing site has adequate room to expand and install the shelter, including lay-down and staging areas, without encroaching on wetlands, easements, setbacks, right-of-ways, or property lines.

AM detuning or electromagnetic emission studies will not be required.

Protective grating over microwave dishes or the communications shelter has not been included in this proposal.

Structural and foundation drawings of the antenna support structure will be made available to preclude the need for ultrasonic testing, geotechnical borings or mapping of existing tower structural members.

Lead paint testing of existing painted towers has not been included.

On the existing tower, the antenna locations for the proposed antenna system design will be available at the time of installation.

The new shelter can be located within 20 feet of the existing tower location and the generator/fuel tank can be located within 25 feet of the shelter.

Restoration of the site surroundings by fertilizing, seeding, and strawing the disturbed areas will be adequate.

The site has adequate utility service to support the proposed equipment loading. Utility transformer upgrades or step-up or down transformers will not be required.

Underground utilities are not present in the construction area and as such no relocation will be required.

The existing antenna support structure is structurally capable of supporting the new antenna, cables, and ancillary equipment proposed and will not need to be removed or rebuilt at the existing site. The tower or supporting structure meets all applicable EIA/TIA-222 structural, foundation, ice, wind, and twist and sway requirements. Motorola has not included any cost for structural or foundation upgrades to the antenna support structure.

The existing cable support facilities from the antenna to the cable entry port can be used for supporting the new antenna cables.



Structural analyses for towers or other structures that have not been performed by Motorola will relinquish Motorola from any responsibility for the analysis report contents and/or recommendation therein.

Foundations for the compound, shelter, generator and fuel tank are based on "normal soil" conditions as defined by TIA/EIA 222-F. Footings deeper than 30 inches, raised piers, rock coring, dewatering, hazardous material removal or wetland mitigation have not been included.

EXISTING EQUIPMENT ROOM ASSUMPTIONS

Alarming at existing sites will be limited to new component installations and will have to be discussed and agreed to on a site-by-site basis.

The site will have adequate room for installation of proposed equipment, based on applicable codes and Motorola's R56 standards.

The existing utility service and backup power facilities (UPS, generators) have sufficient extra capacity to support the proposed new equipment load.

A clear obstruction-free access exists from the antenna location to the equipment room.

The Customer does not desire an upgrade of the existing site to meet Motorola's R56 standards.

The floor can support the proposed new loading. Physical or structural improvements to the existing room will not be required.



Warranty Support and Sustainment Services

Included with the purchase of Motorola Solutions equipment is a standard one-year manufacturer's limited commercial warranty to correct possible defects in materials and workmanship. It covers only the equipment supplied by Motorola Solutions. Warranty services will include repair service during normal business hours, Monday through Friday, excluding holidays observed by Motorola Solutions.

Today's IP-based, software-driven communications systems provide our customers with robust features and advanced applications which can lead to increased productivity and operational efficiency. The integration of third party software applications and Commercial-Off-The-Shelf (COTS) equipment provide benefits and flexibility, yet they also affect how these systems are managed and sustained. Multiple technologies and multiple vendors must now be addressed in a sustainment plan. Information Assurance, security, and technology obsolescence strategies must be taken into account.

Motorola Solutions has invested heavily in developing the resources, tools, policies and programs necessary to fully support and sustain these highly complex systems. Our plans have been designed to address the unique challenges involved in the sustainment of these IP based, multi vendor/technologies. Motorola Solutions has a proven track record providing comprehensive and effective sustainment plans. Each service offering is managed by a Motorola Solutions Customer Service Manager (CSM) who provides an experienced interface between our customers and the organizations providing service.



Pricing Summary

EQUIPMENT AND SERVICES SUMMARY	
Equipment	\$2,721,889 .00
Systems Integration	\$983,490 .00
System Total List Price	\$3,705,379.00
System Discount	\$805,379 .00
SUMMARY TOTAL:	\$2,900,000 .00

Quote is valid for 60 days from the date of this proposal.

Due to significant market and tariff volatility, as well as fluctuations in the cost of energy and raw materials including, but not limited to, steel, copper, finished wood, and concrete, Motorola Solutions reserves the right to equitably adjust the contract price, completion schedule, and/or contract requirements. Additionally, Motorola Solutions reserves the right to apply a fuel surcharge to quoted freight rates based on the prevailing diesel cost at the time of shipment.



Payment Milestones

Except for a payment that is due on the Effective Date, Customer will make payments to Motorola within thirty (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. If Customer has purchased additional Professional or Subscription services, payment will be in accordance with the applicable addenda. Payment for the System purchase will be in accordance with the following milestones.

Milestone	Milestone Detail	Percentage
1	Completion of Contract Execution	25%
2	Shipment of Equipment	60%
3	Installation of Equipment at Customer Site	10%
4	Final Acceptance	5%

Motorola shall make partial shipments of equipment and will request payment upon shipment of such equipment. In addition, Motorola shall invoice for installations completed on a site-by-site basis or when professional services are completed, when applicable. The value of the equipment shipped/services performed will be determined by the value shipped/services performed as a percentage of the total milestone value. Unless otherwise specified, contract discounts are based upon all items proposed and overall system package. Overdue invoices will bear simple interest at the maximum allowable rate by state law.

Due to significant market and tariff volatility, as well as fluctuations in the cost of energy and raw materials including, but not limited to, steel, copper, finished wood, and concrete, Motorola Solutions reserves the right to equitably adjust the contract price, completion schedule, and/or contract requirements. Additionally, Motorola Solutions reserves the right to apply a fuel surcharge to quoted freight rates based on the prevailing diesel cost at the time of shipment.



Contractual Documentation

PRODUCTS AND SERVICES AGREEMENT		
This Products and Services Agreement (this "Agreement") is entered into between Motorola Solutions, Inc., ("Seller" or "Motorola") and the entity set forth in section I(b) ("Customer") as of the date last signed below ("Effective Date"). Seller and Customer will each be referred to herein as a "Party" and collectively as the "Parties".		
Seller and Customer Information		
(a)	Seller	Motorola Solutions Inc.
(b)	Customer	Name: City of Mt. Juliet, TN Address: 1019 Charlie Daniels Parkway Mt. Juliet, TN 37122 Contact: Director Adam Williams
Transaction Details		
(a)	Proposal	Proposal No. PS-000229432 Date: _____ Motorola will provide Customer with the products and services set forth in the proposal dated above (the "Proposal"), a copy of which is attached hereto and incorporated herein.
(b)	Pricing	Pricing for products and services being purchased by Customer is set forth in the Proposal. Customer affirms they have signatory authority to execute this contract. The contract price of \$2,900,000 is fully committed and identified, including all subsequent years of contracted services, if applicable. The Customer will pay all invoices as received from Motorola and any changes in scope will be subject to the change order process as described in this Agreement. Motorola acknowledges the Customer may require the issuance(s) of a purchase order or notice to proceed as part of the Customer's procurement process. However, Customer agrees that the issuance or non-issuance of a purchase order or notice to proceed does not preclude the Customer from its contractual obligations as defined in this Agreement.
(c)	Term and Conditions	The Parties acknowledge and agree that the terms of the Tennessee Statewide Contract No. 424 are incorporated herein and shall apply to the products and services provided to Customer as set forth in the Proposal.
Entire Agreement		
This Agreement, including the Proposal and any terms and conditions referenced herein, constitutes the entire agreement of the Parties regarding the subject matter of the Agreement and supersedes all previous agreements, proposals, and understandings, whether written or oral, relating to this subject matter. This Agreement may be executed in multiple counterparts, and shall have the same legal force and effect as if the Parties had executed it as a single document. The Parties may sign in writing, or by electronic signature, including by email. An electronic signature, or a facsimile copy or computer image, such as a PDF or tiff image, of a signature, shall be treated as and shall have the same effect as an original signature. In addition, an electronic signature, a true and correct facsimile copy or computer image of this Agreement shall be treated as and shall have the same effect as an		



original signed copy of this document. This Agreement may be amended or modified only by a written instrument signed by authorized representatives of both Parties. The preprinted terms and conditions found on any Customer purchase or purchase order, acknowledgment or other form will not be considered an amendment or modification of this Agreement, even if a representative of each Party signs that document, and the terms of this Agreement will take precedence.

CUSTOMER: City of Mt .Juliet, TN

Motorola Solutions, Inc

By:_____

By:_____

Print Name:_____

Print Name:_____

Title:_____

Title:_____

Date:_____

Date:_____

