1.0 SYSTEM INTEGRATION – STATEMENT OF WORK

1.1 STATEMENT OF WORK

This document, known as the SOW, describes the deliverables to be furnished to the Commonwealth of Virginia (the Commonwealth), and the tasks to be performed by Motorola, its subcontractors, and the Commonwealth to implement the Statewide Agencies Radio System (STARS).

This section incorporates any equipment and software specifications included as attachments. These attachments are technical product sheets, special narratives, printed brochures, or other documents that describe the form, fit, function, facility impact, power requirements, and interface requirements of all the equipment and software supplied by Motorola.

1.2 GENERAL REQUIREMENTS

Motorola will provide System Integration services to the Commonwealth for providing the infrastructure and subscriber equipment for the project as identified in this Contract. Motorola will perform the work and tasks required to design, manufacture, install, optimize, test, and integrate STARS. Motorola will provide the contractually required level of documentation and training, to support operation of STARS, to the Commonwealth. Motorola and the Commonwealth will each provide a dedicated Program Manager to act as the single point of contact for all administrative, technical, and scheduling issues. The Motorola Program Manager has the overall responsibility for providing the Motorola deliverables required for the implementation of STARS and management of the STARS project schedule. The Commonwealth Program Director has the overall responsibility for ensuring that all Commonwealth responsibilities and tasks are completed per the Contract schedule. Motorola will establish and maintain a project office in the Richmond, Virginia area within 20 miles of SPHQ to support the implementation team throughout the project’s duration. Motorola is responsible for providing the appropriate level of project staffing to support the implementation of STARS.

1.2.1 Motorola’s Program Manager

The Motorola Program Manager has complete responsibility for the successful implementation of Motorola’s contractual obligations. This individual is fully responsible for the compliant execution of the Contract, and has due authority and responsibility over all resources required for such execution. This individual will provide status reports, coordinate and attend internal and external meetings; request, gather, and format reports from subordinates, and present status reports and information to the Commonwealth. The Program Manager will create work teams.
and provide high-level direction. The Program Manager will track the progress of the project and take proactive measures to ensure that the project proceeds as planned. If changes to the project scope or deliverables are required or requested, the Program Manager will provide the required Contract changes to the STARS Project Manager. The Program Manager will develop statements of work for subcontractors that result in subcontracts. The Program Manager will also track the subcontractors' progress. The Program Manager will work with the Commonwealth's Program Director to ensure that the requirements and needs of the Commonwealth are being delivered and fulfilled. The Program Manager will assure the Commonwealth's acceptance and commission the system for use while at all times ensuring the Commonwealth's satisfaction in all aspects of the project.

1.2.2 Motorola Contract Administrator

The Contract Administrator advises the Motorola Program Manager in all matters pertaining to the Contract. Specific duties include: 1) Meeting with appropriate Commonwealth personnel regarding routine Contract matters, 2) managing Contract change orders by the Commonwealth’s Procurement and Contracting Officer, 3) meeting bimonthly with the Motorola Program Manager and key project personnel to review Contract compliance, 4) review correspondence with the Commonwealth regarding contractually related issues, and 5) review all Motorola subcontracts for proper pass-through clauses and terms.

1.2.3 Motorola Finance Manager

The Finance Manager is responsible for all financial issues related to the project. Specifically, these duties include: 1) review and management of the financial aspects of the Contract to ensure compliance, 2) review and approval of all factory orders to ensure correct pricing, 3) management of the project accounting system, i.e., a cost forecasting, revenue recognition, and financial performance report, 4) accompany the Motorola Director of Technical Services at any meetings with the Commonwealth of Virginia regarding financial matters, 5) administer billings through invoices to the Commonwealth of Virginia STARS Program Director, 6) administer payments to subcontractors for work performed, and 7) report the financial status of the project to senior Motorola management.
1.2.4 Motorola Service Coordinator

The Service Coordinator reports directly to the Motorola Program Manager and is responsible for the coordination of service repair during the system implementation and warranty period. The Service Coordinator will also manage the warranty operation during the first year of the active system and supports ongoing STARS operations thereafter. The Service Coordinator coordinates closely with: 1) the Motorola Service Centers in the Commonwealth to roll out the statewide maintenance plan, 2) the Commonwealth’s Program Management Team to add more detail to the service support plan and problem handling procedures in the Warranty Service Section after the system is commissioned, and 3) the Motorola Installation Manager to repair or replace equipment that may be damaged during transit or installation.

1.2.5 Motorola Director of Technical Services

The Motorola Director of Technical Services has complete responsibility for the successful direction of Motorola’s technical staff and their subcontractors. This staff includes:

- Sr. Project Manager
- Sr. Systems Engineer
- Asset Management/Inventory Control Personnel
- Network Engineering
- Documentation/Drafting
- Systems Technologists

This position reports directly to the Motorola Program Manager and is responsible for the technical integrity for the entire network and for ensuring the system, as designed installed and optimized, meets the detailed functional and technical requirements of the Contract. This individual has the authority to add, or replace any technical staffing resources, which may be necessary during the staging, installation, optimization, quality assurance and acceptance testing phases of this project. The Director, in conjunction with the Program Manager will keep the Commonwealth Program Director and senior Motorola management apprised of all technical aspects of the project.
1.3 SCOPE

STARS includes the following:

- An Integrated Voice and Data Statewide Land Mobile Radio (LMR) communication network
  - Interoperability subsystems
- A Mobile Data communication network
  - Premier Mobile Data Computing (and PRC CAD API Support)
  - Automated Vehicle Location and Graphic Geofile Manager with Advanced Tactical Mapping (ATM)
  - Separate Future 700 MHz mobile data network
- An Intranet and Wireless Local Area Network (WLAN)*
  - Wide Area Data Network (WAN)
  - Integration Framework
  - Air Mobile
- Microwave Telecommunication Network (MTS)
  - System alarm and control network
- VSP Communications Centers upgrades
- Two Zone Control Centers
- Network Operation Center
- Migration of Users from existing Networks to STARS

Motorola will develop the transmitter sites, which will include upgraded and/or new towers, shelters, grounding systems, and power systems, required to support the STARS. It will also include the development of the Zone 1 Master Site, upgrading or development of the seven (7) VSP Division Headquarters (including the Zone 2 Master Site located at Division 6).

*Note: The 700 MHz data network, Intranet and WLAN are planned Future System Enhancements, described in Section 16.

1.4 MOTOROLA STATUS REPORTS

The Motorola Program Manager or designee will be responsible for delivering status reports to the Commonwealth’s Program Director. These reports will be provided on an agreed monthly basis. These status reports will include the following information:

Overall project status compared to scheduled events
- Tasks completed over the last 30 days
- Statement of problem areas that have been resolved and action taken to affect resolution
- Tasks scheduled to be completed over the next 30 days
- Statement of potential problem areas that could hinder the progress of the project
- Updated schedule to be provided when changes occur and not less than monthly
• Deliverable status
  • Deliverables provided over the last 30 day
  • Statement of problem areas that have been resolved and action taken to affect resolution
  • Deliverables scheduled to be provided over the next 30 days
  • Statement of potential problem areas that could hinder the progress of the project
• Change order status/issues
  • Change Orders completed over the last 30 days
  • Statement of problem areas that have been resolved and action taken to affect resolution
  • Change Orders forecasted over the next 30 days
  • Statement of potential problem areas that could hinder the progress of the project
• Implementation issues
• Operational issues
• Maintenance issues
• Detailed description of work provided
• Action Item List
  • Action Items completed over the last 30 days
  • Statement of problem areas that have been resolved and action taken to affect the resolution
  • Action Items scheduled to be completed over the next 30 days
  • Statement of potential problem areas that could hinder the progress of the project

1.5 CONTRACT STATUS MEETINGS

The Motorola Program Manager will host status meetings in their Richmond area office. These meetings will take place monthly. Motorola will record the meeting minutes and supply this information to the Commonwealth’s Program Director within five working days. The general agenda will include those items reflected on the monthly status report and such other matters as may be placed on the agenda by either party with at least two days written notice.

1.5.1 Project Subsystem Meetings

It is expected that subsystem (civil work, subscriber installations, microwave, fleetmapping, AVL etc…) meetings will take place every two weeks, and weekly during critical stages of the subsystem. Motorola will record the meeting minutes and supply this information to the Commonwealth Program Director within three working days. The general agenda will include:
  • Overall progress of the subsystem
  • Descriptions of major efforts
  • Roadblocks
  • Accomplishments

All meeting notes and reports are assumed to be accepted if not refuted within 10 days of receipt.
1.6 PROJECT SCHEDULE

The project Gantt chart enclosed in the Contract identifies the projected timeline and responsibilities for completing the required tasks to successfully implement STARS. All days referenced are working days. This schedule will be updated, to include all task associated with the STARS implementation, and mutually agreed upon between the parties within thirty (30) days of the project kickoff meeting. The Motorola schedule will be provided monthly in Microsoft Project or an agreed upon electronic format with the Status Report to the STARS Project Manager.

The Project Schedule is contingent upon the following assumptions:

- Contract start date of 7/1/04
- Design and construction of transmitter sites is a continuous effort
- (10) days for customer reviews and approval of routine site design documents (Extensions will be discussed during project meetings and approved by the STARS PD and Motorola Project Manager.)
- Design and implementation of microwave system is a continuous effort
- Design reviews are completed on schedule
- VHF, 700 MHz, 800 MHz, and microwave frequencies are acquired, coordinated, and licensed in time to support initial ordering of equipment
- The Commonwealth has adequate personnel to complete its responsibilities per the project schedule
- The Commonwealth provides boundary surveys and facility documents for Division 1 implementation 30 days after Contract award
- No delays for site acquisition or approvals from state property owners/managers
- The Commonwealth is exempt from zoning – and no delays are encountered based on zoning issues
- No extreme weather conditions or other uncontrollable delays
- No relocation and/or removals of existing equipment and facilities (towers, shelters, etc.) except as specified in this Contract Subscriber installations begin upon successful completion of functional and coverage ATPs, documentation to follow regarding the installation prototypes
- Refer to Contract Terms and Conditions for Project Delays
1.7 PROJECT CHANGE ORDERS

Either the Commonwealth Program Director or Motorola Program Manager may request formal changes to the Contract by identifying the actual change requested, the reason for the request, and the associated date of the request. Both parties will review the requested change order and any revisions to the change request will be negotiated. The change order will record any monetary, scheduling, or contractual changes that are required. The official change order will provide new SOW insert pages that include the revisions. The following information will be recorded in each change order:

CHANGE REQUEST #
DATE
REQUESTORSECTION
PARAGRAPH
PAGE
REASON FOR CHANGE
CHANGE TO BE IMPLEMENTED
MONETARY IMPACT
IMPACT ON SCHEDULE
IMPACT ON CONTRACT
DRAWINGS EFFECTED

1.8 SAFETY

Motorola will comply with all applicable safety requirements as adopted by the Safety Codes Commission of the Commonwealth and as issued by the Department of Labor and Industry under Title 40.1 of the Code of Commonwealth, and all national safety codes. Motorola will have a Project Manager, foreman, superintendent, or team leader on the job site at all times when work is being performed.

1.9 STANDARDS (EIA, FCC, ETC.)

Motorola will comply with all applicable standards such as Electronics Industries Association (EIA) and Federal Communications Commission (FCC) standards and regulations in effect at the time of Contract. Motorola will adopt if requested by the Commonwealth any newer regulations or standards through the change order process. Motorola will comply with all OSHA recommendations while working on the STARS project.
1.10 STANDARDS AND GUIDELINES FOR COMMUNICATION SITES (R56)

Motorola will utilize Motorola’s R56 Standards and Guidelines for Communication Sites as a minimum requirement for site development and equipment installations. This scope of work will amend the standard grounding requirements identified in Motorola’s R56 document by replacing the #2 copper ground leads with 2/0 copper ground leads and by replacing the requirement for use of 8’ ground rods with 3/4 inch diameter 10’ ground rods. All other R56 requirements continue to be applicable unless superseded by local or national standards and requirements. “All references in the Contract to Motorola’s R56 Standards and Guidelines will include these amended requirements.”

Motorola will provide an R56 audit for locations where the Commonwealth is responsible for providing the facilities to support equipment installations. The Commonwealth will be responsible for bringing those facilities into R56 compliance. Motorola will accept each such facility prior to installation of equipment.

1.11 PERMITS, LICENSES, FAA REQUIREMENTS

Motorola will be responsible for obtaining and/or assisting the Commonwealth in acquiring the necessary permits, licenses, fees, and approvals associated with the construction of the new buildings and towers. If Motorola identifies any environmental and/or hazardous material issues, Motorola will stop work immediately and notify the Commonwealth Program Director. The Commonwealth will be responsible for resolving any environmental and/or hazardous material issues. The Commonwealth may request Motorola to be responsible for resolving the environmental and/or hazardous material issue through the change order process. Motorola will assist the Commonwealth in the preparation of any associated license applications or extensions.

1.12 CONTRACT DESIGN REVIEW

After the Contract award, Motorola will hold a Contract Design Review (CDR) of STARS deliverables. The goal of the CDR process is to verify and finalize the overall system design and deliverables. The CDR process will include a review of the STARS functional system overview, subscriber equipment, network architectural requirements, and construction requirements. This meeting is intended to restate and review the baseline Contract deliverables.

Suggested Preliminary Agenda:

A. TECHNICAL
   1. Technical Description of IV&D System Configuration
   2. IV&D System Operation Description
   3. Subscriber Radio Descriptions
4. Microwave Infrastructure Descriptions
   • Microwave frequency search progress
   • Onsite microwave path surveys progress
   • Tower design review progress
   • Detailed microwave equipment list with model numbers

5. Alarm System (MOSCAD) Description
6. Network Manager Description
7. Control Configuration (Consoles, Control Stations, etc.)
8. Failure Modes Descriptions
9. Testing/Acceptance Overview
10. ATPs and design documents not provided previously in Contract documents:
    Aircraft Radio Function
    • Instant Recall Recorder
    • Locality Network Interfaces (generic plan or process)
    • Agency Network Interfaces (generic plan or process)
    • Logging Recorder Functionality
    • Legacy System Function on STARS (generic plan or process)
    • Local and Remote Backup Control Stations
    • Microwave Factory ATP

B. INTERFACES
1. Microwave Radio System
   • Interface between new and legacy microwave systems (generic process)
2. Microwave Radio and Land Mobile Radio Networks - Telco/PABX
3. Power - Physical Facilities - Radio System - UPS - Generators
4. Console
5. CAD
6. IFLOWS
7. Localities and Agencies
8. Legacy radio systems (generic process)
9. Mobile Data Generic Documents

C. FLEET MAPPING/TALK GROUPS

D. SCHEDULE REVIEW

E. LICENSING STATUS/FREQUENCY PLANNING
1. Draft Frequency Plan
F. SITE STATUS
   1. Site Development
   2. Floor Plans
   3. UPS
   4. Antenna Combining
   5. RF Design
   6. Electrical Layout

G. TRAINING, CUTOVER, AND MIGRATION
   1. Microwave and LMR Networks migration at existing towers (generic process).
   2. A preliminary cutover plan will be provided to the Commonwealth prior to the Contract Design Review.
   3. Legacy Mobile Data Users (generic process)

H. COMMUNICATIONS CENTER INTEGRATION
I. GENERAL Q&A

Other tasks, such as developing talk groups, developing programming templates for the subscribers and consoles, IP addressing, site designs, finalizing the migration/cutover plan, etc., will be conducted either in parallel with this meeting or after completion of the CDR process. Upon completion of the CDR, the Commonwealth will provide authorization for ordering the equipment and software. The sequence of implementation tasks and a highlighted project schedule will also be completed during the CDR.

1.13 MICROWAVE PATH STUDIES AND SURVEYS

Motorola and its preferred microwave supplier have performed paper studies to predict the path performance for the Microwave Telecommunication subsystem. Motorola will conduct physical site and path surveys to verify the performance capability of each recommended microwave path. The results of these path surveys will be reviewed by Motorola to determine if the proposed paths will meet the specification requirements and if any alternative path solutions are required. The results will then be provided to the Commonwealth for review. Any resulting changes to the overall system design, schedule, and associated costs for the Microwave Telecommunication Network, and/or impact to microwave antenna and tower heights will be addressed, and both Motorola and the Commonwealth will work toward an equitable resolution to address any required changes.
1.14 FREQUENCY PLANNING

Motorola will provide initial system design work, which will include professional services to develop a frequency plan for all of the STARS wireless networks within this Contract. This includes the Land Mobile Radio Integrated Voice and Mobile Data Network (IV&D), microwave network, and 700 MHz wireless/mobile data networks. The frequency-planning effort for the LMR network includes the identification of additional channels from the existing pools for any given transmitter site, as well as specialized subscriber components such as: 700/800 MHz Vehicular Repeater System; 700/800 MHz, VHF, and microwave transportable sites; subscriber communications outside the infrastructure (tactical channels), and tunnels.

Frequency searches and associated paper-study predictions will be performed in the following areas to determine the best frequency-reuse strategy and allocate which specific frequency pairs are to be used at designated tower, vehicle, and transportable sites. Motorola will seek additional spectrum (all bands being used) as available/required and prepare the necessary documentation to license the radio frequencies. Spectrum utilized for locality and agency interfaces, legacy radio systems, and other co-located transmitters such as commercial wireless services will also be considered.

Additional considerations are:

- Environmental noise and terrain influences
- Co-channel frequencies (including LMR licensees and coordinated applicants, in any radio service, within 70 miles of Virginia land areas or navigable waterways, as well as any plan-proposed use)
- Adjacent-channel frequencies (including LMR licensees and coordinated applicants, in any radio service, within 35 miles of Virginia land areas or navigable waterways, as well as any plan-proposed use)
- Transmitter noise and receiver desensitization (desense)
- Intermodulation
- Electromagnetic Compatibility
  - Spurious, image responses
  - Harmonic relationships

Spectrum utilized for locality and agency interfaces, legacy radio systems, and other co-located transmitters such as commercial wireless services will also be considered.

The output of the above analysis will be a first draft frequency plan. Motorola will provide a viable draft frequency plan, based upon the system design as detailed in this Contract, with enough technical analysis to allow a detailed review by the Commonwealth. The plan will also be in accordance with the Spectrum Contract with Motorola. The Commonwealth will provide comments to Motorola on the draft frequency plan.
Upon completion of the initial assignment of frequency pairings by channel by tower site, each available tower site will be monitored with appropriate equipment, including spectrum analyzers to establish an in-field baseline measurement of fixed and mobile transmit or receive frequencies for each of the following items:

- Peak and Average Environmental noise floor within each potential range of frequencies (i.e. evaluate each band or sub-band)
- Co-channel interference
- Adjacent channel interference
- Transmitter noise (which would cause receiver desense)
- Intermodulation interference

The information gathered from these in-field RF baseline measurements will be documented and utilized to determine the usability of frequency combinations at the sites. All data will be provided in raw and analyzed form, with date, time, and level information for recorded/measured interference. This in turn will determine whether substitutions or other adjustments are needed to revise the draft frequency plan. The output will be the second draft detailed frequency plan, including frequency coordination requirements, National Radio Astronomy Observatory (NRAO) limitations, maximum permissible exposure (MPE) levels, and any other technical details or parameters required to complete any necessary FCC license applications or license modifications and ensure compliance with FCC regulations. Motorola will provide a viable revised draft frequency plan, consistent with the system design as detailed in this Contract, with enough technical analysis to allow a detailed review by the Commonwealth. The Commonwealth will provide comments to Motorola on the second draft frequency plan. Motorola will also provide revisions of its coverage and grade of service performance guarantees for the Commonwealth’s concurrence and provide justification for each change.

The third draft frequency plan will be based upon the actual radio frequency authorizations received. Identifications of the localities that should be invited to join STARS will be developed and prioritized by Motorola and reviewed by the Commonwealth. This effort will only be used to enhance the existing viable frequency plan and to mitigate potential interference. The Commonwealth will then contact the localities and determine which ones will be partnering/joining STARS. Motorola will provide an impact analysis to include adding a locality/agency to STARS and to include those bringing spectrum, those voiding interference spectrum, or those wishing to join the system without spectrum. Based upon the Commonwealth’s determination of which new users will be joining STARS, Motorola will verify if the original guaranteed Grades of Service are maintained or may draft revisions for the Commonwealth’s concurrence and provide justification for each recommended change. The final channel plan, supporting documentation, and field measurements will be provided to the Commonwealth for review.

If due to errors or omissions in the frequency plan interference is encountered by or caused by the implementation of STARS in accordance with the plan, Motorola will revise and implement the frequency plan to meet STARS performance guarantees, contractual agreements, and also mitigate impacts to adversely affected parties to the greatest extent possible.
1.15 TALK GROUP (FLEET MAP) DEVELOPMENT

The Statewide Agencies Radio System (STARS) will facilitate the communications of 20 participating state agencies, localities, and the federal government by upgrading the existing Virginia State Police land mobile and microwave radio networks. STARS will create an integrated, seamless, statewide, wireless voice and data communications system designed to meet the needs of these agencies. The system will be shared by agencies engaged in public safety, protection, and service; and will facilitate interoperability with localities at the county and city level and with the federal government.

Initial system design work will include engineering services that will lead to the development of the user Land Mobile Radio fleet map for the STARS communications system. This work will result in an initial integrated fleet map for the first responders Land Mobile Radio subscriber users and dispatch console operators and a first pass of a total twenty (20) agency fleet map. Motorola will create up to five (5) programming templates per type of radio model, per agency with the exception of VSP which will receive seven (7) templates. Agency allotments that are not used can be used by another agency. For control stations, Motorola will provide one unique programming template for each individual control station location. It is anticipated that there will be changes made to the programming template after implementation of Division 1; therefore, one additional programming is included in this Contract. Any changes requested by the Commonwealth after this programming is completed will require a change order for additional time and labor.

Motorola will provide fleetmapping engineering services enabling the STARS radio system tailored to the participating agencies’ operational needs to provide efficient and effective communications. Fleet mapping is the process of translating the participating STARS agencies’ operational requirements into a list of features and criteria used by the communications system. The resulting document, called the STARS Land Mobile Radio Fleetmap, will be the product of identifying and formalizing this information for the users.

The completed STARS needs analysis will be the first step to successfully designing the STARS Fleetmap. This will help guide the system design to fit the STARS radio user needs. Motorola will request direct participation in this process from representatives from each of the STARS using agencies, under the coordination and supervision of the STARS Project Manager. Motorola will work with the STARS Project Manager to develop a description of the participating agencies’ organizational structure and user groups on existing channels.
Motorola will provide the following fleetmapping engineering services to develop the actual STARS subscriber radio and console fleetmap structure. The overall 10-step process to accomplish this will be as follows:

Step 1: Document System Technical Information  
Step 2: Document System Operation Information  
Step 3: Develop Fleetmaps of STARS Participating Agencies  
Step 4: Create Fleetmap Structure  
Step 5: Develop System Partitioning  
Step 6: Update Trunked Data Repository (TDR)  
Step 7: Review Contract Loading Analysis  
Step 8: Assign Final Aliases and IDs  
Step 9: Create Radio Templates  
Step 10: Create Console Templates

Motorola will provide the STARS Project Manager a copy of the documentation created after each of the above steps.

A Fleetmapping Responsibility Matrix is included in Table 1-2, which outlines each party’s role in completing the above process.

1.16 ELECTROMAGNETIC EMISSIONS (EME)

Commonwealth sites that Motorola develops or improves will be designed, protected, and posted to limit exposure to Electromagnetic Emissions (EME) from Commonwealth sites in accordance with CFR 47, CFR 29 Sections 1904, 1910, and 1926 [OSHA], and the Commonwealth RF Radiation Exposure Compliance Plan. Motorola will conduct an analysis of the Motorola provided equipment, conduct paper study evaluations and develop an EME safety plan. All information will be properly documented and archived. Personnel, when required as part of the EME safety plan, will wear personal RF energy monitors. Motorola will develop the training protocols or administrative procedures necessary to comply with applicable Federal regulations. Motorola’s responsibility under this paragraph is limited to sites and installations that are part of the Motorola system design in this Contract. Motorola will only be responsible for bringing these Commonwealth sites into compliance. If the expected levels exceed approved levels due to other than STARS installed equipment, it will be the responsibility of others to bring their sites and installations into compliance.
1.17 INTERFERENCE

Motorola will correct mutual radio interference between this system and any other system installed at Contract award within the Commonwealth of Virginia or elsewhere within a two county radius outside the state when it is a direct result of Motorola’s equipment failing to perform to FCC requirements and/or the improper installation and optimization of said equipment. Motorola engineering (not the mobilization of technicians) will assist the Commonwealth in identifying interference problems with other systems located within the Commonwealth or elsewhere when the fault is not due to Motorola’s performance; however it will be the responsibility of the Commonwealth or others to implement any corrective actions to resolve the interference problems.

In order to minimize such interference, Motorola will design the system utilizing industry standard engineering practices and techniques. Motorola is not responsible for issues outside of its immediate control. Such issues include, but are not restricted to, improper frequency coordination by others non-compliant operation of other radios and systems and unusual atmospheric and weather conditions such as multi-state tropospheric ducting when it can be shown to be the problem.

1.18 SITE DEVELOPMENT

Motorola will work jointly with the Commonwealth to identify, acquire, design, permit, and construct and/or renovate: the SPHQ Zone 1 Master Site, the seven (7) Commonwealth State Police (VSP) division headquarters, and one hundred twenty-one (121) transmitter sites.

1.18.1 Site Acquisition

The Commonwealth will be responsible for managing the site acquisition process associated with the transmitter site development and to provide said sites per the Contract schedule, provided however, that Motorola will not be entitled to damages for any delays in site acquisition that do not actually delay the project implementation schedule.

1.18.2 Transmitter Site Development

Motorola will be responsible for the design and construction of one hundred and twenty-one (121) transmitter sites. This scope of work includes site walks, site surveys, and evaluation of existing shelters and tower structures and footings, (where applicable). Motorola will create overall site design packages that include tower, shelter, generator, and all other necessary appurtenances applicable for use for permitting and, FCC tower registration and FAA licensing requirements. This scope also includes construction of the transmitter site facilities. Specific information for this scope of work can be found in the Transmitter Site Section 8 of the Contract.
1.18.3 NOC and Zone 1 Master Site Building Renovation

Motorola will develop a complete and functional Zone 1 Master Site. The site will contain the Zone Controller network equipment for one of the two zones. The design and renovation of this building will be conducted using a Fast Track scheduling method; both Motorola and the Commonwealth will need to follow this scheduling method in order to meet the implementation schedule which includes rapid turn around on all communications, correspondence, and request regarding construction at these sites. The Commonwealth will provide Motorola with a Substantial Completion approval upon the Commonwealth taking beneficial occupancy of that building. Warranty for the building and its facilities will begin at this time. Specific information for this scope of work can be found in the Master Sites and VSP Communications Centers Section of the Contract.

1.18.4 VSP Communication Center Renovation/Construction

Motorola will renovate six (6) existing Virginia State Police Communication Centers per the drawings provided by the Commonwealth. These drawings can be found in the Master Sites and VSP Communication Centers Section of the Contract. The Division 6 facility will be a new, standalone building that incorporates the Division 6 Communications Center and the Zone 2 Master Site. The design and construction of these buildings will be conducted using a Fast Track scheduling method; both Motorola and the Commonwealth will need to follow this scheduling method in order to meet the implementation schedule. The Commonwealth will provide Motorola with a Substantial Completion approval of each building upon the Commonwealth taking beneficial occupancy of the renovated area or new building. Warranty for the building and its facilities will begin at this time. Specific information for this scope of work can be found in the VSP Control and Communication Centers Section of the Contract.

1.18.5 Mobile Dispatch Trailer

Motorola will provide two (2) Mobile Dispatch trailers to support the renovation process at the VSP Division HQs. These trailers will be utilized to provide temporary dispatching facilities for the VSP dispatchers while their facilities are being renovated.

The Commonwealth will be responsible for providing and installing all communication equipment required to continue dispatching its personnel. The Commonwealth will be responsible for providing adequate space for parking the trailer within reasonable proximity of the existing facility to allow for inter-connection to the existing equipment. The Commonwealth is responsible for providing adequate power within fifty (50) feet of the trailer, and for all utility usage costs. The trailer will be configured to include a communication room for the installation of two (2) dispatcher and two (2) call taker positions, a location to place the G-Link equipment, and a rack space for placement of miscellaneous servers and printers. The trailer will also include
space for a small kitchenette, lavatory, and an equipment room for the supporting communication equipment. Handicap facilities and access will be provided. Table 1-1 provides generic specifications for the temporary dispatch trailer that is being provided. Space requirements and specifications will be finalized during the design review process and any cost and schedule impact issues will be addressed at that time.

### 1.19 SYSTEM STAGING

Motorola will factory stage the Statewide Agencies Radio System (STARS) prior to delivery to the field. Factory staging of the equipment allows for the pre-assembly of the subsystems and system to verify connectivity, functionality and performance capabilities, and to identify and eliminate equipment and system defects prior to shipment of the system to the field. The staging of the IV&D, Mobile Data, Wide Area and Wireless Data Network subsystems will be at Motorola’s Customer Center for System Integration (CCSI) in Schaumburg, IL. Staging for non-Zone related phases will not include a customer visit, but the Commonwealth will be provided with all data from these FATPs. The staging of the microwave subsystem will be at the microwave manufacturers staging location. Functional demonstrations and formal testing with the Commonwealth of Virginia representative(s) will be conducted in conjunction with CCSI staging for Zone 1 and Zone 2.

#### 1.19.1 Track Equipment Inventory

Motorola will ensure that all hardware and software required for factory staging and factory acceptance tests are received on time.

At completion of system staging Factory Acceptance Test Procedures (FATPs), Motorola will inventory the equipment prior to shipment to verify all hardware and software is accounted for. Motorola will update the Configuration Management System (CMS) inventory database with this information to assist in tracking upon delivery to the field.

Motorola is responsible for all inventory from the start of the project through shipment to the Commonwealth’s location. Equipment manuals will be included on the inventory list and tracked.

#### 1.19.2 Physical Setup of System

Motorola will set up the system hardware, load all equipment software, and program subscriber equipment using STARS programming templates, if available, at the staging facilities. Physical set up and location of hardware will comply with the STARS equipment layout plans. All cables will be cut and labeled with to/from information to clarify interconnection for field installation. Cables will be cut to fit the room layout plan specifications as supplied by the Motorola’s Field Engineer. All provided equipment cables will be connectorized and tested.
1.19.3 Optimization

The staging technicians will power up, load software, set levels, and optimize the equipment during factory staging. The staging technicians will load application software. System parameters will be set according to inputs from the field team. System software and system features will be tested and validated. All “system” levels will be set per specification by the staging technician to verify proper end-to-end connectivity. These “system” levels will be recorded and documented in the CMS to provide baseline information to the field integration team; all levels will be checked and reset, where applicable, prior to final optimization in the field. Once the system or subsystem has been assembled, optimized, and integrated as a complete working unit, the system will be tested using the procedures identified in an internal staging acceptance test procedure similar to the one that will be utilized in the field.

1.19.4 Commonwealth Visit and System Staging ATPs

Upon satisfactory completion of all internal testing for Zones 1 and 2 for the Motorola staged equipment, Motorola will coordinate with the Commonwealth for two factory visits in Schaumburg, IL, to witness the FATPs. It is also anticipated that the Commonwealth will witness the microwave FATP for Division 1 staging at the microwave manufacturer’s staging facility. These visits will provide the Commonwealth the opportunity to see the equipment assembled and working as it was designed. Most or all functionality and features of the system that are capable of operation in a factory environment will be tested and verified for the Commonwealth. The passing of these FATPs will be the determination that the equipment is ready to be shipped to the field.

1.20 EQUIPMENT INSTALLATION

For installation of the fixed equipment at the transmitter sites, master sites, and dispatch facilities, Motorola will furnish all power, audio, control, and radio transmission cables connecting the Motorola supplied equipment to the power panels or receptacles and the audio/control line connection point. Motorola will provide the necessary building penetrations for these cables. All Motorola provided equipment will be properly grounded to the site’s grounding system using Motorola’s R56 Standards and Guidelines. All cabinets, racks, enclosures, telephone circuit surge protectors, and transmission line surge protectors provided by Motorola will be connected to the single point ground window. Ground connections will be connected using approved split bolt or clamp connections. All painted surfaces where ground connections will be made will be scraped and dissimilar metal connections treated with an anti-oxidant compound.
1.20.1 General Requirements
Motorola will commence work at a site only after the STARS Program Director or designee has provided Motorola with written notice through meeting minutes, or other documentation. Motorola and its subcontractors will coordinate with the Commonwealth Program Director or designee on all site access requirements prior to commencing work.

1.20.2 Antenna Systems
Motorola will follow the manufacturer’s specifications, guidelines, and/or structural engineer’s recommendations in the assembly and installation of all antenna systems unless Motorola deems R56 standards to be more stringent in which case R56 will be followed. Motorola will utilize appropriate Andrew connectors with exceptions as specified by MNI in the Microwave network, and assemble the cables per the manufacturer’s specifications and guidelines. Andrew Transmission lines will be properly secured/fastened to the cable tray or ladder attached to the tower using the manufacturer’s recommended devices and following either R56 or manufacturer’s recommendations. Transmission lines will be installed using a hoisting grip, which will be used at the top and at 200 foot intervals to provide strain relief.

1.20.3 Placement and Mounting
Motorola will install all Motorola provided communications equipment per the agreed to floor plans that are developed during the design reviews. Thirty-six inch clearances will be provided in the front or side aisles (as applicable) to satisfy all safety codes. Equipment will be installed such that no equipment will be required to be moved for maintenance after installation.

1.20.4 Cabling
All cabling will be properly connectorized and terminated per the manufacturers or Motorola’s R56 Standards and Guidelines, whichever is deemed more stringent. All cabling will be clearly labeled at both ends. All associated punch blocks connections will be properly labeled. All cabling and punch block connections will be recorded into the final System As-built documentation. All cabling associated with computer equipment will be shielded and grounded per the manufacturer’s specifications. Cables for computer terminals will provide a minimum of five feet of slack to allow for slight adjustments in positioning of the equipment (if requested). All additional cabling will be neatly coiled and secured with cable ties.

All cabling will be grouped by category and run separately. Cable categories will consist of power, data, RF and ground. All cables will be run neatly in cable tray, under elevated flooring, conduit, or by other appropriate means and secured appropriately. Any cuts in computer flooring will be dressed with a protective grommet to avoid sharp edges. All sawdust and metal shavings will be vacuumed from beneath the computer flooring. Entry holes placed in cabinets will have grommets installed to protect the cables from damage. Any wiring connections terminating to punch blocks will utilize appropriate bridging clips for cross connections.
When integrating a new system into an existing facility, Motorola will separate new wiring from any previously installed wiring when practical. Motorola will not use existing conduit containing electrical power for communication cabling runs.

1.21 Integrated Voice and Data
Motorola will be responsible for the installation of the IV&D subsystem fixed network equipment (FNE). This equipment will include the transmitter site equipment, dispatch subsystems, Master Site equipment, and all ancillary equipment and systems such as the dispatch phone and video conferencing systems, as described in the Contract. The Commonwealth will provide information concerning existing fiber optic cabling and access to the fiber optic system.

1.21.1 Console Installation
Motorola will replace the existing furniture and console equipment at the seven (7) Commonwealth State Police Divisional Dispatch Centers. The replacement of this equipment will correspond with the renovation of each of the Division HQs. The Non-VSP dispatch facilities included in the STARS will utilize their existing console furniture, but will receive new console dispatching equipment.

1.21.2 Console Furniture
Motorola will coordinate with the Commonwealth Program Director or designee to determine the final room layouts for the console furniture installations. Motorola will provide the Commonwealth Program Director examples of the various colors available for the final laminate, fabric, and edge treatments for the console furniture.

1.21.3 Installation of Console Equipment
Motorola will install all new console equipment into the console furniture at all dispatch facilities as identified in the Contract. All cabling will be properly dressed and provide a minimum of 5’ of slack to allow some movement of the equipment. All cabling will include appropriate labeling at each end. All cabling will be labeled at both ends and all demarcation information properly documented. All racks for the Central Electronics Bank (CEB) will be securely fastened to the floor. All equipment will be properly grounded per Motorola’s R56 Standards and Guidelines.

1.22 Microwave Telecommunications
Motorola will provide, install, and optimize the microwave telecommunication subsystem. Motorola will adhere to the same installation and optimization practices as stated for the other subsystems.

Antenna systems, with radomes, elliptical wave guide and wave guide attachment, mounting and pressurization parts and hardware will be furnished for all microwave links. Antenna systems will meet all requirements of the CFR 47 as of the date of the Contract.
1.23 Migration Management

Motorola will be responsible for developing with the Commonwealth a detailed migration plan for existing land mobile radio, mobile data, and microwave radio networks, leased lines, and users onto STARS that will ensure a transfer of communications from existing networks onto STARS and the continued usability of legacy systems as agreed during migration planning sessions and collocated systems operating concurrently with STARS. The Commonwealth will have final approval of this plan but will not be responsible for the technical efficacy of the plan as approved technical. Motorola will be responsible for the implementation of the approved plan and the management of the migration process; however, variations to the baseline plan may result in a change order.

1.24 Integrated MOBILE DATA Communication System

Motorola will design, provide, install, optimize, and test the Integrated Mobile Data Communication System as described in the Contract. The Mobile Data fixed network equipment consists of the following:

Current Contract:

- Premier MDC (PMDC) Message Switch Server and Software
- PMDC Clients
- In-House PMDC Clients
- Interface to the PRC CAD
- Interface to the VSP Exchange Server for OutlookPOP3
- Automatic Vehicle Location (AVL) and Graphic Geofile Manager (GGM)

Future System Enhancements:

- Airmobile Wireless File Transfer Application
- Complex Systems Integration (Integration Framework)
- Canopy
- 700 MHz Mobile Data
1.24.1 Requirements Validation and Application Development Process

During the Contract Design Review, and the subsequent application development process, Motorola will develop the initial documents and work with the Commonwealth to translate the contract requirements into detailed technical requirements for the Integrated Mobile Data Communication System. The Commonwealth will be responsible for reviewing these documents, and identifying in writing any specific deficiencies found within twenty (20) business days of specific document due dates. The Commonwealth will also be responsible for coordinating with any other agencies and/or non-Motorola contractors that are involved and/or impacted by the development and implementation of the Integrated Mobile Data Communication System. Motorola will then provide the corrected document within ten (10) business days of receipt of documents. The following documents will be completed:

- **Functional Specification Document (FSD):** describes agreed upon Premier MDC functions, deliverable items, mobile query screen layouts, and assumptions, as well as defining the associated system interfaces.
- **Interface Control Document (ICD):** describes agreed upon interface specifications between the VSP WAN/LAN, PMDC, PRC CAD, and ATM AVL components, and specific network connectivity and data transferring requirements. For the PRC CAD interface, Motorola has scoped the effort to write to the provided PRC CAD API. Motorola will only provide functionality defined within that document. Should there be other CAD integration desired, that effort will be scoped in a change order to this contract.
- **Configuration Request Form (CRF):** describes configuration and related technical information required for Premier MDC system development.

1.24.2 AVL, GGM, and ATM

Motorola will develop the requirements for the GGM to support Commonwealth’s use of the AVL and ATM. The ATM will be in the dispatch center to provide a map view of the mobile units. AVL will be implemented to provide an on-demand GPS request for vehicle location.

The subsystem will be comprised of the following software components:

- Graphic Geofile Manager (Premier GGM, v 5.x)
- Advanced Tactical Mapping (Premier ATM, v 5.x)

When available, the Commonwealth is expected to supply all GIS data, containing the completed street centerlines, to be used as the base map. The geofile source data is the Commonwealth GIS data, which is used as the base map. Commonwealth is expected to supply the base Commonwealth GIS data to Motorola, exported into a format supported by Motorola. Motorola supports ArcInfo and ArcView, MapInfo, TIGER and DXF file formats in Universal Transverse Mercator (UTM), State Plane NAD 27 and State Plane NAD 83 projections (coordinates must be seven digits or less).
Motorola will import the initial Commonwealth GIS data into the GGM in order to obtain the correct data. After the Commonwealth GIS data is imported into the GGM, Motorola will produce a series of Analysis Reports detailing the data status. If the Commonwealth GIS data is not complete (i.e., street centerlines are inaccurate or boundary layers are missing), a GIS agency, such as Geographic Data Technology (GDT) may make required modifications. Commonwealth has the option of making modifications to specific geographic layers using Premier GGM or other GIS software.

If the Commonwealth obtains accurate and up-to-date Commonwealth GIS street centerlines, the Commonwealth or a GIS agency may create the required boundaries and common places. If the Commonwealth purchases the option for “Boundary/Common Place Build”, Motorola will create the required boundaries and common places.

The following map layers are used to create the geofile. Additional layers may be used for display reference in Premier ATM. Additional layers may include tow zones, rivers, lakes, railroads, parks, right-of-way, fire hydrants, parcels, and any map layers that enhance map display.

<table>
<thead>
<tr>
<th>Map Layer</th>
<th>Required/Optional</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Street Centerline</td>
<td>Required</td>
<td>Contains the street centerlines and associated attribute information such as the left and right, low and high address ranges, X and Y coordinates, street left and right municipal and dispatch zone assignments, additional boundary assignments, low and high cross streets, response code, message information, class code designation and other attributes for each street record.</td>
</tr>
<tr>
<td>Intersection</td>
<td>Required</td>
<td>Contains each unique intersection name and associated attributes such as the X and Y coordinates, municipal and dispatch zone assignments, additional boundary assignments, response code, message information and other attributes. Note: The intersection layer may be automatically generated in the GGM from the street layer upon Commonwealth GIS data import.</td>
</tr>
</tbody>
</table>
## Boundaries

<table>
<thead>
<tr>
<th>Boundaries</th>
<th>Required</th>
<th>The following provides examples of typical boundaries. City/County/State: Contains city/county/state boundaries used to distinguish street addresses and associated attributes such as the name, agency, X and Y coordinates, message, response and other attributes. Law: Contains law dispatch zones and associated attributes such as the name, agency, X and Y coordinates, message, response and other attributes. The law dispatch zones are required for systems using law dispatch. Fire: Contains fire dispatch zones and associated attributes such as the name, agency, X and Y coordinates, message, response and other attributes. The fire dispatch zones are required for systems using fire dispatch. EMS: Contains emergency medical service dispatch zones and associated attributes such as the name, agency, X and Y coordinates, message, response and other attributes. The emergency medical service dispatch zones are required for systems using EMS dispatch. Statistical Reporting Areas: Contains statistical reporting areas and associated attributes such as the name, agency, X and Y coordinates, message, response and other attributes. The statistical reporting areas are used for analysis purposes. Map Page Grids: Contains map grids and associated attributes such as the name, and X and Y coordinates. The map grids may be used for reference purposes.</th>
</tr>
</thead>
</table>

## Common Places

| Common Places | Optional          | Contains commonplace locations (i.e., hospitals, cemeteries, businesses, government buildings, recreation areas, mile markers) and associated attributes such as the X and Y coordinates, municipal and dispatch zone assignments, other boundary assignments, response, message and other attributes. |

### 1.24.3 Geofile Source Review/Service Boundary Workshop

The geofile production will be initiated during a breakout session following the AVL Subsystem Project Kickoff Meeting. The objective of the session is to establish the geofile process flow, review GIS data resources, and discuss service boundary requirements.

Motorola will set-up the initial ATM map layer ordering and map element styles, fonts and symbols and configure the ATM database tables specific to the Commonwealth’s requirements to meet Commonwealth’s operational needs of the ATM system.
Motorola will be responsible for the following tasks:

- Review existing base Commonwealth GIS data resources
- Review existing service boundaries and discuss service boundary requirements
- Review and collect existing Commonwealth GIS data and record layouts necessary to establish interfaces with the Premier GGM, Premier ATM, and AVL
- Import the base Commonwealth GIS data into the GGM software.
- Compile the Commonwealth GIS data review results in the Analysis Reports.
- Send the Analysis Reports to the Commonwealth’s Geofile System Administrator and review the identified discrepancies via a phone conference.
- Create the required SQL queries, legends, reports, styles, and labels for Commonwealth’s GGM application and configure the SQL database tables that correspond to required map layers.
- Assist the Commonwealth in defining the ATM requirements.
- Configure the unit, agency, and event ATM databases specific to the Commonwealth’s requirements.
- Provide an ArcView translator to Commonwealth, used to export the GGM map layers into ArcView shape file format, and project the layers into latitude/longitude coordinates for use in ATM.
- Install the ATM system software on the ATM workstations.

The Commonwealth will be responsible for the following tasks:

- Appoint a Geofile System Administrator.
- Coordinate Commonwealth’s GIS data review with the appropriate agency/agencies.
- Provide the base Commonwealth GIS data in a supported format.
- Ensure that street and commonplace classification codes are established in the Commonwealth GIS data. Street classification codes are used to designate types of streets such as freeways, interstates, major and local roads. Commonplace classification codes are used to designate types of common places such as hospitals, schools and government buildings.
- Provide hardcopy map or electronic resources that contain existing service boundaries for review with Motorola.
- Review the Analysis Reports with Motorola’s Geofile Project Coordinator via phone conference as part of Motorola’s scheduled project meetings.
- If necessary, coordinate the required Commonwealth GIS data updates.
- Assist with verification of ATM functionality at each ATM work station.
- Perform subsequent GGM to ATM exports.
1.24.4 Equipment Space and Facilities
With the exception of installation locations where Motorola is responsible for site improvements, the Commonwealth will be responsible for providing adequate space, power, grounding, and environmental conditions per Motorola’s R56 Standards and Guidelines to support the Motorola supplied equipment. The Commonwealth will be responsible for providing the cable pathways required to run the cables between equipment and/or communication links.

The Commonwealth will be responsible for providing any required telephone dial-up lines, and TCP/IP communication links to any existing networks, workstations, and printers that are to have access to the applications. The Commonwealth will be responsible for verifying proper operation of these communication links and interfaces. Termination of these interfaces will be at a demarcation point within 15’ of the Motorola provided equipment. Motorola will be provided dial-in access to all development and system “root” accounts on all servers running Motorola licensed software.

1.24.5 Installation and Configuration
Motorola will work with the Commonwealth to place the equipment in a maintenance accessible location. All cabling will be labeled at both ends and all demarcation information properly documented. All installed cabling will comply with national and local codes. All Ethernet cabling will be rated for Category 6 and plenum rated where applicable. Appropriate surge suppression will be provided to protect critical network communications and storage devices. All equipment will be properly grounded per the revised Motorola’s R56 Standards and Guidelines. Motorola will configure the client software and interfaces based on the design documents (FSD, ICD, and CRF) approved by the Commonwealth.

1.25 In-Tunnel Antenna Systems
Motorola will provide, install, and optimize an in-tunnel antenna solution at six (6) tunnel facilities. The tunnels are the Big Walker tunnel, the East River Mountain tunnel, the Elizabeth River Downtown and Midtown tunnels, the Hampton Roads tunnel, and the Monitor Merrimack tunnel.

1.25.1 Tunnel Installation Overview
Motorola will coordinate tunnel installations with the appropriate VDOT District Office personnel. The installation will be performed between 12:00 AM and 5:00 AM EST on consecutive evenings, Monday through Thursday, or at such other time as may be arranged between Motorola and VDOT. If through no fault of Motorola, or its subcontractors, if access is not provided on a continuous basis for the full shift time specified, Motorola will be provided a day-for-day schedule and cost relief, and reallocation of a full work shift for each full work shift not allocated or otherwise not provided to Motorola or its subcontractors.
The Commonwealth will provide on-site storage, if available, for all equipment received within reasonable distance of tunnel access. The Commonwealth is responsible for providing facility access for Motorola System Integration Specialists and its authorized agents, as required. This scope of work does not include the cost for any special environmental insurance, which may be required.

1.25.2 Tunnel Implementation

Motorola will conduct a detailed field survey of RF propagation of each of the six tunnels to determine each tunnel's RF propagation characteristics and installation requirements. Motorola, with Commonwealth concurrence, will determine installation details such as:

- Routing of the RF cables
- Locations of antennas
- Location for equipment racks and enclosures
- How the cable will be fastened and the materials required
- How the equipment will be mounted on walls
- Special tools and equipment required
- Confirm availability of required AC circuits
- Shipping and storage locations and instructions
- Special working conditions and restrictions

Floor plans will be marked with detailed cable routing, antenna, and equipment locations. The annotated floor plans will be provided to the Commonwealth as part of the as-built documentation.

The project engineer will perform detailed uplink and downlink RF calculations based on the site survey results. This phase will result in a detailed system design, materials list, System Installation Package, cable layout drawings and system block diagrams. The as built drawings will be included in the system manual.

The Commonwealth will be responsible for providing and connecting the required AC circuits (if required) as identified in the System Installation Package. Detailed access arrangements will be made.
1.26 CONTROL STATION INSTALLATIONS

Motorola will install control station radios as identified in this contract.

1.26.1 Electrical and Grounding

With the exception of where Motorola is responsible for site improvements, the Commonwealth will be responsible for providing a dedicated 15-amp, 3-wire 120 VAC circuit with earth/facility system ground within 15’ of the control station. The Commonwealth is responsible for providing an appropriate grounding source for the control station location.

1.26.2 RF Cabling

Motorola will install the RF cabling for the control stations. The Andrew cabling will be properly connectorized with Andrew products, grounded, and will be run via the least obtrusive way to the outdoor antenna location. Motorola has included an average of 100’ of coax per antenna installation. This will include up to a maximum of four (4) wall penetrations. No core drilling or custom wire molding is included in this scope. Distances greater than 100’ are outside this scope and can be quoted on a case-by-case basis. Motorola will provide 100 50-foot wooden utility poles for the installation of the coax and antenna. The Commonwealth is responsible for ensuring that there is appropriate space and clearance for placement of the wooden pole.

1.27 SYSTEM OPTIMIZATION

Motorola will verify that all equipment is operating properly and that all levels are properly set once installation in the field is complete. Motorola and its subcontractors will optimize each subsystem individually. All audio and data levels will be checked to verify factory settings. Any necessary changes will be made to the appropriate settings. All radio equipment will have forward and reflected power checked after connection to the antenna systems to verify that they meet the FCC requirements and are within tolerances. All communication interfaces between devices will be verified for proper operation. All features and functionality will be tested to ensure that they are functioning according to the manufacturer’s specifications and per the final configuration established during system staging.
1.28 SYSTEM INTEGRATION

To provide the Commonwealth with a complete communication system solution, Motorola will verify proper end-to-end operation of all subsystems in its final system configuration. Motorola will verify that all communication protocols between subsystems are compatible and that all signal levels are set appropriately.

The microwave subsystems will be thoroughly tested to ensure proper operation and that it meets the specifications. Where Motorola is not responsible for providing the entire interface to the equipment, Motorola will coordinate with the STARS Program Director to test the end-to-end capabilities (i.e. link audit).

Motorola will ensure that all circuits supporting Legacy equipment interconnected at STARS sites will be retained or replaced in such a manner to support Legacy equipment operation.

All parameters required in each subsystem to allow for proper communications with the overall system will be verified and tested. Motorola will test and verify that all functionality required between subsystems is provided and that it meets the specifications described in this contract.

Motorola will verify all back up, redundant, and fault tolerant systems operate properly. All promised functionality will be verified.

1.29 SUBSCRIBERS

Motorola will provide the following scope of work to ensure a successful delivery of all subscriber units to the Commonwealth.

1.29.1 Programming

Motorola will program and test each mobile and portable radio, digital vehicular repeater system (DVRS), and mobile data computer for proper operation. Power, frequency and deviation will be verified for radios. Radios will be programmed with its specific programming template, its ID, and serial number recorded in the Asset Management database. Mobile Computer Terminals will be tested to verify basic operation and functionality, all software applications and configurations will be programmed, and tested its ID, and serial number recorded in the Asset Management database. State Police regulations require that anyone programming an MCT be VCIN certified.

1.29.2 Mobile Radio Installations

The Motorola and Commonwealth Project Managers will coordinate the installation of all mobile radios, vehicular repeaters, and mobile data computers into the identified vehicles. Motorola will work with the Commonwealth Project Manager to develop and approve prototypes of each type of mobile installation for each unique vehicle configuration. These prototypes installations will
be designed to avoid interference with any functional devices, or adversely affect the safe operation of the vehicles. Motorola will not install a radio which knowingly interferes with the safe operation of the vehicles. Motorola will additionally test and provide a prototype installation configuration with all known devices in use prior to any final installation in order to, the greatest extent possible, prevent interference. Motorola will develop an installation guidebook that contains photographs, diagrams, equipment placement details and cable routing and dressing data for each approved vehicle prototype. This guidebook will be provided to each of the authorized installation subcontractors to be used as the basis of all installations. Any required deviations will be pre-approved by the Commonwealth and Motorola and may require a field authorized change order in some circumstances. This will minimize confusion and limit the requests for non-standard installations. Except as specified below, Motorola will certify compliance with the manufacturers’ air bag deployment specifications for each vehicle installation. Motorola will work with the Commonwealth to identify locations and mounting hardware that will keep the unit out of the airbag deployment zone as indicated by the published specifications from the manufacturer. The Commonwealth will work with Motorola to finalize the mounting locations based on usability of the equipment. However instances may arise where the airbag deployment zone is impacted due to the arrangement of preexisting equipment or limitations to the vehicle itself. In those instances, certification will not be possible, and Motorola will work with the Commonwealth to help determine alternate accommodations (which may include not installing the equipment). For vehicles that require unique installations, or where prototyping is not practical, Motorola will work with the Commonwealth Project Manager to develop the agreed upon installation configuration. Examples of these types of vehicles include situations where the Commonwealth may only operate a small quantity of a type of vehicle, or where unique configurations are required such as the Mobile Command Centers and marine vehicles. For these installations, Motorola will utilize the standard mounting hardware. With the exception of VSP armored vehicles, it is not anticipated any specialized metalwork or fabrication requirements are required to accommodate unique installations or environmental concerns.

For VSP installations that include Mobile Computer Terminals [MCT], Motorola will provide a console-mounting device similar to what is currently being used today by the VSP. All other mobile installations will utilize standard mounting hardware for the Mobile Radio and DVRS unit, and generic Mobile Data mounting hardware. Motorola will work with the Commonwealth Project Manager to determine if the standard mounting hardware is appropriate for installation in non-VSP vehicles, and will provide alternative mounting solutions if required. It is possible that some of the alternative solutions may require a change order to accommodate the different and/or additional hardware and/or services.

Charge guards will be provided and installed for each Mobile Computer Terminals [MCT] next to the existing power distribution panel for the radio equipment, to prevent the Mobile Data Computer from draining the vehicles battery.
Mobile Radios will be interfaced to the existing, VSP vehicle PA system and floor mounted emergency activation button. Motorola will interface the mobile radio with the VSP existing Whelen Signal light bar system.

For VSP vehicles that receive the Mobile Computer Terminals, Motorola will remove existing radios that are being replaced by new units and return them to the Commonwealth for disposition. Existing equipment that remains in the vehicle and conflicts with the new installations will be relocated to the new console-mounting device. Motorola will provide a report detailing disposition of the radios returned to the Commonwealth.

Motorola will program and test each mobile radio for proper performance. Power, frequency and deviation within specification will be verified. The programming templates will also be verified. If it is determined that any mobile radio creates or receives interference from other electronic equipment in the vehicle, Motorola will coordinate with the STARS PD for a satisfactory resolution under warranty. Interference will be handled on a case-by-case basis. If the determination is made that the issue is of a systemic nature, Motorola will address the correction as a universal correction under warranty.

To complete the project per the identified schedule included in this contract, Motorola intends to install approximately forty (40) vehicles a day. The Commonwealth is responsible for providing a continuous flow of vehicles per the agreed upon schedule. Motorola will install the majority of the mobile radios at the local Motorola Service Centers located throughout the Commonwealth. Due to the large amount of vehicles to be installed, and the aggressive scheduling requirements, Motorola may also lease a facility to handle any overflow of vehicle installations at the Motorola Service Centers, if necessary. Motorola will place the removed equipment in the trunk of the vehicle for the user to return to their agency.

### 1.29.3 Aircraft Radios

Motorola will provide installation services through a certified installation center for the Commonwealth fixed and rotary wing aircraft. The final design and scope of work for each individual installation will be determined upon conducting a site walk of each aircraft by a FAA licensed subcontractor. Where Wulfsburg radios are being utilized, Motorola and Wulfsburg will evaluate the existing Wulfsburg radio installed in the identified aircraft and determine if it can be re-utilized and/or upgraded to operate on the new STARS network at that time. Any scope changes required to accommodate each custom installation will be addressed and mutually agreed upon at the time of these site walks.
Certified installation centers will perform the following tasks:

- Install radio, control heads, antennas, and associated equipment according to FAA standards and standards per the manufacturer’s installation documentation.
- Design and fabricate unique brackets needed complete above.
- Provide documentation consistent with FAA requirements and standards.
- Motorola will program, via the Motorola CPS, all relevant information into the radio transceiver.

The general specifications for the Wulfsburg radio are provided below:

**Wulfsburg Radio General Features**

- 136 – 174 MHz APCO Project-25 (9600 bps) trunking (TIA 102 series standard)
- AES Encryption for 136 – 174 MHz
- Night Vision Goggle compatible control head
- All relevant items listed on Wulfsburg drawing #150-040625 – Declaration of Design Performance for Flexcomm II tactical communication systems

**1.29.4 Portable Radio Distribution**

Motorola will coordinate the distribution of portable radios with the Commonwealth Project Manager. Motorola will document all inventory adjustments in the asset management database as these units are distributed and verify the information with the Commonwealth Project Manager. Portable radios will be issued directly with the DVRS installation.

**1.30 TESTING**

Motorola will conduct the Acceptance Test Procedures (ATPs) with the Commonwealth to verify proper operation of all Motorola supplied equipment. The purpose of the ATPs is to verify that the Motorola supplied communication systems operate as they are represented in this contract, SOW, and any subsequent change orders. These tests are outlined in the testing section of this Contract.

If any problems are detected during the execution of the ATP(s), a system deficiency list (punch list) will be created to document all deficiencies to the ATP(s). Upon completion of the ATP(s), if it is determined by the STARS PD that the system can be utilized by the Commonwealth for its intended purposes and provide beneficial use, the system or network will be deemed as conditionally accepted. Upon a satisfactory correction of all punch list items, and the delivery of all hardware, software and documentation deliverables, the Commonwealth will grant System Acceptance to Motorola.
1.31 PUNCH LIST

All identified project related deficiencies during the execution of the various ATPs will be documented on a punch list form. The recording of these punch list items on a documented form will allow the Motorola Project Manager and the STARS Program Director or the Commonwealth’s designated representative, to track any project related deficiencies and expedite satisfactory resolutions. The purpose of the project punch list is to document system deficiencies to be resolved prior to final acceptance. The following form example (email and soft documents will be the standard) will be utilized to capture any identified punch list items.

STARS
Official Project Punch List Example

EXCEPTION RESOLUTION PROCEDURE

For each failure, non-compliance, or out-of-specification item that is determined by the Commonwealth or Motorola, a detailed explanation of the item will be recorded as a punch list item. The model number (if applicable), serial number (if applicable), test number, test checklist ID (if applicable), date, target completion date (if applicable), and the exception procedure code will be filled out for each punch list item. All punch list items must be initialed by both the Commonwealth or Commonwealth’s designated representative, and Motorola representatives.

Exception Procedures Codes:

AI - Accept as Is
Exception item minor and does not require any corrective action.

CS - Pen and ink Correction to Specifications or procedures.
Not an exception item, but recorded for future reference. Delineate corrections to specification or ATP procedure on the punch list.

CI - Critical Item
Exception item that requires correction prior to any system transition/cutover.
Note: When CI is circled, one of the other exception codes is required (CM, MA or CR).

CM - Corrective action required by Motorola as part of contract.
Exception item that falls within Motorola’s contract commitment.

MA - Management Action required.
Exception item disagreement on site, to be resolved by both the Commonwealth and Motorola’s Project Managers.

CR - Change Request with or without additional cost.
Exception item beyond Motorola’s contract commitment. In this case, the Commonwealth may find a problem at a site where the work responsibility is beyond Motorola’s contract work commitment.
“All official project punch list item sheets are to be attached to the back of this STARS punch list sheet. Official project punch list items should be sorted by test number as described in the Acceptance Test Plan.”

STARS
Official Project Punch List Example

<table>
<thead>
<tr>
<th>Item #</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Site__________________, Test No.________________, Test Checklist _________________,
Description of Exception:
______________________________________________________________________________
______________________________________________________________________________
Model No.______________________________, Serial No.______________________________
Exception Procedure Code: (circle one) AI CI CS CM MA CR

Target Completion Date ___/___/___

Commonwealth of Virginia (sign)_________________
Motorola (sign)___________________________
Date Completed ___/___/___

Resolution

Comment________________________________________

_____________________________________________________________

Commonwealth of Virginia (sign)___________________________
Motorola (sign)____________________________________

Exception Procedure Codes:
AI - Accept as Is
CI - Critical Item
CS - Pen and ink Correction to Specifications or procedures
CM - Corrective action required by Motorola as part of contract
MA - Management Action required
CR - Change Request with or without additional cost

Refer to punch list STARS punch list sheet for complete explanation of exception procedure codes.

This form represents the information to be gathered, upon mutual agreement by the Commonwealth and Motorola Project Managers, the final format of the information may be modified.
**TRAINING**

Motorola will provide operational, administrative, and technical training classes. These various classes are described in detail in the training section of this contract. Training classes provided by Motorola consist of a lecture presentation augmented by student manuals, demonstrations, and hand-on practice sessions. By receiving on-site training, the Commonwealth will experience hands-on training using its own system’s equipment. Legal liability issues prohibit Motorola instructors from addressing any "procedural" matters or certification issues specifically related to Commonwealth operations. The Commonwealth will provide an adequate training facility.

**DOCUMENTATION**

Motorola will provide all operator, equipment maintenance, and system manager manuals as identified in this contract. Motorola will provide documentation in Adobe Acrobat PDF format if available by the manufacturer at the time of production or any document can be scanned in with permission. In addition to the equipment manuals, System As-Built Manuals will be provided to the Commonwealth in both hard copy and in electronic format. All documentation will be provided in draft and approved by the Commonwealth before delivery.

**System Manual**

Motorola will provide system manuals, which will include the “As Built” documents for each Division. They will be in 3 ring binders with tabbed sections for reference by Commonwealth operations and maintenance personnel. These system manuals will include the following information:

- A final system configuration diagram with all equipment clearly identified
- Cabling Diagrams
- All As-Built documents
- Tower and antenna system drawings
- All distribution frame and cross-connect wiring diagrams
- Final site layout drawings
- Recordings of all primary level settings and jumper locations
- Recordings of configuration parameters, where applicable
- Complete equipment inventory for each site by model and serial number
- Subscriber unit inventory by model and serial number
- IP Network addressing
- Acceptance test procedure results
- Channelization charts
- Radio programming templates
- System alarm list
DIVISION AND FINAL SYSTEM ACCEPTANCE MEETINGS

Motorola will conduct acceptance meetings at the completion of implementation for each Division and upon completion of the project to verify with the Commonwealth that all contract deliverables have been satisfied and also review the System Support Plan. These meetings will allow the Commonwealth to have an opportunity to discuss any final issues or address any questions associated with the completion of the implementation of a Division or the overall Project prior acceptance. Reviewing the System Support Plan will provide the opportunity for the Commonwealth to review the level of support available, the procedures that need to be followed, and who to call when questions or concerns arise.
### TABLE 1-1

**Temporary Dispatch Trailers, Generic Specifications**

*Make: 2003 Model Monocoque Semi Trailer*

<table>
<thead>
<tr>
<th>Specification</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>GVWR</td>
<td>49,000-lbs</td>
</tr>
<tr>
<td>Rear Axle</td>
<td>20,000-lbs. with Air ride suspension</td>
</tr>
<tr>
<td>King Pin</td>
<td>Tartan Air ride, fifth wheel</td>
</tr>
</tbody>
</table>

**Body Specifications:**

*Make: Great Dane or Kentucky Trailer*

<table>
<thead>
<tr>
<th>Specification</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall Length</td>
<td>36’</td>
</tr>
<tr>
<td>Overall Height</td>
<td>13’ 6”</td>
</tr>
<tr>
<td>Overall Width</td>
<td>8’ 6”</td>
</tr>
<tr>
<td>Floor Height</td>
<td>4’ 3”</td>
</tr>
<tr>
<td>Interior Usable Length</td>
<td>35’ 7”</td>
</tr>
<tr>
<td>Interior Width</td>
<td>8’</td>
</tr>
<tr>
<td>Interior Height</td>
<td>8’</td>
</tr>
</tbody>
</table>

**Under Frame:** Complete rust proofing of entire under frame.

**Leveling legs:** Two-speed crank jacks, 50,000 lifting capacity, front and rear.

**Cross Sills:** 4’ Hi –Ten I-beams –12 on center.

**Flooring:** 1-3/8” Laminated hardwood, base flooring.

**Sidewalls:** 14 gauge – Hi-Ten hat section post galvanized 1-1/4” deep post– Double slots-
Single riveted –16” on centers.

**Roof:** 0.040 aluminum over 16 ga steel Anti –snag bows, 24” on center. Roof is bonded to bow and riveted to top rail on 1” centers.

**Electrical System** 4” sealed stop, tail, and turn light with rubber grommet. 7 Pole-12 volt (9 marker lights only) with lower center marker/turn.

**Wheels and Tires** Polished aluminum outside rims- Steel inside, 8.25 x 22.5 tubeless, Michelin XT-111R 22.5, 16 ply.
Conversion Specifications:

Exterior Fasteners: All exterior fasteners will be stainless steel (machine screws, bolts, and sheet metal screws, rivets, etc.).

Exterior Hinges: All exterior hinges used for passenger and compartment doors will be stainless steel, continuous piano style, with a 3 in. open dimension, and contain a ¼ in. diameter hinge pin. Hinge mounting holes will be slotted to allow door adjustment in two planes. Holes will be drilled and tapped in door and jamb extrusions to accept truss head style hinge attachment machine screws.

Main Entrance Doors: The main entrance doors will be located on the curbside of the unit. The doors will be constructed of .125 in. 3003 aluminum. The doors will have a continuous stainless steel piano hinge, be equipped with a key locked automotive style “Tri-Mark” handle, a 18" x 24" fixed window, a spring door closer and have a aluminum drip rail installed above the door.

Stairs and Handrails: Heavy duty custom aluminum stairs will be provided for the main entrance doors. Stairs and handrails are stowed in the under belly compartments.

Generator Front mount: Generator with an exterior casing, and is painted and insulated. 60 gallon fuel tank with a 12-volt electric pump system.

Battery Compartment: The battery compartment will be constructed from 0.125 in. 3003 aluminum sheet, continuously welded to prevent battery gases from intruding into the coach.

Storage Compartments: Exterior storage compartments will be constructed from 0.125 in. 3003 aluminum sheet continuously welded. Compartment interiors will be watertight.

Air Conditioning Structure: Rear mounted air conditioning opening will be structured to support load.

Windows: One (1) dark tinted, 18 in. x 24 in. window will be installed in each entry door. Black out shades or mini blinds will be provided for all windows.

Exterior Paint: The unit body is prepped and primed with etching primer, then caulked and sealed, then painted. The coach base color will be all white. A graphics package is included.
Electrical

120 VAC Wiring: Wiring sizes will be determined for each circuit with a minimum of 14 ga. wire used in the coach. All 120 VAC wiring will be routed through ENT conduit. At any point where wiring passes through a structural member, a protective grommet will be installed. Rubber coated cable clamps will be used at appropriate points to support harnesses.

12 VDC Wiring: Wire sizes will be determined for each circuit. All 12 VDC wiring will be color coded and routed through convolute split loom. At any point where wiring passes through a structural member, a protective grommet will be installed. Rubber coated cable clamps will be used at appropriate points to support harnesses.

Battery System: The coach will be equipped with a dual battery system. The auxiliary battery selected to support the conversion Load will be a Group 4D, 1314 CCA rating.

Power Converter: A 120 VAC to 12 VDC 50amp power converter will be provided to support 12 VDC electrical load during generator or shore power operation.

Generator: One (1) 20 KW Kohler water-cooled diesel powered generator will be provided. The generator will include a remote start with an hour meter located in the coach electrical load Center panel. Fuel supply for the generator will be provided from a skid fuel tank.

Electrical Load Center: The load center will consist of an anodized aluminum panel equipped with appropriately sized Heinemann circuit breakers for both 120 VAC and 12 VDC applications. A power transfer switch will be located at the electrical distribution panel for selection of either generator power or shore power.

Shore Power: A 240VAC 60Hz. 50' hard-wired shore power cable with connectors will be provided and stored in an exterior compartment.

120 VAC Lighting: The vehicle interior will be equipped with fluorescent lights. All lights will be wired on a single circuit connected to a single circuit breaker. No wall outlets or other electrical devices are on the light circuit.

12 VDC Utility Lighting: Utility lighting will include ceiling mounted lights. Additional 12 VDC lights will be installed in each exterior compartment, at the main entry doors, and four to six external Scene lights on the street side and the curbside.

Electrical Outlets: 120 VAC duplex outlets will be located throughout the coach to provide electrical power for all workstations and appliances. Two (2) 120Vac duplex outlets will be installed on the exterior of the vehicle; one (1) street side and one (1) curbside.

Raceway: A two-piece multi-channel nonmetallic raceway will perimeter all work stations for access to 120 VAC, computer wiring, radio and telephone connections. It will meet UL flammability requirements of UL-5; and be constructed of material with UL94V-O rating.
Interior

Insulation: The vehicle will be insulated with spray foam insulation.

Flooring: Floor surfaces will be covered with 1/2" plywood and finished with commercial grade vinyl. The Commonwealth has a choice of colors. (Lonseal no seam flooring, optional.)

Ceiling: Ceiling will be covered with 1/2" plywood and finished with sound absorbing, flame retardant, 26 oz. carpet or Kemlite vinyl material. The Commonwealth has a choice of colors.

Walls: Walls will be covered with 1/2" plywood and finished with Carpet, Kemlite or Laminate paneling. The Commonwealth has a choice of colors.

Cabinet Construction: Interior cabinets and desks will be constructed of ¾” Luan plywood. Cabinet interiors will be finished with a white laminate cabinet liner. All cabinet doors will be finished with laminate. Overhead doors to be side or top hinged (depending on cabinet location). All cabinetry will have positive latches to prevent opening while vehicle is in motion. Counter tops and desk tops will be finished with a laminate in a customer approved color.

Heating and Air Conditioning

Air Conditioning: Three ton Bard A/C Unit with hot gas bypass system will be mounted on the rear of the vehicle with ceiling aluminum ductwork. Duct system will be insulated.

Heating: Air conditioning unit will be supplied with heat strips. (Two space heaters will also be installed.)

Safety Equipment

Two (2) 5-lb. BC fire extinguishers
Two (2) 12VDC smoke detectors / alarms ceiling mounted
Carbon Monoxide detector / alarm
Ground fault interrupter

Miscellaneous Equipment

Awning over Entry door
Amplified TV Antenna
Telephone/ LAN Cable Entry and Demarcation Panels

Table 1-1 - Temporary Dispatch Trailers, Generic Specifications
### TABLE 1-2

**STARS Fleetmapping Responsibility Matrix**

**RESPONSIBILITY LEGEND:**
- VA -- Commonwealth of Virginia
- M-Eng -- Motorola System Engineer
- M-ST -- Motorola System Technician
- M-MSS -- Motorola Service Shop
- M-Sales – Motorola Sales

<table>
<thead>
<tr>
<th>Step 1: System Technical Information</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Select System ID</td>
<td>M-Eng</td>
</tr>
<tr>
<td>2. Select Control Channels</td>
<td>M-Eng</td>
</tr>
<tr>
<td>3. Select System Connect Tone</td>
<td>M-Eng</td>
</tr>
<tr>
<td>4. Finalize System Equipment (FNE &amp; Subscribers)</td>
<td>M-Eng</td>
</tr>
<tr>
<td>5. Identify equip. options, (or likely future options) with the STARS PD</td>
<td>M-Sales</td>
</tr>
<tr>
<td>6. Enter preliminary Trunked Data Repository (TDR)</td>
<td>M-Eng</td>
</tr>
<tr>
<td>7. Review Responsibility Matrix</td>
<td>M-Eng</td>
</tr>
<tr>
<td>8. Create spreadsheet to log information using Excel</td>
<td>M-Eng</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Step 2: System Operation Information</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>9. Provide Customer with Fleetmap philosophy</td>
<td>M-Eng</td>
</tr>
<tr>
<td>10. Fleetmap Training</td>
<td>M-Eng</td>
</tr>
<tr>
<td>11. Describe Fleetmap limitations</td>
<td>M-Eng</td>
</tr>
<tr>
<td>12. Explain Operational Options (Emergency, Scan, etc.)</td>
<td>M-Eng</td>
</tr>
<tr>
<td>13. Select desired operational features</td>
<td>VA</td>
</tr>
<tr>
<td>14. Describe Trunking Protocol options</td>
<td>M-Eng</td>
</tr>
<tr>
<td>15. Select Trunking protocol (Msg., Transmission, PTT-ID)</td>
<td>M-Eng</td>
</tr>
<tr>
<td>Step</td>
<td>Task Description</td>
</tr>
<tr>
<td>------</td>
<td>------------------</td>
</tr>
<tr>
<td>16</td>
<td>Establish Site or System Roaming parameters</td>
</tr>
<tr>
<td>17</td>
<td>Describe talkgroup &amp; individual priority options</td>
</tr>
<tr>
<td>18</td>
<td>Select desired priorities</td>
</tr>
</tbody>
</table>

**Step 3: Map Customer's Organization**

<table>
<thead>
<tr>
<th>Step</th>
<th>Task Description</th>
<th>Responsible Parties</th>
</tr>
</thead>
<tbody>
<tr>
<td>19</td>
<td>STARS Project Management Team</td>
<td>VA</td>
</tr>
<tr>
<td>20</td>
<td>Obtain Customer Radio User Specific Org. Chart</td>
<td>VA</td>
</tr>
<tr>
<td>21</td>
<td>Identify Agencies and Work Groups</td>
<td>VA/</td>
</tr>
<tr>
<td>22</td>
<td>Describe operations process &amp; work group Comm. Needs</td>
<td>VA</td>
</tr>
</tbody>
</table>

**Step 4: Create Fleetmap Structure**

<table>
<thead>
<tr>
<th>Step</th>
<th>Task Description</th>
<th>Responsible Parties</th>
</tr>
</thead>
<tbody>
<tr>
<td>23</td>
<td>Explain Zone, Multigroup and Talkgroup structure</td>
<td>M-Eng</td>
</tr>
<tr>
<td>24</td>
<td>Create Talkgroup Structure based on operational Needs</td>
<td>VA/ MOT</td>
</tr>
<tr>
<td>25</td>
<td>Describe system failure modes... (Failsoft, Site Trunking)</td>
<td>M-Eng</td>
</tr>
<tr>
<td>26</td>
<td>Select Failsoft Channel Talkgroups</td>
<td>VA</td>
</tr>
<tr>
<td>27</td>
<td>Describe Emergency Protocols (Ruthless, Top of Queue, Talkgroup Steering)</td>
<td>M-Eng</td>
</tr>
<tr>
<td>28</td>
<td>Select Desired Emergency Protocols</td>
<td>VA</td>
</tr>
</tbody>
</table>

**Step 5: Develop System Partitioning**

<table>
<thead>
<tr>
<th>Step</th>
<th>Task Description</th>
<th>Responsible Parties</th>
</tr>
</thead>
<tbody>
<tr>
<td>29</td>
<td>Define DIGITAL &amp; ANALOG ID Ranges</td>
<td>VA/M-Eng</td>
</tr>
<tr>
<td>30</td>
<td>Define 1st Pass Individual ID Plan</td>
<td>VA/M-Eng</td>
</tr>
<tr>
<td>31</td>
<td>Separate RIDs (Radio IDs) into Zones</td>
<td>VA/M-Eng</td>
</tr>
</tbody>
</table>

**Step 6: Update Trunked Data Repository (TDR)**

<table>
<thead>
<tr>
<th>Step</th>
<th>Task Description</th>
<th>Responsible Parties</th>
</tr>
</thead>
<tbody>
<tr>
<td>32</td>
<td>Finalize Technical Requirements &amp; Information</td>
<td>M-Eng</td>
</tr>
<tr>
<td>33</td>
<td>Update Trunked Data Repository</td>
<td>M-Eng</td>
</tr>
</tbody>
</table>
Step 7: Loading Analysis

<table>
<thead>
<tr>
<th></th>
<th>Activity</th>
<th>Responsible Party</th>
</tr>
</thead>
<tbody>
<tr>
<td>34</td>
<td>Assemble System Loading Information</td>
<td>M-Eng</td>
</tr>
<tr>
<td>35</td>
<td>(Mobile Data, Multigroup, Talkgroup, Pvt. Call, Telco Interconnect)</td>
<td>M-Eng</td>
</tr>
<tr>
<td>36</td>
<td>Recalculate Loading Analysis using loading prediction tool</td>
<td>M-Eng</td>
</tr>
</tbody>
</table>

Step 8: Assign Final Aliases and ID's

<table>
<thead>
<tr>
<th></th>
<th>Activity</th>
<th>Responsible Party</th>
</tr>
</thead>
<tbody>
<tr>
<td>37</td>
<td>Describe Aliases &amp; ID operation and limitations with Talkgroups</td>
<td>M-Eng</td>
</tr>
<tr>
<td>38</td>
<td>Assign Aliases for Talkgroups</td>
<td>VA</td>
</tr>
<tr>
<td>39</td>
<td>Assign ID ranges</td>
<td>VA</td>
</tr>
</tbody>
</table>

Step 9: Create Radio Templates

<table>
<thead>
<tr>
<th></th>
<th>Activity</th>
<th>Responsible Party</th>
</tr>
</thead>
<tbody>
<tr>
<td>40</td>
<td>Review Zone, Multigroup and Talkgroup Concepts</td>
<td>M-Eng</td>
</tr>
<tr>
<td>41</td>
<td>Explain Template Concept</td>
<td>M-Eng</td>
</tr>
<tr>
<td>42</td>
<td>Review Radio Features &amp; Controls</td>
<td>M-Sales</td>
</tr>
<tr>
<td>43</td>
<td>Explain Multi-Zone Concept</td>
<td>M-Eng</td>
</tr>
<tr>
<td>44</td>
<td>Create Zone map/layout</td>
<td>MOT/VA</td>
</tr>
<tr>
<td>45</td>
<td>Create spreadsheet templates</td>
<td>MOT/VA</td>
</tr>
</tbody>
</table>

Step 10: Create Console Templates

<table>
<thead>
<tr>
<th></th>
<th>Activity</th>
<th>Responsible Party</th>
</tr>
</thead>
<tbody>
<tr>
<td>46</td>
<td>Explain Console Operation, Features &amp; Limitations</td>
<td>M-Eng</td>
</tr>
<tr>
<td>47</td>
<td>Define Console Resources per Folder</td>
<td>VA</td>
</tr>
<tr>
<td>48</td>
<td>Define Operator Position Requirements (paging, multiselect, patch etc.)</td>
<td>VA</td>
</tr>
<tr>
<td>49</td>
<td>Create console templates</td>
<td>M-Eng</td>
</tr>
<tr>
<td>50</td>
<td>Check console templates against radio templates</td>
<td>M-Eng</td>
</tr>
</tbody>
</table>

|   | **Table 1-2 - STARS Fleetmapping Responsibility Matrix** |

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**Commonwealth of Virginia**

**Statewide Agencies Radio System (STARS)**

**Section 1**

**Statement of Work**

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**Motorola**

35 years of innovation in mobile communications

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