

**SYSTEM PURCHASE**

**AGREEMENT**

**BETWEEN**

**THE CITY AND COUNTY OF DENVER**  
**(Buyer)**

**and**

**HARRIS CORPORATION**  
**RF COMMUNICATIONS DIVISION**  
**(Seller)**

# SYSTEM PURCHASE AGREEMENT

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## **SYSTEM PURCHASE AGREEMENT**

**THIS SYSTEM PURCHASE AGREEMENT** ("Agreement") is made and entered into as of the date set forth on the City signature page, below (the "Effective Date"), by and between The City and County of Denver, (hereinafter referred to as "Buyer") and Harris Corporation, a Delaware corporation, acting through its RF Communications Division (hereinafter referred to as "Seller") together the ("Parties").

### **WITNESSETH:**

**WHEREAS**, Buyer whose address 8500 Peña Blvd., Denver, CO 80249 and

**WHEREAS**, Seller, whose address is 221 Jefferson Ridge Parkway, Lynchburg, VA 24501, delivered a proposal (collectively, the "Seller's Proposal") to provide the radio communication system and services requested by Buyer.

**WHEREAS**, Buyer has selected Seller's Proposal and now desires to contract with Seller to provide Buyer with the radio communications system and services set forth in the Statement of Work attached to this Agreement as an exhibit.

**WHEREAS** Buyer and Seller desire to enter into this Agreement to set forth in writing their respective rights, duties and obligations hereunder.

**NOW, THEREFORE**, for and in consideration of the mutual promises contained herein and other good and valuable consideration, the sufficiency and receipt of which are hereby acknowledged, it is mutually agreed between the Buyer and Seller as follows:

### **SECTION 1. DEFINITIONS:**

As used herein, the terms set forth below shall have meanings set forth below.

- A.** "Acceptance" shall mean acceptance of the System as set forth in the Testing and Acceptance section of this Agreement.
- B.** "Acceptance Date" shall mean the date the System is accepted or deemed accepted as set forth in the Testing And Acceptance section of this Agreement.
- C.** "Acceptance Tests" shall mean the testing procedures attached to the Statement of Work and mutually agreed upon by Buyer and Seller to be performed to determine whether the System has met the acceptance criteria either set forth in the Statement of Work attached to this Agreement as an exhibit or as mutually agreed upon in writing by Buyer and Seller.
- D.** "Certificate of Insurance" shall mean the certificate to be provided by Seller evidencing the insurance coverage of Seller.
- E.** "Change Order" shall mean a written modification to the Total Agreement Price, Project Schedule or other Agreement terms which is signed by both Parties.
- F.** "Detailed Design Documents" shall mean those documents deliverable by Seller to Buyer at the conclusion of the Detailed Design Review described in the subsection Detailed Design Review under the Project Management Planning section of this agreement.

- G.** “Detailed Design Review” or “DDR” shall have the meaning given in the subsection Detailed Design Review under the Project Management Planning section of this agreement.
- H.** “Documentation Deliverables” shall mean the standard commercial quality manuals to be furnished by the Seller to the Buyer pursuant to the terms set forth in the Statement of Work attached to this Agreement as an exhibit and this Agreement.
- I.** "Effective Date of the Agreement" shall be the date on which the Agreement is signed by the last of the parties to sign the Agreement.
- J.** “Expiration Date” shall mean the date on which the Term of this Agreement shall end which shall be the end of the Warranty Period (as defined in the Warranty Section) except that some other sections of this Agreement may have a later end date for that section of the Agreement as specifically provided in those sections of this Agreement.
- K.** “FX Agreement” shall have the meaning given in Section Software License – Software Maintenance Services of this agreement.
- L.** "Hardware" shall mean, collectively, the Terminal Hardware and Infrastructure Hardware, as defined below.
- M.** "Infrastructure Hardware" shall mean the equipment, goods, and materials to be supplied by Seller for the System infrastructure, as further described in the Statement of Work attached to this Agreement as an exhibit.
- N.** “Project Kick-Off Meeting” shall have the meeting given in the Project Management and Planning section of this Agreement.
- O.** "Project Manager" shall mean each respective Party’s duly authorized representative designated to manage each Party’s Project obligations.
- P.** "Project Schedule" shall mean the schedule attached to the Statement of Work or otherwise mutually agreed upon by Seller and Buyer in writing for the delivery of the Hardware and Software and the performance of the Services described in the Statement of Work attached to this Agreement as an exhibit.
- Q.** “Project Sites” shall mean those sites where any construction work is performed or any Infrastructure Hardware is installed under the terms of this Agreement. The term “Project Sites” will include all of the Tower Sites (as defined below).
- R.** “Responsibility Matrix” shall mean the table included in the Statement of Work attached to this Agreement as an exhibit. which depicts the roles and responsibilities of Seller and Buyer set forth this Agreement.
- S.** "Services" or “Work” shall mean the services and work to be provided by Seller to Buyer included in the Statement of Work attached to this Agreement as an exhibit.
- T.** "Software" shall mean the proprietary computer software of Seller as owned exclusively by Seller or Seller's suppliers, as appropriate, and as further defined in and licensed to Buyer pursuant to the terms of the Software License Agreement.

- U. "Software License Agreement" shall mean the System Software License Agreement set forth in an exhibit attached to this Agreement.
- V. "Statement of Work" shall mean the description of the work to be performed by Seller to deliver the Hardware, install the System and provide the Services, all as described in an exhibit attached to this Agreement.
- W. "System" shall mean the radio communications system comprised of the Hardware and Software to be furnished by Seller to Buyer pursuant to the terms set forth in the Statement of Work attached to this Agreement as an exhibit.
- X. "Terminal Hardware" shall mean mobile units, portable units, control stations and related accessories to be provided by Seller as listed in the Statement of Work attached to this Agreement as an exhibit.
- Y. "Total Agreement Price" or "Maximum Contract Liability" shall mean the price of the Hardware, the Software license and the Services to be furnished by Seller to Buyer pursuant to the terms set forth in the Statement of Work attached to this Agreement as an exhibit and this Agreement.
- Z. "Tower Sites" shall mean those sites where equipment will be installed on existing or new towers as included in the Contractor's Proposal and to be finalized in the Detailed Design Documents or subsequent Change Orders.

## **SECTION 2. SCOPE OF WORK:**

- A. Seller shall furnish, deliver and install the Hardware and Software for the System and provide the Documentation Deliverables and Services in accordance with the terms of the Statement of Work, attached to this Agreement as an exhibit, the Project Schedule and this Agreement.
- B. The Detailed Design Documents, as described in the Project Management and Planning section of this Agreement and as amended from time to time in writing by the Parties, shall be incorporated into this Agreement after the Detailed Design Documents are approved by the Buyer and thereafter shall supersede any contrary provisions in the Statement of Work attached to this Agreement as an exhibit.
- C. Seller shall commence, carry on and complete its obligations under this Agreement with all deliberate speed in accordance with the dates set forth in the Project Schedule and in a sound, economical and efficient manner, in accordance with this Agreement and all applicable laws. In providing services under this Agreement, Seller agrees to cooperate with the various departments, agencies, employees and officers of Buyer.
- D. Seller agrees to secure at Seller's own expense all personnel necessary to carry out Seller's obligations under this Agreement. Such personnel shall not be deemed to be employees of Buyer nor shall they or any of them have or be deemed to have any direct contractual relationship with Buyer. Seller expressly understands and agrees that the Seller is and shall in all respects be considered an independent contractor.
- E. **Additional Services.** The Seller may also perform services, hereinafter referred to as "Additional Services," which relate to the subject matter of this Agreement, but which the Buyer determines to be not described in the Scope of Work or in excess of the requirements of the Scope of Work. Change orders and/or additional Statements of Work (SOWs) will be

provided as needed to document work beyond that identified in **Exhibit A**. The Seller shall be compensated for such Additional Services only if the services and the amount of fees and reimbursable expenses for the services have been authorized in writing in advance by the Buyer. The total amount of fees and reimbursable expense costs for Additional Services shall not cause this Agreement to exceed the Maximum Contract Liability set forth herein, and in no event shall the approval of Additional Services and the cost of performing them be deemed to constitute an agreement by the City to an increase in the Maximum Contract Liability.

### **SECTION 3. PROJECT MANAGEMENT AND PLANNING:**

- A. **Project Managers.** Seller shall designate a Project Manager who will lead the Seller’ team for the System installation project and other Services and Work described in this Agreement (the “Project”) and will serve as the Buyer’s primary point-of-contact for Seller’s project team and the official liaison between Seller’s project team and Buyer. Buyer shall designate a Project Manager to function as the single point-of-contact and official liaison between Seller’s Project Manager and the Buyer.
- B. **Project Completion Dates.** The Project completion dates are described in the schedule included in the Statement of Work, entitled “Project Schedule.” The Project Schedule may only be modified by mutual written approval of the Parties or as otherwise provided in this Agreement.
- C. **Project Kick-off Meeting.** Promptly after the Effective Date of the Agreement, the Seller’s Project Manager shall schedule a Project Kick-Off Meeting, the timing and location of which will be mutually agreed upon by Seller and Buyer. The objectives of this meeting include introduction of all project participants, review of the roles of the project participants, review of the overall project scope and objectives, review of the resource and scheduling requirements and review of current site status.
- D. **Site Visits.** All existing towers, shelters and associated equipment provided by or mandated by Buyer shall be satisfactory in all manners to accommodate the System proposed by the Seller. Following the Effective Date of the Agreement, the Buyer shall provide Seller with access to all Project Sites upon reasonable notice to allow Seller to thoroughly examine each Site and to perform the Detailed Design Review, to prepare a schedule of preparatory work required for each site and a timeline for completion of the preparatory work at each site.
- E. **Construction Management Services. Site Preparatory Work.** Seller shall perform the civil construction services set forth in the Statement of Work and the Responsibility Matrix including, but not limited to, the site improvement civil construction to be performed at the identified sites. Buyer shall identify and disclose to Seller any and all problems or conditions at all Project Sites of which Buyer is aware that may affect the Work to be performed by Seller under this Agreement.
- F. **Detailed Design Review.** The Detailed Design Review (“DDR”) phase will commence after the Effective Date of the Agreement, and conclude at a mutually acceptable time to maintain adherence to the Project Schedule. During the DDR, Seller’s Project Manager will meet with Buyer’s project team on one or multiple occasions to review the system design, technical data, and site specific information to confirm and to refine the System and Tower Sites. At the conclusion of the DDR, Seller will provide Buyer with the following documents (the “Detailed Design Documents”) for review and approval by Buyer:
- Final Siting Plans

- Project Schedule
- Engineered Site plans (sufficient for the Buyer to obtain required zoning approvals) and construction drawings for each site.
- Shelter Floor Plan Drawings
- Rack Elevation Drawings
- System Block and Level Diagrams
- Power and HVAC Loads
- Antenna Network Diagrams
- Site Frequency Plans (including spectrum analysis and intermodulation studies of existing and proposed frequencies at each site).
- TX Combiner Plan by Site
- Network Backhaul Plans
- Any other documents as mutually agreed upon by the parties

Buyer shall have fourteen (14) days to conduct its review of the above documents. Approval of Detailed Design Documents by the Buyer shall not be unreasonably withheld, conditioned or delayed.

- G. Project Schedule.** The Project Schedule for the Work is included in the Statement of Work, as an attachment entitled “Project Schedule.” Updates to the start dates and durations will be made as the information evolves and will be mutually agreed upon by both parties or updated as otherwise provided herein.
- H. System Implementation Communications.** Seller and Buyer shall jointly establish a plan that defines regular meetings, reporting structure, and other communications activities, including working sessions that may be needed throughout the term of this Agreement to plan sub-tasks, including at a minimum: (a) one or more DDR meetings to communicate the final engineering design; (b) formal monthly reports to Buyer’s Project Manager concerning work in progress and accomplishments; (c) periodic status meetings at which the parties’ Project Managers and other project participants will provide updates; (d) conference calls with Seller’s and Buyer’s project teams to discuss tasks, assign responsibility, and establish schedules; and (e) workshops or working sessions that may be needed throughout the Project to plan subtasks.
- I. Buyer Approvals.** Buyer will review and respond with reasonable promptness to all submittals or other items requiring its approval under this Agreement. For all such submittals or other items Buyer will provide the Seller with either; (i) written notification of Buyer's approval, or (ii) a written notification of conditional approval subject to Seller providing prompt correction of any noted deficiency, or (iii) in the case of a submittal that does not meet the requirements of the Agreement, a written notification of Buyer's disapproval. Buyer's disapproval notification will be provided with reasonable detail to sufficiently advise Seller of the basis on which the submittal was determined to be unacceptable. Buyer agrees that, except as otherwise provided, failure to provide approval, conditional approval or non-approval of a submittal for which its approval is required within fifteen (15) days of receipt of the submittal from the Seller shall constitute approval of the submittal. The parties agree that this section, Project Management and Planning, does not relate to the Testing and Acceptance procedures in the Testing and Acceptance section of this Agreement.



#### **SECTION 4. OBLIGATIONS FOR SYSTEM IMPLEMENTATION:**

The following subsections apply to the Work to be performed under the Agreement.

- A. **Project Management and Implementation Plan.** Buyer and Seller each agree to perform their respective tasks and obligations pertaining to permits and licenses, Project Site surveys, general Project Site-related responsibilities, general Hardware-related responsibilities, and Project Site-specific responsibilities as set forth in the Statement of Work. The Buyer's obligations set forth in the Statement of Work shall be performed by Buyer in a timely and proper fashion in accordance with the Project Schedule, or as otherwise agreed upon by Buyer and Seller, to allow Seller to timely perform its obligations under the Agreement.
- B. **Access.** Buyer shall provide access, at no cost to Seller, to all owned, leased, or licensed Project Sites at reasonable times, and with an escort (if required) at no charge, upon reasonable prior notification from Seller. Buyer shall ensure sufficient room, within reason, for construction vehicles used by Seller. Buyer, through its usual and customary process shall issue temporary identification cards to Seller's eligible personnel and its authorized subcontractors, if required, for access to any of the Project Sites.
- C. **Changes in Sites.** Any sites where Seller will operate and perform System installation under the terms of this Contract must be approved by Buyer, which approval shall not be unreasonably withheld, delayed or conditioned. Should Buyer direct an addition to, removal from, or modification of the list of sites as detailed in this Agreement that affects Seller's cost or schedule or System performance, the parties agree that such change shall entitle Seller to a Change Order and each Party shall attempt, in good faith to fully negotiate and execute such change order prior to commencement of the Work at the changed site.
- D. **Preparatory Work on Sites.** Notwithstanding anything to the contrary contained in this Agreement, the parties agree that some Project Sites may require tower replacement or modifications, as well as related permitting and licensing for Work and/or obtaining physical real estate space. As stated in the Responsibility Matrix, Buyer shall be responsible for securing all necessary site zoning, site access, or other permits (including but not limited to easements, impact studies, planning commission approval, variances, etc.) necessary for the Work, whether required by federal, state, or local authorities, with Seller assisting by providing information and any required civil engineering drawings. Buyer shall also have the responsibility to secure by lease, purchase, easement or otherwise all rights and access to selected sites or additional real estate as may be required. Buyer also shall be responsible for paying all utility charges to the appropriate utility for providing utility services to the System installation areas. The Parties agree to mitigate the need for tower replacement or modification to the extent practical. If any unanticipated tower replacements become necessary, Seller is entitled to an extension of time for any impacted activities and/or an equitable adjustment to the Contract Price to maintain the Project Schedule.
- E. **Frequency FCC Licensing.** The Buyer will be responsible for obtaining all Federal Communications Commission frequency licenses for the System, with Seller providing technical assistance and information as set forth in the Statement of Work. Seller has no responsibility or obligation to secure licensed frequencies.
- F. **Federal Aviation Administration (FAA) Approvals.** Buyer will be responsible for obtaining all approvals for newly-constructed or modified towers.

- G. **Contractor Licenses.** Seller will be responsible for obtaining all contractor licenses required for the performance of its duties and obligations.

**SECTION 5. DELIVERY, TITLE AND RISK OF LOSS:**

- A. Seller shall ship the Hardware to Buyer at Buyer's expense on or before the dates set forth in the Project Schedule. Partial deliveries shall be permitted. Upon delivery to the first carrier, title to each portion of the Hardware and all risk of loss or damage shall pass to Buyer; provided, however, that Seller shall remain responsible until Acceptance of the System for loss or damage resulting from the willful misconduct or negligent acts or omissions of Seller, its employees, agents, and subcontractors. Buyer shall keep the Hardware fully insured for the total amount of all monies then due, or yet to become due, to Seller with respect to this Agreement.
- B. If Buyer fails to take delivery of any of the Hardware, Seller may place such Hardware in storage at the place of manufacture or elsewhere. In such event: (1) Seller shall notify Buyer of the placement of any Hardware in storage; (2) Seller's delivery obligations shall be deemed fulfilled and title and all risk of loss or damage shall thereupon pass to Buyer; (3) any amounts otherwise payable to Seller upon delivery shall be payable upon presentation of Seller's invoices therefore; and (4) promptly upon submission of Seller's invoices therefore Buyer shall reimburse Seller for all expenses incurred by Seller such as preparation for and placement into storage, handling, storage, demurrage, inspection, preservation and insurance.

**SECTION 6. PRICE / MAXIMUM CONTRACT LIABILITY:**

The Total Agreement Price to be paid by Buyer to Seller is Five Million Three-Hundred Seventy-Five Thousand Dollars and Zero Cents (\$5,375,000.00). The individual prices for the units of Hardware, the Software license and the Services to be performed are as set forth in the Price Schedule as an attachment to the Statement of Work.

**SECTION 7. TAXES:**

In addition to any price specified herein, Buyer shall pay the gross amount of any present or future sales, use, excise, value-added, or other similar tax applicable to the price, sale or any Products or services furnished hereunder or to their use by Seller or Buyer, or Buyer shall otherwise furnish Seller with tax exemption certificates acceptable to all applicable taxing authorities.

**SECTION 8. CHANGES AND ADDITIONS:**

- A. **Hardware Changes.** In the event of any change in the Hardware as a result of the imposition after the Effective Date of this Agreement of any requirements by any federal, state, or local government, an equitable adjustment in the price shall be made to reflect any added cost and expense of such change and the Agreement shall be modified in writing accordingly.
- B. **Buyer Requested Changes.** Buyer may request changes in or additions to the Work or in the time or place of performance of the Work under this Agreement. If any such change causes an increase or decrease in the cost of, or the time required for, performance of any part of the Work under this Agreement, Seller shall be entitled to an equitable adjustment, by change order, in the Total Agreement Price, the Project Schedule, or both. Any such adjustment in the Total Agreement Price or Project Schedule shall be mutually satisfactory to Buyer and Seller. Price increases and/or extensions of time shall not be binding upon either Party unless and until evidenced by a change order signed by the parties hereto.

- C. **Buyer Delays In Performance.** To the extent that Buyer fails to timely perform its obligations under the Responsibility Matrix or otherwise under this Agreement, and such failure has a material impact on the cost of Work performed by Seller under the Agreement and/or the schedule, the parties agree that Seller shall be entitled to an equitable adjustment to the Project Schedule, the Total Agreement Price, or both and that a Change Order shall be agreed to by the parties.
- D. **Concealed Conditions.** If, following Buyer's acceptance of the Detailed Design Documents, Seller encounters a concealed condition, of which it had no reason to be aware, at one or more Project Sites, then the Parties agree to work together to determine the best course of action and agree to negotiate in good faith a Change Order and an equitable adjustment to the Project Schedule and/or Total Agreement Price.
- E. **Product Discontinuance.** Subject to its obligation to fulfill its obligations set forth in the Agreement, Seller reserves the right to change or to discontinue any product covered by the Agreement provided that Seller agrees to make available to the Buyer a functionally equivalent replacement product equal to or better than the product discontinued.
- F. **Frequency Support and Frequency Changes.** Seller shall reasonably support Buyer in submitting the Buyer's frequency licensing applications to the Regional authorities and the Federal Communications Commission for this project. In the event that, after all commercially reasonable efforts and due diligence have been expended, the Buyer cannot obtain all of the necessary United States and Canada government approvals for the frequency plan as described in this Statement of Work and this Agreement, it shall be treated as an excusable delay event pursuant to the Excusable Delays section of this agreement for which an extension to the Project Schedule shall be granted, and Seller will diligently and expeditiously prepare and provide to Buyer a System re-design for its review and approval including all price and schedule changes. Notwithstanding anything to the contrary contained in the Agreement, the Parties agree that Seller may be entitled to an equitable adjustment to the Total Agreement Price and/or the Project Schedule for Seller's services on any such System re-design. In the event that Buyer and Seller cannot mutually agree on the System re- design, either party may then terminate the Agreement on thirty (30) days written notice to the other Party.

## **SECTION 9. PAYMENTS:**

- A. The Total Agreement Price for the Hardware, the Software license and the Services shall be paid by the Buyer to Seller as follows:
- A.1. Infrastructure Hardware:
1. Fifteen percent (15%) of the Total Agreement Price shall be due at the time of the signing of the Agreement by the Buyer and Seller.
  2. Thirty-five percent (35%) of the Total Agreement Price shall be due at the time of the Infrastructure Hardware staging validation as described in the project schedule.
  3. Thirty-five percent (35%) of the Total Agreement price shall be due at the time of Infrastructure Hardware shipment and delivery to Buyer. Partial payments of the total Infrastructure Hardware amount due under this subparagraph shall be allowed and shall be calculated using the value of the Infrastructure shipped and delivered as a percentage of the total value of the Infrastructure Hardware to be shipped and delivered under the terms of this Agreement.

4. Fifteen percent (15%) of the Total Agreement price, plus any remaining unpaid portion of the Total Agreement Price for all Hardware, Software and Services to be provided under the terms of this Agreement, shall be due upon completion of DIA site build, onsite training, acceptance testing and final Acceptance of the System.

A.2. Terminal Hardware:

1. One Hundred Percent (100%) of the purchase price of Terminal Hardware shall be invoiced upon shipment of unit on a per unit basis.

**B. Payment Dates**

The Payment(s) associated with the event(s) above shall be due thirty (30) days following the date of Seller's invoice.

**C. Other Amounts**

Any other amounts due Seller hereunder shall be due upon Buyer's receipt of Seller's invoice.

**D. Late Payments / Prompt Pay Ordinance**

All amounts past due over thirty (30) days shall accrue interest from their due date at the rate of one and one-half percent (1-1/2%) per month (or such lesser rate as may be the maximum permissible rate under applicable law). The Seller is subject to D.R.M.C. Section 20-112 wherein the Seller is to pay its subcontractors in a timely fashion. A payment is timely if it is mailed to the subcontractor no later than seven days after receipt of any payment from City. Any late payments are subject to a late payment penalty as provided for in the prompt pay ordinance (Denver Revised Municipal Code, Section 20-107 through 20-118).

**SECTION 10. SUBCONTRACTING:**

Seller may subcontract any portion of Work to be performed by Seller hereunder provided that Seller shall be responsible for the performance and Work of any such subcontractors.

**SECTION 11. EXCUSABLE DELAYS:**

- A. Seller shall not be liable for delays in delivery or failure to perform due directly or indirectly to: (1) causes beyond Seller's reasonable control, (2) Acts of God, acts (including failure to act) of any governmental authority (de jure or de facto), wars (declared or undeclared), riots, revolutions, strikes or other labor disputes, fires, floods, sabotage, nuclear incidents, earthquakes, storms, epidemics, (3) Seller's inability to timely obtain necessary materials, items, components or services from suppliers who are affected by the foregoing circumstances, or (4) the failure of the Buyer to perform its obligations hereunder in a timely manner. The foregoing shall apply even though any of such causes exists at the time of signature of the Agreement by Seller or occurs after delays in Seller's performance of its obligations due to other reasons.
- B. In the event of any delay or failure excused by this Section Excusable Delays, Seller shall as soon as practical notify Buyer and shall at the same time, or at the earliest practical date after such notice, specify the revised delivery and performance dates. In the event of such delay, the time of delivery or of performance shall be extended for a reasonable time period to compensate for the time lost by Seller by reason of the delay.

**SECTION 12. SELLER'S INSURANCE:**

A. The Seller shall obtain and keep in force during the entire term of this Agreement, including any warranty periods, all of the minimum insurance coverage forms and amounts set forth in **Exhibit E**, which is incorporated into this Agreement by this reference. The Seller shall submit to the City fully completed and executed certificates of insurance (ACORD form or equivalent approved by the City) which specifies the issuing company or companies, policy numbers and policy periods for each required form of coverage. The certificates for each insurance policy are to be signed by a person authorized by the insurer to bind coverage on its behalf, and must be submitted to the City at the time the Seller signs this Agreement.

B. All certificates and any required endorsements must be received and approved by the City before any work commences. Each insurance policy required by this Agreement must be in effect at or prior to commencement of work under this Agreement and remain in effect for the duration of the project, including any warranty periods. Failure to maintain the insurance policies as required by this Agreement or to provide evidence of renewal is a material breach of the Agreement. All subcontractors' work shall also be subject to the minimum requirements identified in **Exhibit E**. All subcontractors' certificates and endorsements must be received and approved by the Seller before work commences. The City reserves the right to request copies of these certificates at any time.

C. All certificates required by this Agreement shall be sent directly to Denver International Airport, Risk Management, Airport Office Building, Room 8810, 8500 Pena Boulevard, Denver, Colorado 80249. The City Project/Agreement number and project description shall be noted on the certificate of insurance.

D. The City's acceptance of any submitted insurance certificate is subject to the approval of the City's Risk Management Administrator. All coverage requirements specified in the certificate shall be enforced unless waived or otherwise modified in writing by the City's Risk Management Administrator.

E. The Seller shall comply with all conditions and requirements set forth in the insurance certificate for each required form of coverage during all periods in which coverage is in effect.

F. The insurance coverage forms specified in this Agreement are the minimum requirements, and these requirements do not lessen or limit the liability of the Seller under the terms of this Agreement, including the Indemnification provisions herein. The Seller shall maintain, at its own expense, any additional kinds and amounts of insurance that it may deem necessary to cover its obligations and liabilities under this Agreement.

**SECTION 13. TESTING AND ACCEPTANCE:**

A. Seller shall notify Buyer that the System is ready for Acceptance Tests at least ten (10) days before commencement of the Acceptance Tests. Buyer and Seller shall jointly commence the Acceptance Tests on the date specified in Seller's notice (or other mutually agreeable date) and a representative of Seller and a representative of Buyer shall sign off on the form provided as part of the test procedure whether each item of the test was passed or failed. If the System does not fulfill the requirements of the Acceptance Tests, Seller shall correct the defects at no additional cost to Buyer as soon as practicable. Upon correction of the defects the Acceptance Tests

for the applicable part of the System shall be repeated in accordance with the procedures set forth in this Section. Successful completion of the Acceptance Test is the sole criterion for technical system acceptance and the initiation of the warranty period. Final system acceptance shall occur when the Hardware and Software for the System, Documentation Deliverables and Services have been furnished, delivered, installed and the Acceptance Tests have been passed.

- B.** Notwithstanding the acceptance testing of the System set forth in subsection A above, if Buyer commences use of any portion of the System for its intended purpose, other than for the express purpose of training or testing as mutually agreed upon by Seller and Buyer in writing, prior to System Acceptance, the applicable portion of the System shall be deemed accepted by Buyer. The final payment for the applicable portion of the System shall be due and payable upon such acceptance. The Warranty Period for the applicable portion of the System put into use together with the associated installation Services shall be deemed to have commenced concurrently with the use of the applicable portion of the System for its intended purpose. The use of the applicable portion of the System for its intended purpose shall be deemed to have occurred when Buyer commences to use and rely primarily on the applicable portion of the System for its communications.
- C.** As used in the Agreement, the term "Acceptance Date" shall mean and "Acceptance" of the System shall be deemed to occur upon the earlier of: (1) the date on which the System is deemed accepted pursuant to subsection (A) above, or (2) the date on which the System is deemed accepted pursuant to subsection (B) above.
- D.** Buyer and Seller agree that in the process of completing the Acceptance Tests, most if not all of the Acceptance Tests can be successfully completed with only a minor number of punchlist items remaining to be completed. In such event, Buyer and Seller shall mutually (and reasonably) agree upon the punchlist items to be completed, the value of those items and that "conditional acceptance" of the System has occurred. For the purpose of initiating the Warranty Period, satisfying the Project Schedule requirements and the release of any retained funds (other than the value of the punchlist items) conditional acceptance shall constitute "Acceptance" of the specific portion or phase of the System. This conditional acceptance shall not, however, release Seller from its obligations to complete the remaining punchlist items by the dates set forth on the punchlist schedule.
- E.** Terminal Hardware shall be deemed accepted upon Buyer's receipt of delivery at a Buyer-controlled facility, together with a bill of sale or other reasonably requested evidence of title.

#### **SECTION 14. SOFTWARE LICENSE, SOFTWARE MAINTENANCE SERVICES**

- A.** Subject to the terms and conditions of the Software License Agreement attached hereto as an exhibit to this Agreement, Buyer is granted a license to use the Software only in conjunction with the System purchased under this Agreement. "Software" means the "Licensed Programs" as defined in the Software License Agreement.
- B.** Seller shall furnish to Buyer a Software maintenance services contract ("FX Agreement") in the form set forth in an exhibit attached to this Agreement. Pricing for Software maintenance services shall be defined in the Price Schedule attached to the Statement of Work.

#### **SECTION 15. COVERAGE:**

Seller's representations concerning the distance at which usable radio signals will be transmitted and received by Hardware supplied hereunder are set forth in the Statement of Work. Coverage for the

System shall be measured as provided in the Testing and Acceptance section of this Agreement.

**SECTION 16. WARRANTIES:**

**A. Hardware and Services**

Seller warrants for the following periods of time from the Acceptance Date (hereinafter referred to as the "Warranty Period"), that the Hardware and installation Services furnished by Seller under this Agreement shall be free from defects in material and workmanship and shall conform to the Agreement specifications. Any and all claims for breach of this warranty are conclusively deemed waived unless made within the Warranty Period. The warranty period for additional Hardware purchased by Buyer from Seller after System Acceptance shall be warranted for the following periods of time from the date the Hardware is delivered to Buyer:

1. for mobile and portable radios ("Subscriber Units"), twenty-four (24) months.
2. for Unity<sup>®</sup> model Subscriber Units, thirty-six (36) months.
3. for all other Hardware, one (1) year.

**B.** For purposes of this Warranty the batteries supplied by Seller shall be deemed defective if: (1) the battery capacity is less than 80% of rated capacity, or (2) the battery develops leakage. Replacement batteries shall be warranted only for the remaining unexpired portion of the Warranty Period. This warranty becomes void if: (1) the battery has been subjected to any kind of misuse, detrimental exposure, or has been involved in an accident, or (2) the battery is used in equipment or service other than the Hardware for which it is specified.

**C.** During the Warranty Period if any component of the Hardware or portion of the installation Services fails to meet the foregoing warranties, Seller's sole obligation and Buyer's exclusive remedy under this warranty shall be the correction by Seller of the failure at Seller's option: (1) by repairing any defective component of the Hardware, or (2) by furnishing any necessary repaired or replacement parts, or (3) by the redoing of the faulty installation. Any such failure, or the repair or replacement of the defective component or the redoing of any installation, shall not extend the Warranty Period. Where such failure cannot be corrected by Seller's reasonable efforts, the parties will negotiate an equitable adjustment in price. Seller will be responsible for all charges incurred in returning defective parts to Seller's plant and shipping repaired or replacement parts to Buyer. All warranty labor must be performed by an authorized service group approved by Seller either at its place of business, for mobile or portable equipment, or at the Buyer's location for fixed location equipment should Seller determine that it is not feasible to return the fixed location equipment to Seller's authorized service group.

**D.** Any additional purchases of equipment, including radios, and installation services which may be purchased by Buyer and delivered or performed by Seller after System Acceptance, shall be warranted on the same terms, limitations, and exclusions as are set forth herein, except that the warranty on the equipment and installation services shall be for a period of two (2) years for additional Terminal Hardware items from the date of delivery of that item of equipment, one (1) year for additional Infrastructure Hardware items from the date of delivery of that item of equipment, and one (1) year from the date of completion of that installation service.

**E.** Seller's obligations shall not apply to: (1) Hardware or components thereof which are normally consumed in operation, or, or (2) defects which are the result of improper storage, use, or installation performed by other than Seller, maintenance performed by other than Seller, or repair

performed by other than Seller, or (3) Hardware which has been subjected to any other kind of misuse or detrimental exposure or has been involved in an accident, or (4) Hardware or installations altered or repaired by any party other than Seller without Seller's prior written consent.

**F. Coverage Warranty.** Notwithstanding the other provisions of this Section Warranties, Seller's only Warranty as to radio coverage is that the System, prior to Acceptance, shall have successfully passed the coverage tests in the Acceptance Test Plan.

**G. Software** The warranty for the Software is set forth in the Software License Agreement.

**H.** THE WARRANTIES AND REMEDIES SET FORTH IN THIS SECTION AND IN THE SOFTWARE LICENSE AGREEMENT CONSTITUTE THE ONLY WARRANTIES WITH RESPECT TO THE HARDWARE, SOFTWARE AND SERVICES AND THE BUYER'S EXCLUSIVE REMEDIES IN THE EVENT SUCH WARRANTIES ARE BREACHED. THEY ARE IN LIEU OF ALL OTHER WARRANTIES WHETHER WRITTEN, ORAL, EXPRESS, IMPLIED, OR STATUTORY INCLUDING, WITHOUT LIMITATION, THE WARRANTY OF MERCHANTABILITY AND THE WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE. IN NO EVENT SHALL SELLER BE LIABLE FOR SPECIAL, CONSEQUENTIAL OR INDIRECT DAMAGES INCLUDING, BUT NOT LIMITED TO, LOSS OF PROFITS OR REVENUES.

#### **SECTION 17. INTERFERENCE:**

Radio system coverage and performance are subject to degradation due to anomalous propagation and interference beyond the reasonable control of Seller. Seller cannot be responsible for degradation or disruption of Service caused by operation of other radio systems or by natural phenomena or other interference over which the Seller has no reasonable control. In the event of a case of degradation due to interference by an outside party, Seller will provide engineering support to Buyer at Buyer's expense to support Buyer's efforts in resolving the interference issue with the outside party.

#### **SECTION 18. INDEMNIFICATION:**

Seller shall be responsible for and agrees to indemnify, hold harmless and defend the Buyer and its boards, commissions, agencies, officers and employees from and against all liability, losses, damages, costs or expenses which the Buyer and its boards, commissions, agencies and employees may sustain, incur or be required to pay by reason of third party claims, demands and causes of action for damages resulting from personal injuries, loss of life or damage to tangible property to the extent resulting from the willful misconduct or negligent acts or omissions of Seller, Seller's officers, agents, employees, or subcontractors. Buyer agrees to notify Seller in writing as soon as practical of any third party claim, demand or cause of action for which Buyer will request indemnification from Seller. Buyer will provide Seller with the necessary information and assistance to defend or settle such claim, demand or cause of action. The obligations of Seller under this paragraph shall survive the expiration or termination of this Agreement.

#### **SECTION 19. PATENTS:**

**A.** Seller warrants that the System furnished hereunder shall be delivered free of any rightful claim of any third party for infringement of any United States patent or copyright. If Buyer notifies Seller promptly of the receipt of any claim that the System infringes a United States patent or copyright and gives Seller information, assistance and exclusive authority to settle and defend such claim, Seller at its own expense shall defend, or may settle, any suit or proceeding against Buyer so far as based on a claimed infringement which breaches this warranty. If, in any such suit arising from such claim, the continued use of the System for the purpose intended is enjoined by any court of competent jurisdiction, Seller shall, at its expense and option, either: (1) procure for Buyer the right to continue using the System, or (2) modify



the System so that it becomes non-infringing, or (3) replace the System or portions thereof so that it becomes non-infringing, or (4) remove the System and refund the purchase price (less reasonable depreciation for use). The foregoing states the entire liability of Seller for patent or copyright infringement by the System and is subject to any limitation of total liability set forth in this Agreement.

- B.** The preceding subsection (A) shall not apply to: (1) any portion of the System which is manufactured to Buyer's design, or (2) the use of the System in conjunction with any other apparatus or material not supplied by Seller to the extent that such conjoined use causes the alleged infringement. As to any portion of the System or use described in the preceding sentence, Seller assumes no liability whatsoever for patent infringement.
- C.** THE PATENT AND COPYRIGHT WARRANTY AND INDEMNITY OBLIGATIONS RECITED ABOVE ARE IN LIEU OF ALL OTHER PATENT AND COPYRIGHT WARRANTIES AND INDEMNITIES WHATSOEVER, WHETHER ORAL, WRITTEN, EXPRESS, IMPLIED OR STATUTORY.

#### **SECTION 20. LIMITATION OF LIABILITY:**

- A.** Except for Seller's liability to third parties for its willful misconduct or negligent acts or omissions as more particularly described in the Indemnification Section of this Agreement, the total liability of Seller, including its subcontractors or suppliers, for all claims of any kind for any loss or damage, whether in contract, warranty, tort (including negligence or infringement), strict liability or otherwise, arising out of, connected with, or resulting from the performance or non-performance of this Agreement or from the manufacture, sale, delivery, installation, technical direction of installation, resale, repair, replacement, licensing or use of any Hardware, Software or the furnishing of any Service, shall not exceed an amount equal to three times (3x) the Maximum Contract Liability of this Agreement. Except as to title, any such liability shall terminate upon the expiration of the Warranty Period.
- B.** IN NO EVENT, WHETHER AS A RESULT OF BREACH OF AGREEMENT, WARRANTY, TORT (INCLUDING NEGLIGENCE OR INFRINGEMENT), STRICT LIABILITY OR OTHERWISE, SHALL SELLER, OR ITS SUBCONTRACTORS OR SUPPLIERS, BE LIABLE FOR ANY SPECIAL, CONSEQUENTIAL, INCIDENTAL, INDIRECT OR EXEMPLARY DAMAGES INCLUDING, BUT NOT LIMITED TO, LOSS OF PROFITS OR REVENUES, LOSS OF USE OF THE HARDWARE OR ANY OTHER EQUIPMENT, COST OF CAPITAL, COST OF SUBSTITUTE GOODS, FACILITIES, SERVICES OR DOWNTIME COSTS.
- C.** Any action for any claim of any kind for any loss or damages arising out of, connected with, or resulting from the performance, non-performance or breach of the Agreement, or from the manufacture, sale, delivery, installation, technical direction of installation, resale, repair, replacement, licensing or use of any Hardware, Software or the furnishing of any Services, shall be commenced within one (1) year after the cause of action accrued or it shall be deemed waived or barred.
- D.** The provisions of this Section, LIMITATION OF LIABILITY, shall apply notwithstanding any other provisions of this Agreement or any other agreement.
- E.** The provisions of this Section, LIMITATION OF LIABILITY, shall survive the expiration or termination of this Agreement.

## **SECTION 21. REMEDIES:**

- A.** In the event of a material breach of this Agreement by Seller which shall continue for one hundred twenty (120) or more days after written notice of such breach (including a reasonably detailed statement of the nature of such breach) shall have been given to Seller by Buyer, Buyer shall be entitled to avail itself cumulatively of any and all remedies available at law or in equity (provided such remedies are not otherwise limited under the terms of this Agreement) and either: (1) suspend performance of its payment obligations under the Agreement for as long as the breach continues uncorrected; or (2) terminate this Agreement by written notice to Seller if the breach remains uncorrected. The following shall constitute material breaches of this Agreement:
1. violation by Seller of any State, Federal or local law, or failure by Seller to comply with any applicable States and Federal service standards, as expressed by applicable statutes, rules and regulations.
  2. failure by Seller to carry applicable licenses or certifications as required by law.
  3. failure of Seller to comply with reporting requirements contained herein.
  4. inability of Seller to perform the Work provided for herein.
- B.** In the event of: (1) any failure by Buyer for thirty (30) or more days to make any payment when due, or (2) any other material breach of this Agreement by Buyer which shall continue for one hundred twenty (120) or more days after written notice of such breach (including a reasonably detailed statement of the nature of such breach) shall have been given to Buyer by Seller, Seller shall be entitled to avail itself cumulatively of any and all remedies available at law or in equity (provided such remedies are not otherwise limited under the terms of this Agreement) and either: (1) suspend performance of its obligations under this Agreement for as long as the breach remains uncorrected; or (2) terminate this Agreement by written notice to Buyer if the breach remains uncorrected.
- C.** In the event Buyer terminates this Agreement as provided herein, all finished and unfinished Hardware and Documentation Deliverables produced or made by Seller for Buyer under this Agreement shall become the property of Buyer and Seller shall be entitled to receive compensation in accordance with the terms of this Agreement for any such Hardware and Documentation Deliverables. Notwithstanding the above, Seller shall not be relieved of liability to Buyer for damages sustained by Buyer by virtue of any breach of this Agreement by Seller described in subsection A above and, after providing Seller with written notice of breach as set forth in subsection A, Buyer may withhold any payments to Seller for the purpose of set-off of any damages, as agreed upon or finally adjudicated, against such payment.

## **SECTION 22. CONFIDENTIALITY:**

- A.** During the term of this Agreement, it is anticipated that one party (hereafter the "Disclosing Party") may disclose to the other party (hereafter the "Receiving Party") information which the Disclosing Party considers proprietary and confidential. Accordingly, with respect to any specification, drawings, sketches, models, samples, tools, technical information, confidential business information or data, in written or other tangible form which: (1) has been designated in writing by the Disclosing Party as confidential or proprietary, or (2) is of the type that the Receiving Party customarily treats as confidential or proprietary, and which is furnished by the Disclosing Party to the Receiving party in contemplation of or under this Agreement (hereinafter "Information"), the Receiving Party shall treat such Information, for a period of five (5) years

after the Effective Date of this Agreement, as confidential information with the same degree of care as the Receiving Party affords to confidential information of its own of a similar nature and shall not reproduce any such Information, in whole or in part, except as specifically authorized in writing by the Disclosing Party.

- B.** The provisions of the preceding subsection shall not apply to any Information which:
1. is or shall become publicly available without breach of this Section Confidentiality, on the part of the Receiving Party;
  2. is already known by the Receiving Party prior to receipt from the Disclosing Party;
  3. is independently developed by the Receiving Party;
  4. is rightfully obtained by the Receiving Party from third parties without restriction; or
  5. is required to be disclosed by appropriate governmental or judicial order provided that Receiving Party gives Disclosing Party prior written notice of such order and assists Disclosing Party in taking reasonable actions to restrict such order.
  6. is subject to disclosure pursuant to the Colorado Open Records Act (“CORA”), C.R.S. Section 24-72-201, *et. seq.*
- C.** The provisions of this Section, Confidentiality, shall survive the expiration or termination of this Agreement.
- D.** The confidentiality obligations of this Section, Confidentiality, shall not apply to Software, the confidentiality and other rights and obligations with respect to which are set forth in the Software License Agreement.

**SECTION 23. COMPLIANCE:**

Seller agrees to comply with all federal, state and local laws, ordinances, codes, rules and regulations in effect as of the Effective Date of this Agreement that may in any way affect the Work by Seller hereunder. Any Hardware or Software furnished by Seller under this Agreement shall comply in all material respects with federal, state and local laws and regulations applicable to the manufacture, packing, sale and shipment of such Hardware or Software as of the Effective Date of this Agreement and shall comply with any amendments thereto which may have come into effect prior to the time such Hardware or Software are delivered provided that the price and, if necessary, delivery of such Hardware or Software shall be equitably adjusted to compensate Seller for the effect of compliance with any such amendments.

**SECTION 24. NOTICES:**

Notices and other communications between the parties shall be transmitted in writing by certified mail or nationally recognized overnight courier service to the parties at the addresses set forth below and shall be deemed effective upon receipt by the receiving party. Either party may change its address by giving notice in writing thereof to the other party.

**IF TO BUYER:**

Chief Executive Officer  
Denver International Airport  
8500 Pena Blvd.  
Denver, CO 80249

WITH A COPY TO:  
Airport Legal Services  
8500 Pena Blvd., Suite 9810  
Denver, CO 80249

IF TO SELLER:  
Harris Corporation  
221 Jefferson Ridge Parkway  
Lynchburg, Virginia 24501  
Attn: Program Manager

WITH A COPY TO:  
Harris Corporation  
221 Jefferson Ridge Parkway  
Lynchburg, Virginia 24501  
Attn: Lori Rodriguez

**SECTION 25. ORDER OF PRECEDENCE:**

The Statement of Work and the following Exhibits are expressly incorporated herein by reference and, together with this Agreement, constitute the Agreement Documents. In the event of a conflict among or between the Agreement Documents, the documents shall control in the order of precedence set forth below:

1. Federal Appendix 1 and 3
2. Amendments to this Agreement
3. This Agreement (not including the Exhibits and documents listed below)
4. Detailed Design Documents
5. Exhibit A - Statement of Work, with Attachments
6. Exhibit B - Software License Agreement
7. Exhibit C - Software FX Agreement
8. Exhibit D - System Maintenance Agreement
9. Exhibit E - Certificate of Insurance

**SECTION 26. TERM:**

The term of this Agreement shall commence upon the Effective Date of this Agreement and FIVE (5) YEARS thereafter. The term of the Software license is set forth in the Software License Agreement.

**SECTION 27. ENTIRE AGREEMENT:**

The entire agreement of the parties is contained herein and this Agreement supersedes any and all oral agreements and negotiations between the parties relating to the subject matter hereof.

**SECTION 28. AMENDMENT:**

The parties expressly agree that this Agreement shall not be amended in any fashion except in a writing(s) executed by authorized representatives of both parties.

**SECTION 29. SEVERABILITY:**

The invalidity, in whole or in part, of any Section or part of any Section of this Agreement shall not affect the validity of the remainder of such Section or the Agreement.

**SECTION 30. WAIVER:**

No term of this Agreement may be waived except in a writing signed by the party waiving enforcement. No term of this Agreement shall be deemed to be waived by reason of any failure to previously enforce such term. In no event shall the making of any payment required by this Agreement constitute or be construed as a waiver by Buyer of any breach of the covenants of this Agreement or a waiver of any default of Seller and the making of any such payment by Buyer while any such default or breach shall exist shall in no way impair or prejudice the right of Buyer with respect to recovery of damages or other remedy as a result of such breach or default.

**SECTION 31. HEADINGS:**

Section headings are inserted for convenience only and shall not be used in any way to construe the meaning of terms used in this Agreement.

**SECTION 32. ASSIGNMENT; SUCCESSORS AND ASSIGNS:**

This Agreement shall not be assigned nor any interest or obligation in this Agreement transferred by either Party without the written consent of the other Party, which shall not be unreasonably withheld or delayed. Notwithstanding the above, Seller may assign this Agreement, without consent, (a) in whole or in part, to an affiliate or subsidiary or (b) in the event of a change of controlling ownership interest (either directly or indirectly) in Seller or in the event of merger, recapitalization, consolidation, other business combination or sale of all or substantially all of the assets of Seller. In addition, Seller may also assign or transfer, without consent, claims for money due or to become due Seller from Buyer under this Agreement to a bank, trust company or other financial institution if and only if the instrument of assignment contains a provision substantially to the effect that it is agreed that the right of the assignee in and to any moneys due or to become due to Seller shall be subject to prior claims of all persons, firms and corporations for services rendered or materials supplied for the performance of the Work called for in this Agreement. Seller shall promptly provide to Buyer notice of any such permitted assignment or transfer without consent.

**SECTION 33. CITY AND COUNTY OF DENVER REQUIRED PROVISIONS:**

A. STATUS OF SELLER:

It is agreed and understood by and between the parties hereto that the status of the Seller shall be that of an independent contractor retained on a contractual basis to perform professional or technical services for limited periods of time as described in Section 9.1.1(E)(x) of the Charter of the City and County of Denver, and it is not intended, nor shall it be construed, that the Seller or its personnel are employees or officers of the City under Chapter 18 of the Revised Municipal Code for any purpose whatsoever.

B. NO AUTHORITY TO BIND CITY TO CONTRACTS:

The Seller has no authority to bind the City on any contractual matters. Final approval of all contractual matters which obligate the City must be by the City as required by Charter and Ordinance.

C. NO EMPLOYMENT OF ILLEGAL ALIENS TO PERFORM WORK UNDER THE AGREEMENT:

1. The Agreement is subject to Article 17.5 of Title 8, Colorado Revised Statutes, and Den. Rev. Mun. Code 20-90 and the Seller is liable for any violations as provided in said statute and ordinance.

2. The Seller certifies that:

(a) At the time of its execution of this Agreement, it does not knowingly employ or contract with an illegal alien who will perform work under this Agreement.

(b) It will participate in the E-Verify Program, as defined in § 8 17.5-101(3.7), C.R.S., to confirm the employment eligibility of all employees who are newly hired for employment to perform work under this Agreement.

3. The Seller also agrees and represents that:

(a) It shall not knowingly employ or contract with an illegal alien to perform work under the Agreement.

(b) It shall not enter into a contract with a subcontractor or subseller that fails to certify to the Seller that it shall not knowingly employ or contract with an illegal alien to perform work under the Agreement.

(c) It has confirmed the employment eligibility of all employees who are newly hired for employment to perform work under this Agreement, through participation in the E-Verify Program.

(d) It is prohibited from using either the E-Verify Program or the Department Program procedures to undertake pre-employment screening of job applicants while performing its obligations under the Agreement, and it has complied with all federal requirements regarding the use of the E-Verify program, including, by way of example, requirements related to employee notification and preservation of employee rights.

(e) If it obtains actual knowledge that a subcontractor or subseller performing work under the Agreement knowingly employs or contracts with an illegal alien, it will notify such subcontractor and the City within three days. The Seller will also then terminate such subcontractor or subseller if within three days after such notice the subcontractor or subseller does not stop employing or contracting with the illegal alien, unless during such three day period the subcontractor or subcontractor provides information to establish that the subcontractor or subseller has not knowingly employed or contracted with an illegal alien.

(f) It will comply with any reasonable request made in the course of an investigation by the Colorado Department of Labor and Employment under authority of § 8-17.5-102(5), C.R.S. or the City Auditor under authority of Den. Rev. Mun. Code 20-90.3.

D. NO DISCRIMINATION IN EMPLOYMENT:

In connection with the performance of work under this Agreement, the Seller agrees not to fail or refuse to hire, discharge, promote or demote, or to discriminate in matters of compensation, terms, conditions or privileges of employment against any person otherwise qualified, solely because of race, color, religion, national origin, gender, age, military status, sexual orientation, marital status, or physical or mental disability; and the Seller further agrees to insert the foregoing provision in all subcontracts hereunder.

E. DSBO GOALS:

The Seller may be subject to the City's ordinance, DRMC Chapter 28, Article III (MBE/WBE Ordinance) which prohibits discrimination in the awarding of contracts and subcontracts and directs the DSBO Director to establish goals for MBE and WBE participation in the preconstruction and construction of City-owned facilities. The goal for this Agreement is: *0%*. If it is determined that project goals apply, such project goals must be met with certified MBE and WBE participants or by demonstrating good faith efforts under the MBE/WBE Ordinance. The Seller must comply with the terms and conditions of the MBE/WBE Ordinance in soliciting and contracting with its subcontractors in administering the performance of the work hereunder. It shall be an ongoing, affirmative obligation of the Seller to maintain, at a minimum, compliance with the originally achieved level of MBE/WBE participation upon which this Agreement was awarded, for the duration of this Agreement, unless the City initiates a material alteration to the scope of work.

F. PREVAILING WAGES:

Employees of the Seller or its subcontractors may be subject to the payment of prevailing wages pursuant to D.R.M.C. 20-76, depending upon the nature of the Work. By executing this Agreement, the Seller covenants that it is familiar with this Code Section and is prepared to pay or cause to be paid prevailing wages, if any, applicable to the work conducted by the Seller's or its subcontractor's employees. The schedule of prevailing wage is periodically updated and Seller is responsible for payment of then current prevailing wage. The Seller may obtain a current schedule of prevailing wage rates at any time from the City Auditor's Office.

G. COLORADO GOVERNMENTAL IMMUNITY ACT:

The parties hereto understand and agree that the City and County of Denver, its officers, officials and employees, are relying on, and do not waive or intend to waive by any provisions of this Agreement, the monetary limitations or any other rights, immunities and protections provided by the Colorado Governmental Immunity Act, §§ 24-10-101 to 120, C.R.S., or otherwise available to the City and County of Denver, its officers, officials and employees.

H. COLORADO OPEN RECORDS ACT:

The Seller acknowledges that the City is subject to the provisions of the Colorado Open Records Act, Colorado Revised Statutes §24-72-201 et seq., and the Seller agrees that it will fully cooperate with the City in the event of a request or lawsuit arising under such act for the disclosure of any materials

or information which the Seller asserts is confidential and exempt from disclosure. Any other provision of this Agreement notwithstanding, including exhibits, attachments and other documents incorporated into this Agreement by reference, all materials, records and information provided by the Seller to the City shall be considered confidential by the City only to the extent provided in the Open Records Act, and the Seller agrees that any disclosure of information by the City consistent with the provisions of the Open Records Act shall result in no liability of the City.

**I. EXAMINATION OF RECORDS:**

A. The Seller agrees that the City's duly authorized representatives, including but not limited to the City's Auditor, shall, until the expiration of three (3) years after the final payment under this Agreement, have access to and the right to examine any directly pertinent books, documents, papers and records of the Seller involving this Agreement.

B. In connection with any services performed hereunder on items of work toward which federal funds may be received under the Airport and Airway Development Act of 1970, as amended, the City, the Federal Aviation Administration, the Comptroller General of the United States, and any of their duly authorized representatives, shall have access to any books, documents, papers and records of the Seller which are directly pertinent to a specific grant program for the purpose of making audit, examination, excerpts and transcriptions. The Seller further agrees that such records will contain information concerning the personnel, hours and specific tasks performed, along with the applicable federal project number.

**J. CONFLICT OF INTEREST:**

The Seller agrees that it and its subsidiaries, affiliates, subcontractors, principals, or employees will not engage in any transaction, activity or conduct which would result in a conflict of interest. The Seller represents that it has disclosed any and all current or potential conflicts of interest. A conflict of interest shall include transactions, activities, or conduct that would affect the judgment, actions or work of the Seller by placing the Seller's own interests, or the interest of any party with whom the Seller has a contractual arrangement, in conflict with those of the City. The City, in its sole discretion, shall determine the existence of a conflict of interest and may terminate this Agreement if such a conflict exists, after it has given the Seller written notice which describes such conflict. The Seller shall have thirty days after the notice is received in which to eliminate or cure the conflict of interest in a manner which is acceptable to the City.

**K. GOVERNING LAW; BOND ORDINANCES; VENUE; DISPUTES:**

A. This Agreement is made under and shall be governed by the laws of Colorado. Each and every term, provision or condition herein is subject to the provisions of Colorado law, the Charter of the City and County of Denver, and the ordinances and regulations enacted pursuant thereto. Venue for any action arising hereunder shall be in the City and County of Denver, Colorado.

B. This Agreement is in all respects subject and subordinate to any and all City bond ordinances applicable to the Denver Municipal Airport System and to any other bond ordinances which amend, supplement, or replace such bond ordinances.

C. All disputes between the City and Seller regarding this Agreement shall be resolved by administrative hearing pursuant to the procedure established by D.R.M.C. § 5-17.

**L. COMPLIANCE WITH ALL LAWS AND REGULATIONS:**

All of the work performed under this Agreement by the Seller shall comply with all applicable



laws, rules, regulations and codes of the United States and the State of Colorado, the charter, ordinances and rules and regulations of the City and County of Denver, and all Denver International Airport Rules and Regulations.

**M. FEDERAL PROVISIONS:**

This Agreement is subject and subordinate to the terms, reservations, restrictions and conditions of any existing or future agreements between the City and the United States, the execution of which has been or may be required as a condition precedent to the transfer of federal rights or property to the City for airport purposes and the expenditure of federal funds for the extension, expansion or development of the Denver Municipal Airport System, including Denver International Airport. The provisions of the attached Appendices Nos. 1 and 3 are incorporated herein by reference.

**N. AIRPORT SECURITY:**

1. It is a material requirement of this Contract that the Seller shall comply with all rules, regulations, written policies and authorized directives from the City and/or the Transportation Security Administration with respect to Airport security. The Seller shall conduct all of its activities at the Airport in compliance with the Airport security program, which is administered by the Security Section of the Airport Operations Division, Department of Aviation. Violation by the Seller or any of its employees, subcontractors or vendors of any rule, regulation or authorized directive from the City or the Transportation Security Administration with respect to Airport Security shall be grounds for immediate termination by the City of this Contract for cause.

2. The Seller shall promptly upon notice of award of this Contract, meet with the Airport's Assistant Security Manager to establish badging and vehicle permit requirements for the Seller's operations under this Contract. The Seller shall obtain the proper access authorizations for all of its employees, subcontractors and vendors who will enter the Airport to perform work or make deliveries, and shall be responsible for each such person's compliance with all Airport rules and regulations, including without limitation those pertaining to security. Any person who violates such rules may be subject to revocation of his/her access authorization. The failure of the Seller or any subcontractor to complete any required services hereunder shall not be excused on account of the revocation for good cause of access authorization of any person.

3. The security status of the Airport is subject to change without notice. If the security status of the Airport changes at any time during the term of this Contract, the Seller shall take immediate steps to comply with security modifications which occur as a result of the changed status. The Seller may at any time obtain current information from the Airport Security Office regarding the Airport's security status in relation to the Seller's operations at the Airport.

4. The Seller shall return to the City at the expiration or termination of this Contract, or upon demand by the City, all access keys or access badges issued to it or any subcontractor for any area of the Airport, whether or not restricted. If the Seller fails to do so, the Seller shall be liable to reimburse the City for all the City's costs for work required to prevent compromise of the Airport security system. The City may withhold funds in the amount of such costs from any amounts due and payable to the Seller under this Contract.

**O. USE, POSSESSION OR SALE OF ALCOHOL OR DRUGS:**

The Seller and Seller's agents shall cooperate and comply with the provisions of the City and County of Denver Executive Order No. 94 and Attachment A thereto concerning the use, possession or sale of alcohol or drugs. Violation of these provisions or refusal to cooperate with implementation of the policy can result in the City's barring the Seller and Seller's agents from City facilities or participating in City operations.

P. CITY SMOKING POLICY:

Seller acknowledges that smoking is not permitted in Airport buildings and facilities except for designated Airport Smoking Concessions, and so agrees that it will prohibit smoking by its employees and the public in indoor areas and within 15 feet of entryways of the Airport Premises, except as may otherwise be permitted by the Colorado Clean Indoor Air Act, C.R.S. §§ 25-14-201 to 209. Seller and its officers, agents, and employees shall cooperate and comply with the provisions of the Denver Revised Municipal Code, §§ 24-301 to 317 et. seq., the Colorado Clean Indoor Air Act, C.R.S. §§ 25-14-201 to 209, City's Executive Order No. 99 dated December 1, 1993, and Executive Order No. 13 dated July 31, 2002.

Q. ELECTRONIC SIGNATURES AND ELECTRONIC RECORDS:

Seller consents to the use of electronic signatures by the City. The Agreement, and any other documents requiring a signature hereunder, may be signed electronically the City in the manner specified by the City. The Parties agree not to deny the legal effect or enforceability of the Agreement solely because it is in electronic form or because an electronic record was used in its formation. The Parties agree not to object to the admissibility of the Agreement in the form of an electronic record, or a paper copy of an electronic document, or a paper copy of a document bearing an electronic signature, on the ground that it is an electronic record or electronic signature or that it is not in its original form or is not an original.

R. CITY EXECUTION OF AGREEMENT:

This Agreement is expressly subject to and shall not be or become effective or binding on the City until it has been approved by City Council, if so required by law, and fully executed by all signatories of the City and County of Denver.

[SIGNATURE PAGE FOLLOWS]

**Contract Control Number:**

IN WITNESS WHEREOF, the parties have set their hands and affixed their seals at Denver, Colorado as of

SEAL

**CITY AND COUNTY OF DENVER**

ATTEST:

By \_\_\_\_\_

\_\_\_\_\_

APPROVED AS TO FORM:

REGISTERED AND COUNTERSIGNED:

By \_\_\_\_\_

By \_\_\_\_\_

By \_\_\_\_\_



**Contract Control Number:** PLANE-201417087-00

**Contractor Name:** HARRIS CORPORATION

By: Lori Rodriguez

Name: Lori Rodriguez  
(please print)

Title: Contracts Manager  
(please print)

**ATTEST: [if required]**

By: \_\_\_\_\_

Name: \_\_\_\_\_  
(please print)

Title: \_\_\_\_\_  
(please print)



## APPENDIX NO. 1

### STANDARD FEDERAL ASSURANCES

NOTE: As used below the term "contractor" shall mean and include the "Party of the Second Part," and the term "sponsor" shall mean the "City".

During the term of this contract, the contractor, for itself, its assignees and successors in interest (hereinafter referred to as the "contractor") agrees as follows:

1. Compliance with Regulations. The contractor shall comply with the Regulations relative to nondiscrimination in federally assisted programs of the Department of Transportation (hereinafter "DOT") Title 49, Code of Federal Regulations, Part 21, as they may be amended from time to time (hereinafter referred to as the Regulations), which are herein incorporated by reference and made a part of this contract.

2. Nondiscrimination. The contractor, with regard to the work performed by it during the contract, shall not discriminate on the grounds of race, color, sex, creed or national origin in the selection and retention of subcontractors, including procurements of materials and leases of equipment. The contractor shall not participate either directly or indirectly in the discrimination prohibited by section 21.5 of the Regulations, including employment practices when the contract covers a program set forth in Appendix B of the Regulations.

3. Solicitations for Subcontractors, Including Procurements of Materials and Equipment. In all solicitations either by competitive bidding or negotiation made by the contractor for work to be performed under a subcontract, including procurements of materials or leases of equipment, each potential subcontractor or supplier shall be notified by the contractor of the contractor's obligations under this contract and the Regulations relative to nondiscrimination on the grounds of race, color, or national origin.

4. Information and Reports. The contractor shall provide all information and reports required by the Regulations or directives issued pursuant thereto and shall permit access to its books, records, accounts other sources of information, and its facilities as may be determined by the sponsor or the Federal Aviation Administration (FAA) to be pertinent to ascertain compliance with such Regulations, orders, and instructions. Where any information required of a contractor is in the exclusive possession of another who fails or refuses to furnish this information, the contractor shall so certify to the sponsor of the FAA, as appropriate, and shall set forth what efforts it has made to obtain the information.

5. Sanctions for Noncompliance. In the event of the contractor's noncompliance with the nondiscrimination provisions of this contract, the sponsor shall impose such contract sanctions as it or the FAA may determine to be appropriate, including, but not limited to:

a. Withholding of payments to the contractor under the contract until the contractor complies, and/or

b. Cancellation, termination, or suspension of the contract, in whole or in part.

6. Incorporation of Provisions. The contractor shall include the provisions of paragraphs 1 through 5 in every subcontract, including procurements of materials and leases of equipment, unless exempt by the Regulations or directives issued pursuant thereto. The contractor shall take such action with respect to any subcontract or procurement as the sponsor or the FAA may direct as a means of enforcing such provisions including sanctions for noncompliance. Provided, however, that in the event a contractor becomes involved in, or is threatened with, litigation with a subcontractor or supplier as a result of such direction, the contractor may request the sponsor to enter into such litigation to protect the interests of the sponsor and, in addition, the contractor may request the United States to enter into such litigation to protect the interests of the United States.

## APPENDIX NO. 3

### NONDISCRIMINATION IN AIRPORT EMPLOYMENT OPPORTUNITIES

The Party of the Second Part assures that it will comply with pertinent statutes, Executive Orders and such rules as are promulgated to assure that no person shall, on the grounds of race, creed, color, national origin, sex, age, or handicap be excluded from participating in any activity conducted with or benefiting from Federal assistance. This Provision obligates the Party of the Second Part or its transferee for the period during which Federal assistance is to provide, or is in the form of personal property or real property or an interest herein or structures or improvements thereon. In these cases, this Provision obligates the Party of the Second Part or any transferee for the longer of the following periods: (a) the period during which the property is used by the sponsor or any transferee for a purpose for which Federal assistance is extended, or for another purpose involving the provision of similar services or benefits; or (b) the period during which the airport sponsor or any transferee retains ownership or possession of the property. In the case of contractors, this Provision binds the contractors from the bid solicitation period through the completion of the contract.

**It is unlawful for airport operators and their lessees, tenants, concessionaires and contractors to discriminate against any person because of race, color, national origin, sex, creed, or handicap in public services and employment opportunities.**

**EXHIBIT A**

**STATEMENT OF WORK**



## **Exhibit A – Statement of Work (with Attachments)**

**System Description**

**System Drawings**

**Responsibilities Matrix**

**Project Schedule**

**Price Schedule**

**Functional Acceptance Test Plan**

**Project Management Plan**

# System Description

## Proposal Overview – The Harris Solution

Harris understands that many customers are interested in evolving to a standards-based digital radio platform while maximizing the useful remaining life of their existing equipment. Harris is pleased to provide Denver International Airport (DIA) with a proposal to complete the migration of the existing Harris 800 MHz EDACS analog trunked radio system to an 800 MHz narrowband digital simulcast trunked radio system that meets the current APCO P25 Phase 1 trunking standard and is upgradeable to Phase 2. It will provide a common air interface (CAI), interoperation between EDACS and P25 units while transitioning, and interconnection compatibility with neighboring P25 systems via the Inter-RF-Subsystem-Interface (ISSI). This will connect the new DIA P25 system to the Metro Area Radio Cooperative (MARC), formerly known as the Denver Metro Core serving the City of Denver, City of Lakewood, and City of Arvada users.

The proposed P25<sup>IP</sup> system concept is based on Internet Protocols (IP) and Packet Switching technology for routing of voice traffic, which will provide a flexible, scalable network backbone with virtually unlimited addressing capacity. This cost-effective IP solution also represents a fresh approach to critical communications, unifying all disparate communications systems and equipment onto a single network solution. This Harris proposal incorporates a new P25 Radio System using the advanced MASTR V repeater with a Symphony dispatch console subsystem into one integrated solution.

Harris has provided a customized phased implementation plan which allows an adjustable schedule for transitioning from EDACS to the P25<sup>IP</sup> equipment. With a flexible step-by-step approach that can be modified if desired, DIA can budget and migrate key components of the system to a future-proof technology at a customer-paced schedule. A significant benefit of this approach is that it allows DIA to extend the longevity of the existing EDACS equipment. EDACS and the P25<sup>IP</sup> equipment can be utilized simultaneously during transitioning, and existing equipment can be phased out as needed. This simultaneous operation means both the P25 simulcast and EDACS simulcast systems will be running in parallel. After completion of the functional testing of the system, Harris will provide a cutover plan for DIA's user agencies to move from the EDACS system to the P25 system by converting channels from EDACS to P25. At the completion of the migration, the existing EDACS system will be decommissioned.

### The Harris Solution

- **Minimizes Cost**
- **Graceful EDACS-to-P25 Migration**
- **Maximizes Coverage**
- **Maximizes Traffic Capacity**
- **Sustains Regional Interoperability**
- **Maximizes Reliability & Dependability**
- **Future-Ready and Expandable**
- **Expedient Service/Maintenance**
- **Extends Our Long Working Relationship**

This document describes the design choices and decisions made in developing DIA's finalized P25 system. And to further improve the interoperability with neighboring systems, Harris' solution also includes updated VHF interoperability gateways (NetworkFirst). These interoperability gateways take the analog 4-wire audio from the existing VHF base stations, and convert them to digital IP P25 conventional talkgroups. Once converted, these talkgroups are accessible from all devices on the P25 system including dispatch consoles, P25 subscribers, logging recorders, and even P25 ISSI interfaces. DIA will need to provide more detail on the interface requirements that need to be supported by the interoperability gateways including tone control.

**The cost to the DIA is spread over several years for effective budget management. There is no costly one-time "overnight" forklift to P25. Life of the existing equipment can be extended. Transitional stages are flexible. Only Harris can provide this gradual evolution from an EDACS network.**

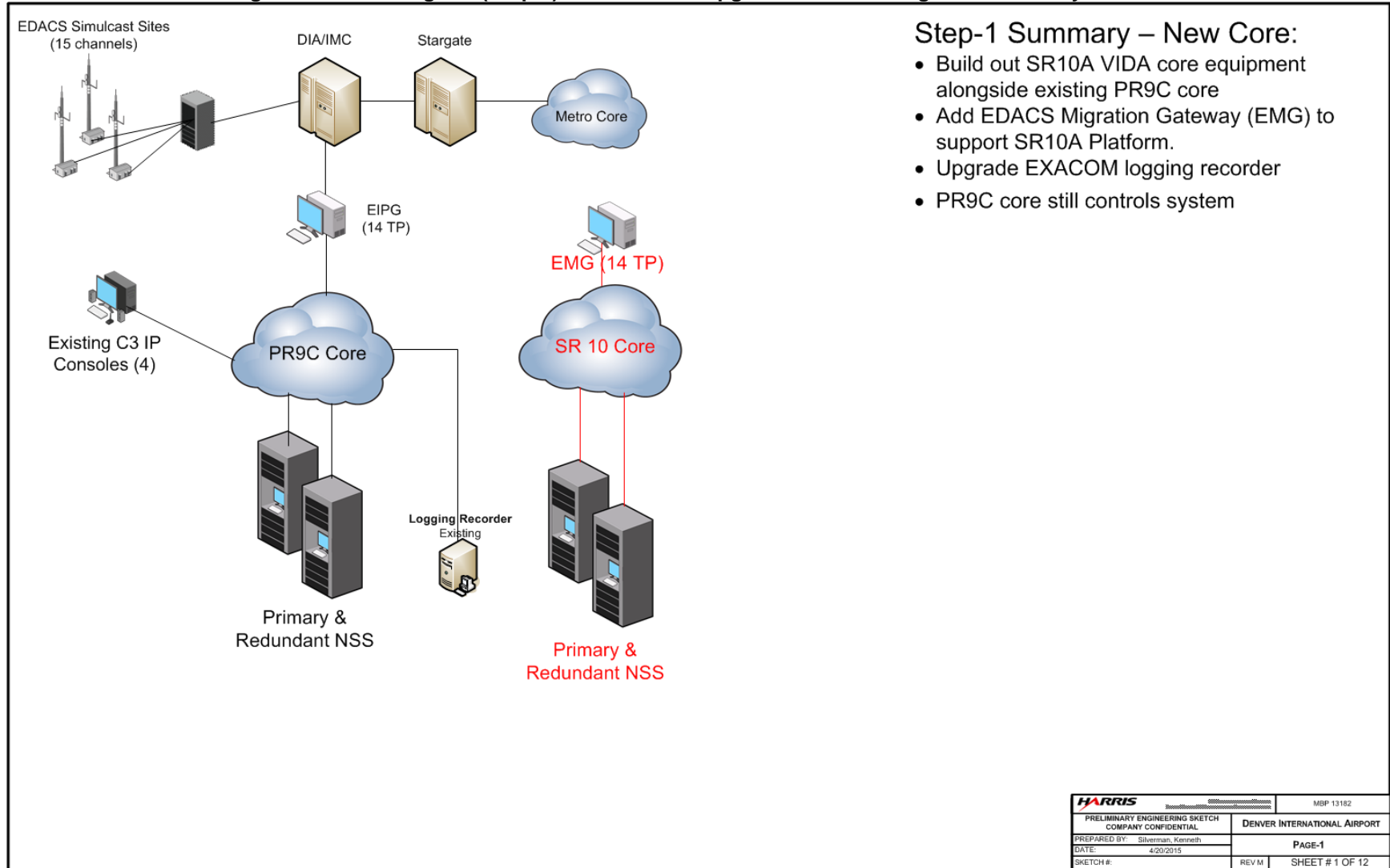
As indicated, the proposed solution is a scalable solution that can easily expand to accommodate more users and sub-systems. This scalability extends to additional interoperability by offering flexibility with interfaces to other agencies.

The DIA migration will be based on the plan Harris discussed during our meetings. This proposal includes four steps as follows:

- Step 1: SR10A Core Upgrade with new EDACS Migration Gateway
- Step 2: Symphony Hardware and Software Replacement
- Step 3: P25<sup>IP</sup> Simulcast Upgrade
- Step 4: Metro Core (MARC) Interoperability via ISSI

The following block diagrams show the transition from the existing system through the final step, Step 4 – Metro Core (MARC) Interoperability via ISSI.

Figure 1. Block Diagram (Step 1): SR10A Core Upgrade + EDACS Migration Gateway



Step-1 Summary – New Core:

- Build out SR10A VIDA core equipment alongside existing PR9C core
- Add EDACS Migration Gateway (EMG) to support SR10A Platform.
- Upgrade EXACOM logging recorder
- PR9C core still controls system

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Figure 2. Block Diagram (Step 2): Dispatch Hardware and Software Upgrades as well as EDACS System Connection

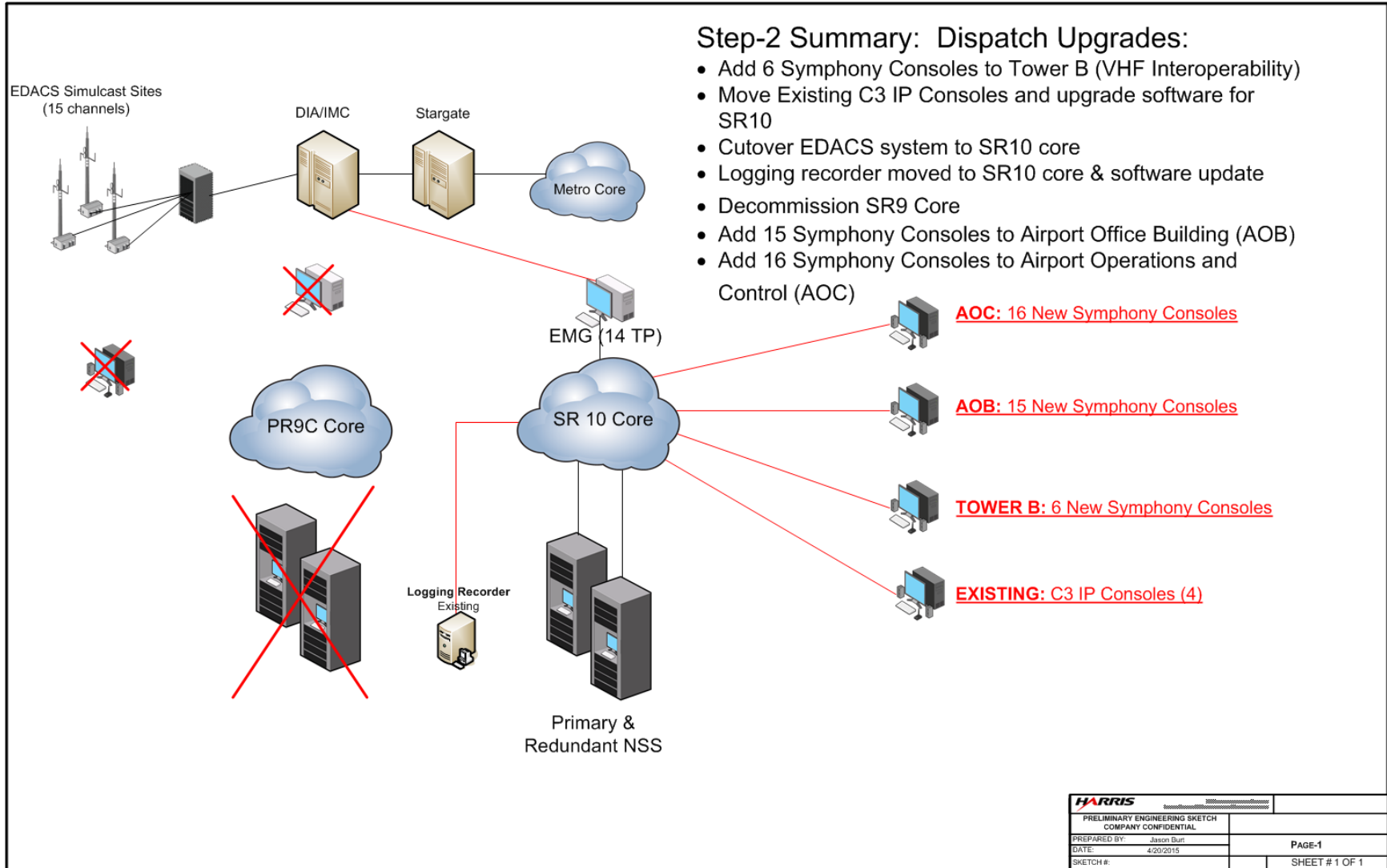


Figure 3. Block Diagram (Step 3): P25<sup>IP</sup> Simulcast Upgrade

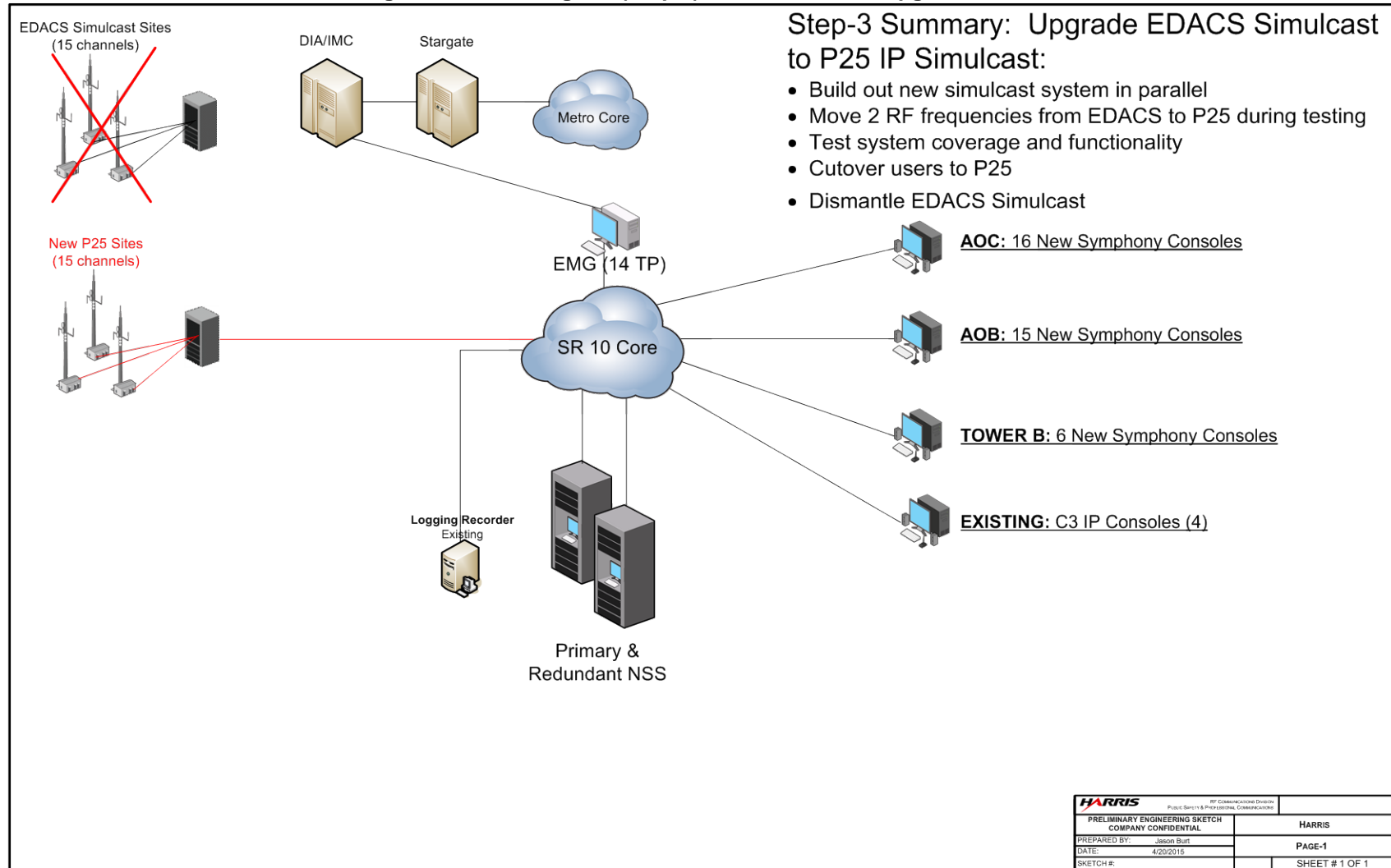
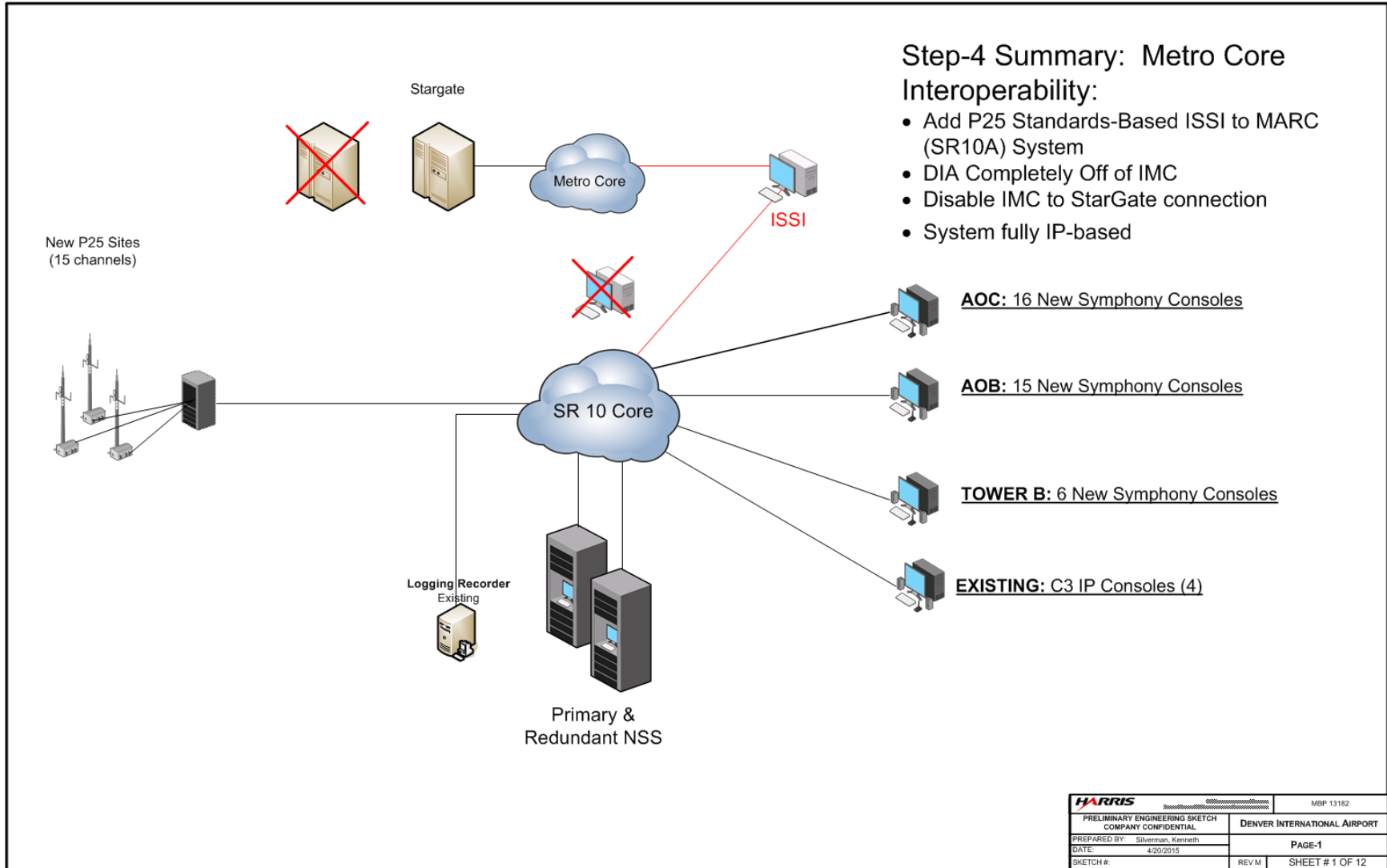


Figure 4. Block Diagram (Step 4): Metro Core (MARC) Interoperability via ISSI



This System Description consists of the following parts:

- Proposal Overview – The Harris Solution
- VIDA System Architecture
- Equipment Overview
- Infrastructure System Equipment Information
- System Network Security
- System Backhaul
- P25 Compliance
- Interoperability
- System Performance Verification
- System Implementation
- System Maintenance
- Training
- Assumptions

## VIDA System Architecture

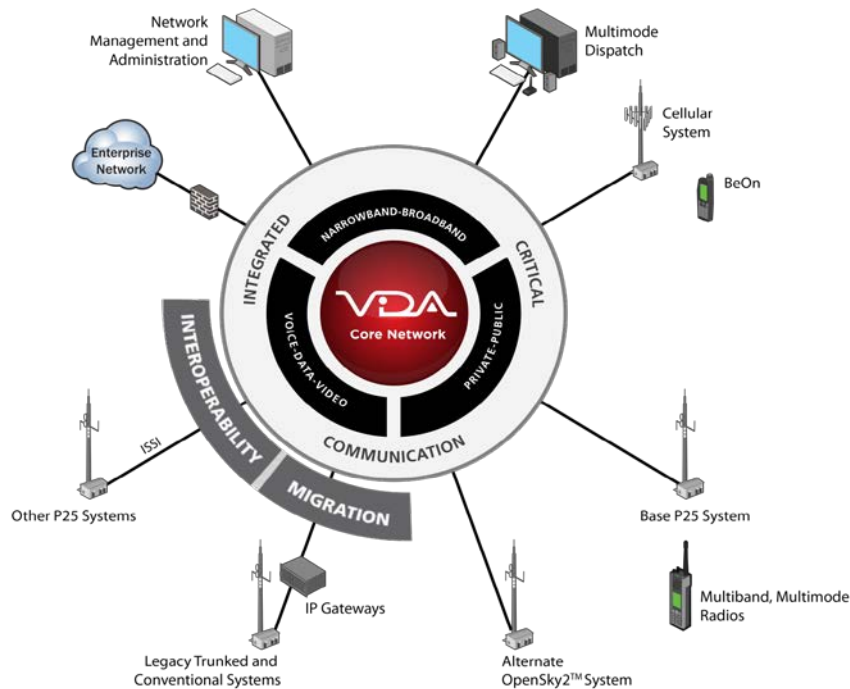
The latest Harris VIDA architecture is based on an Internet Protocol (IP) platform that combines the critical applications required for public safety operations and offers a state-of-the-art solution for the communications needs of Denver International Airport. The advantage of the Harris VIDA network is that it utilizes the same management and administration systems for all Harris RF technologies, reducing the need for dedicated management devices as well as costly maintenance of multiple system management platforms.

Harris' "One Network" standardized design enables our engineering team to incorporate newer technologies and products as they emerge and mature. The Harris solution, with its modular scalability, enables future system growth for existing and emerging technologies.

VIDA infrastructure, from its inception, was designed with standards compatibility. Therefore, the VIDA system can add new technologies like Long Term Evolution (LTE), cell phones, and other equipment, rather than through patches, adjunct interface devices, or other add-ons.



Figure 5. Typical Overview of a VIDA Network



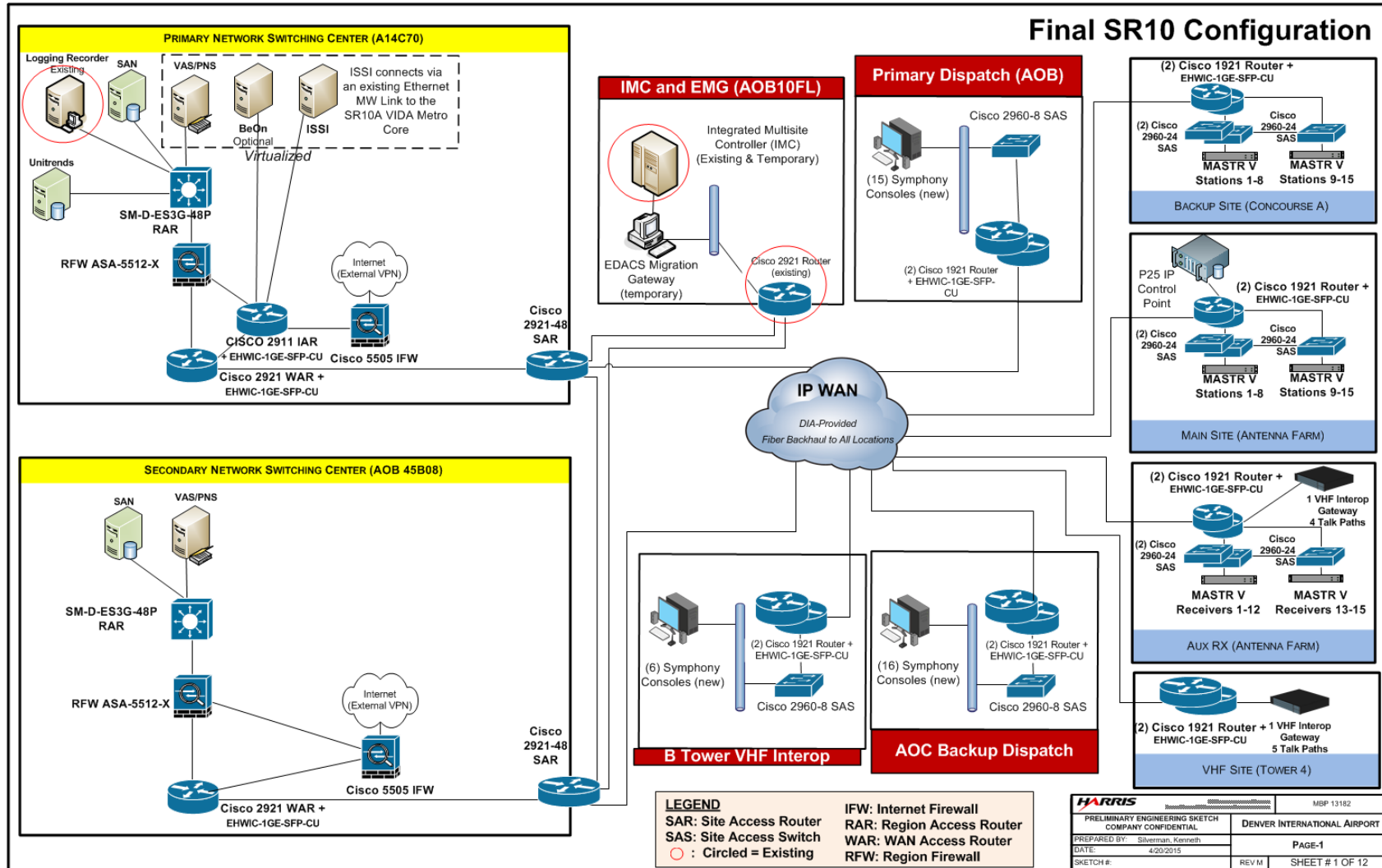
## Equipment Overview

The proposed system design is illustrated in Figure 6. The basic system components are as follows:

- High-Availability SR10A Premier Application Network Switching Center (NSC)
- P25 Phase 1 800 MHz 15-channel IP Simulcast System:
  - Two MASTR V Transmit/Receive Sites
  - One MASTR V Auxiliary Receive Site
  - IP Control Point Equipment
- EDACS Migration Gateway (EMG) to replace existing EDACS IP Gateway
- Symphony Dispatch Consoles w/Symphony software (39 new)
- UAC Interoperability Gateways to tie to existing VHF channels (nine channels)
- Inter RF subsystem interface (ISSI) with concurrent 16 talkpaths
- Software upgrade of Existing EXACOM logging recorder to SR10A
- Redundant Routers for each Network Element

**Figure 6. Block Diagram of Final Proposed System**

*Areas circled in red are the existing equipment that will be re-used in the final system design.*



## Infrastructure System Equipment Information

### P25<sup>IP</sup> Site Equipment

At the RF transmit sites, the voice signals are processed by the site's simulcast equipment and interfaced to the remote simulcast controllers. In Harris' P25<sup>IP</sup> Simulcast, there is no Site Trunked Controller at the transmit site as it is today. Instead, the processing is distributed in the station controllers, eliminating the risk of a single-point failure. In the unlikely event that communication is lost between a transmit site and the control point, these station controllers will allow the site to continue trunking.

The remote sites all transmit simultaneously providing one continuous coverage footprint for system users. To the user, a simulcast system looks like one large coverage footprint even though coverage is provided by multiple sites. Simulcast is more spectrally efficient as it uses fewer frequencies to cover a wide area than multi-site operations. The system timing is controlled via GPS receiver clocks at each site that ensure precise transmitter frequency control and timing of voice packet launch between the control point and each transmit site. This precision control ensures effective performance in the simulcast overlap zones.

The Harris P25<sup>IP</sup> Simulcast System provides an end-to-end all-digital system based on the proven MASTR V hardware platform. The proposed system is composed of a MASTR V IP control point, two MASTR V repeater sites, and a MASTR V auxiliary receiver site.

Each of two proposed P25<sup>IP</sup> 15-channel repeater sites will be configured for 800 MHz simulcast operation. The primary (main) site will be located at the Antenna Farm location. The secondary (backup) simulcast site will be located at the Concourse A location. A Harris auxiliary receiver site is also proposed for the Antenna Farm location to interface with the airport's distributed RF system for improved coverage in tunnels, etc.

Harris will provide DIA with a standard configuration of state-of-the-art Harris P25<sup>IP</sup> site infrastructure for simulcast trunked operation based on the following subcomponents.

Figure 7. MASTR V Station



As proposed, each full-featured P25<sup>IP</sup> simulcast site will include:

- MASTR V P25 trunking RF base station (15)
- IP Simulcast Common Equipment w/Voting/GPS feature
- Network Sentry

- Redundant Site Access Routers and Switches
- 86" Open Rack

The MASTR V series base station incorporates P25 digital voice and data using a digital signal processor for maximum design flexibility. The proposed MASTR V equipment will be configured for P25 Phase 1 operation. The MASTR V equipment is P25 Phase 2 upgradeable, and only requires a change in software. Base station equipment will be mounted in 86" racks. The proposed AC version of the MASTR V base station will require DIA to supply 120VAC power and any backup power equipment preferred.

The Traffic Controller Module manages data and control information. Incoming data from dispatch points is processed into over-the-air P25-formatted transmit messages. The traffic controller module processes decoded radio information received from the baseband processor module, and handles all aspects of trunking (subscriber unit validation, assigned channels, queuing, etc.). Reliability is ensured since there is one traffic controller module for each channel, and any one of them can control the entire site.

All sites are configured with the following specifications:

- 806-821/851-866 MHz Frequency Band
- APCO P25 Phase 1 (CAI) Compatible
- 12.5 kHz Minimum RF Channel Spacing
- Compatible 4 – Level Frequency Modulation (C4FM) as defined in TIA/EIA-102
- 100 Watt RF Output from Final Power Amplifier
- Ethernet Digital Voice/Data Interconnection to Voice Switching Equipment
- Alarm Reporting System

### **P25<sup>IP</sup> Simulcast Control Point Equipment**

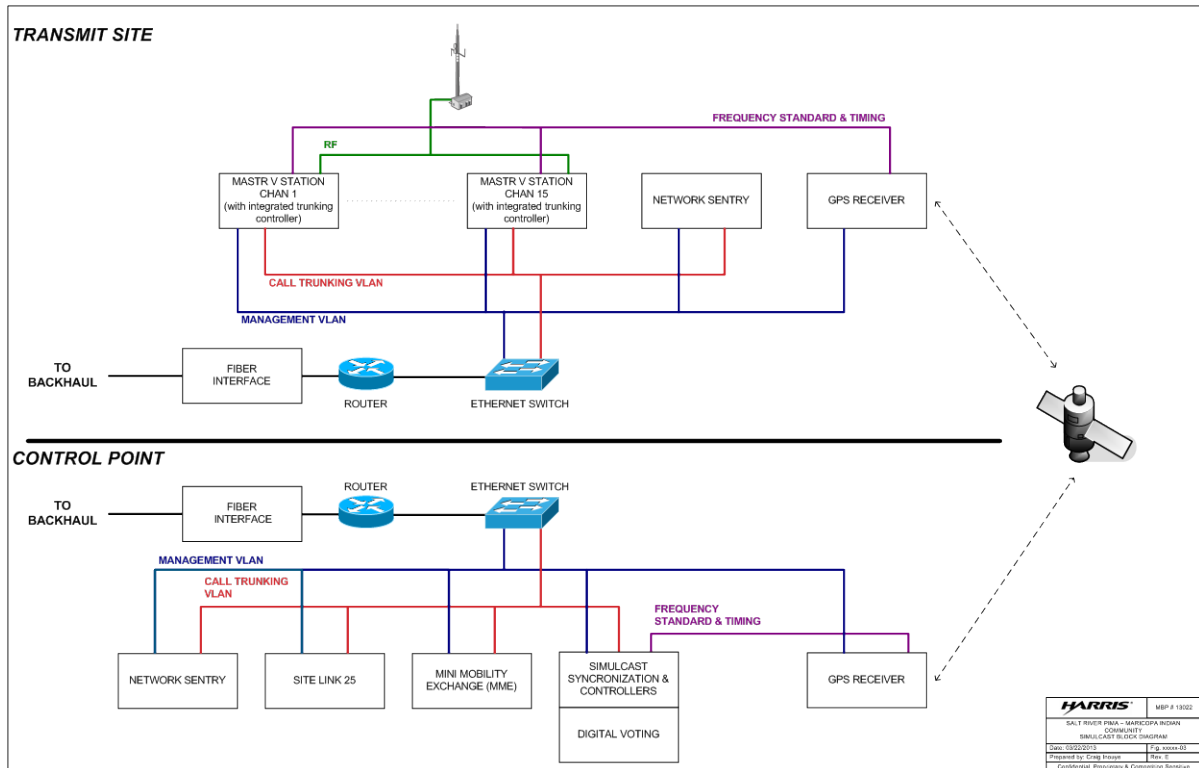
The IP simulcast control point provides synchronization and equalization for the proposed simulcast system. Instead of a Primary Site Trunked Controller, the Harris design relies on a control point controller (SitePro Controller) for each channel at the control point, providing the highest level of fault tolerance. The control point controllers manage digital signaling, transmitter control, and control of the base stations. The signals are processed by the simulcast equipment using GPS timing and are relayed to the transmit site.

The P25<sup>IP</sup> simulcast control point equipment will be co-located with the new primary (main) site equipment at the Antenna Farm location. As proposed, the control point equipment will include:

- IP Simulcast Common Equipment w/Voting and GPS Timing features
- IP Simulcast Controller (15)
- SitePro/MME Controller
- Network Sentry
- Redundant Site Access Routers and Switches
- 86" Rack

A simulcast system consists of two main components: the control point and remote transmit sites. These individual components are denoted in Figure 8.

**Figure 8. Harris IP Simulcast Architecture**



The challenge of a simulcast system is to provide high quality signaling to radios in the overlap zone. An overlap zone is the geographic region where two or more signals of comparable power are received by a single radio. To understand the overlap zone and its significance, the concept of capture and non-capture zones must be explained. The simulcast coverage area is divided into two types of areas: those captured by a single site and those hearing two or more sites of approximately equal RF signal level.

- Capture Zones – A radio (receiver) is captured by an RF signal when the mean signal level is higher than other RF signal sources by a margin strong enough to suppress the weaker signal’s modulation product so that pops and noises created by the mixing of the two signals do not disrupt the intended data stream.
- Non-Capture Zones – In the "non-capture" or "overlap" zone, the radio (receiver) accepts two or more signals. These signals mix producing stronger or weaker signals. If one site’s received mean signal power level is within several decibels of the other sites’ on-frequency modulated signals, audio intermodulation and distortion may occur. In analog communications, this distortion is evident by a crackling and popping sound heard over the speaker. Audio distortion increases to a maximum when the received carrier signals are equal. In digital communications the distortion can cause data errors and result in distortion or missing voice (data) frames. Good communication in these areas is maintained by precision system synchronization and equalization.

To provide this synchronization and equalization, the proposed simulcast system consists of an IP-based simulcast control point with voters. All signals are routed through the control point where synchronization and processing are performed to enhance talk-out performance in the overlap zone. Instead of a Primary Site Trunked Controller, our design utilizes distributed Site Trunked Controllers (SitePro Controller) for each channel at the control point, providing the highest level of fault tolerance. The control point controllers manage digital signaling, transmitter control, and control of the base stations. The signals are processed by the simulcast equipment using GPS timing and are relayed to the transmit site.

The Control Point coordinates transmit and receive activities of the base stations at the Tx sites, and provides interfacing to the Unified Administration Server (UAS) and Regional Network Manager (RNM) where system programming and communications interfacing takes place. All P25 signals are routed through the Control Point where synchronization and processing are performed to enhance system performance in the overlap zone. All management and control messages are also routed to the Control Point for processing by the SiteLink and alarm signaling is routed to the Network Sentry computer.

The IP control point uses an advanced voting technique that provides better performance than signal strength voting. The P25 voter uses a metric that analyzes digital voice BER on a frame-by-frame basis and selects the frame that has the fewest errors. This method improves performance since the best voice quality is always chosen, and a frame incurring a fade will be replaced with a better copy from another site. In contrast, a signal strength voter could initially choose a site with the strongest signal that could then become corrupted as a result of outside interference within the call duration. Voting frame by frame avoids selection of an inferior site and propagation of several bad frames before determining there is a better site.

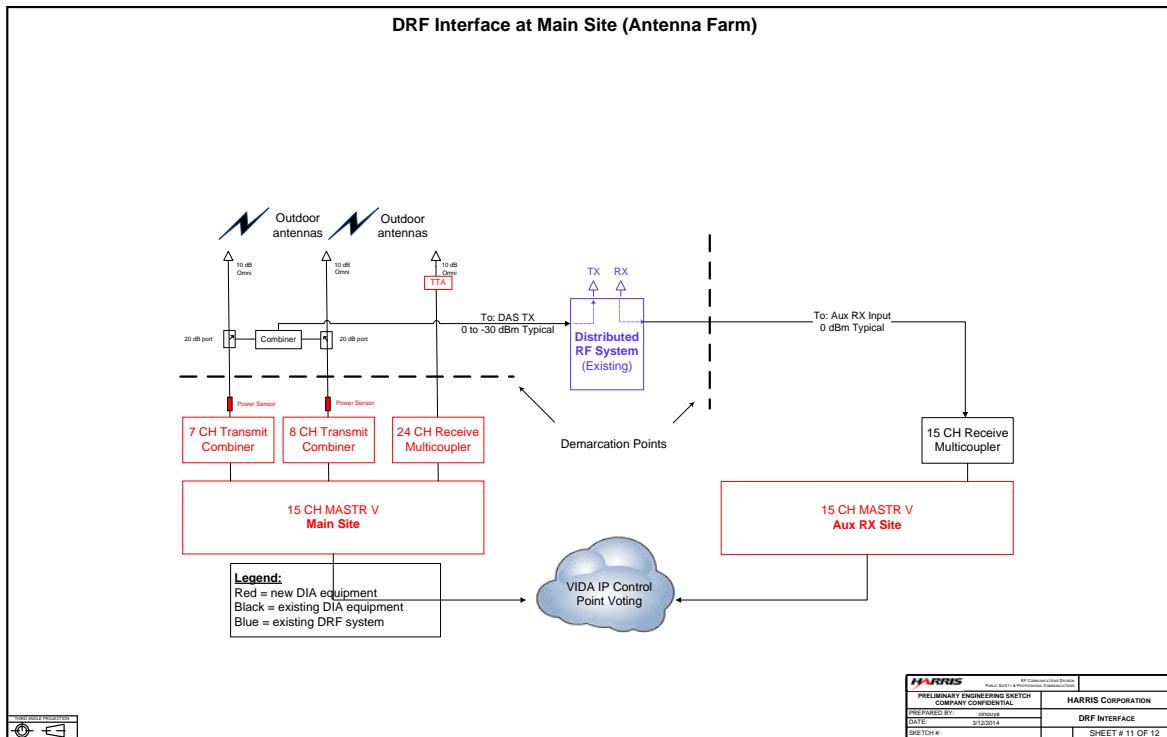
Harris IP Simulcast Control Point architecture provides an important level of reliability. A separate control point controller is provided for each channel in the system rather than a controller per site. This ensures that a single controller failure does not take out a site from simulcast operation. However if the primary site were to fail, system functionality will depend on the bypass plan utilized by DIA. Radios and the system can be programmed to operate from the backup site until simulcast operation is resumed.

### **Aux Receiver Site and Distributed RF Antenna System Interface**

The existing Distributed RF System (DRF) is basically a bi-directional amplifier (BDA) network that provides coverage throughout the airport tunnels and underground areas. The Harris interface to this system is at the Antenna Farm site. The proposed Harris P25 auxiliary receiver site will be used for the receiver side of the DRF system (multicoupler input from the DRF) and there is a splitter on the combiner output for the DRF transmit side. The existing voters are no longer needed as P25 has built-in voting functions.

DIA will be responsible for the existing Distributed RF (DRF) system, or any future DRF system within the airport terminal. The demarcation point between the new P25 system and the DRF system shall be at the directional couplers that feed the DRF system and the multicoupler of the Auxiliary Receive Site. Harris utilizes WCQPSK modulation for P25 Simulcast Systems. DIA will be responsible for verifying that this modulation is compatible with the existing or any future DRF system. Harris support regarding the DRF system is not part of this proposal.

Figure 9. DRF Interface Block Diagram



## Dispatch Consoles

Harris proposes the new state-of-art Symphony Console for dispatch operations at the Denver International Airport. The Symphony dispatch console (Figure 10) is Harris' latest mission critical dispatch solution. It is built on an all new hardware platform and delivers the most reliable, powerful, and flexible dispatch environment available.

**The console requires only a single rack-unit Symphony Dispatch Platform hardware, speakers, microphone, and monitor. Symphony has no audio tower or electronics banks, saving space, maintenance cost, and installation time.**

The Symphony Console uses state-of-art Internet Protocol (IP) technology to connect directly from the dispatch position to the proposed P25 Phase 1 Trunked network, providing fast and efficient connections and distributed fault tolerance.

**Figure 10. Symphony Dispatch Console**



### Symphony Dispatch Console Benefits

The Symphony dispatch console provides a comprehensive suite of features and capabilities that allows DIA users to carry out their mission critical tasks.

**Figure 11. Symphony Features and Benefits Overview**

Features	Benefits
Easy to use, configurable interface	<ul style="list-style-type: none"> <li>▪ The highly configurable Windows-based environment provides DIA users with flexibility in dispatcher setup. For example, agencies can configure different interfaces for each agency, or configure the day-shift interface differently from the night-shift interface. Administrators or authorized users can update the user interface remotely at any time.</li> </ul>
Fully IP-based	<ul style="list-style-type: none"> <li>▪ Standard networking-based architecture provides greater reliability and eliminates the backroom console electronics/switch, which can be a single point of failure for all or multiple consoles.</li> <li>▪ Standard networking-based architecture reduces the total cost of ownership</li> <li>▪ With greater mobility, consoles are no longer tied to locations, such as a dispatch center or Network Operations Center (NOC). Agencies can setup IP consoles anywhere with access to the radio IP network.</li> </ul>
Mobility	<ul style="list-style-type: none"> <li>▪ The console is easy to set up and can use anywhere on the radio IP network. This flexibility makes it convenient to place consoles in mobile command centers or to relocate them if the primary location is disabled.</li> </ul>
End-to-end encryption support	<ul style="list-style-type: none"> <li>▪ Encryption and decryption occurs within the Symphony console. (Optional)</li> <li>▪ Packets route through the IP network, resulting in greater security and the elimination</li> </ul>



Features	Benefits
	of unsecured connections from a separate Digital Voice Unit (DVU).
Resource Management	<ul style="list-style-type: none"> <li>▪ In concert with the Unified Administration System (UAS), the VIDA network allows agency partitioning so that multiple agencies can maintain control of their own system and console resources.</li> </ul>

The Symphony dispatch console offers the DIA several advantages over traditional consoles including:

- **Solid-state hardware platform that lowers operating and maintenance costs** – The console is built on a specially configured, solid state, PC platform, using hardened version of the Windows operating system.
  - The Harris-supplied hardware and software platforms perform the console functions.
  - It does not have additional architectural, ADA, or OSHA implications beyond the best practices required for typical office equipment.
  - The Symphony Dispatch Platforms are capable of years of continuous service.
- **Bandwidth savings** – The Symphony dispatch console is IP-based and shares bandwidth with all other entities on the network. Harris’ bandwidth-efficient implementation means that the Symphony dispatch console does not require dedicated IP local area network (LAN) circuits or T1s to ensure continuous communications.
- **Upgradable software** – Because the console is PC-based, its software is upgradable for new features and capabilities.
- **Expandability** – The networking scheme is similar to a typical computer-based LAN. Just as computers can be added to the LAN by simply connecting to a local hub or LAN switch, consoles can be added to the radio IP network anywhere at any time. Adding or moving consoles require only connection and configuration to the radio network.
- **Less hardware** – The console requires only a single rack-unit, Symphony Dispatch Platform computer unit; speakers; microphone; monitor; keyboard and mouse (or touchscreen). There is no audio tower or electronics banks of any type, saving space, maintenance cost, and installation time.
  - The Symphony platform no longer needs the Harris Enhanced Cable Enclosure (ECE) as the ECE functionality has been built into the Symphony box.
- **Enhanced interoperability through the power of IP** – Harris IP networks utilize a network-based interoperability gateway solution to connect legacy trunked and conventional systems and/or repeaters into the radio network. Legacy interfaces connect to the gateway and “map” to talkgroups that are accessible at any dispatch center or anywhere on the network. (Older console systems rely on local, central electronics banks connected to legacy repeaters, which limit communication among users to a specific dispatch location).

## Symphony Dispatch Console Features

The Symphony console comes with standard features that enable a dispatcher to perform functions efficiently. The standard features are listed in Figure 12:

**Figure 12. Symphony Console P25 Standard Features**

Feature Name	Feature Explanation
Select and Unselect Modules	Any programmed module can be selected as the select module for direct communications from the dispatcher. Other programmed modules will be the unselect modules.
Emergency	The consoles are equipped to both declare and clear an emergency. When an emergency is declared from a radio unit, there is both an audible and visual indication on the module. The audible indication is in the form of an alert tone. The console can be set up so a dispatcher can clear the alarm, to stop the noise and then service the emergency.
Alert Tones	Pulsed, warbled, and alert tones can be transmitted to alert radio units of specific emergency conditions.
Individual Calls (Selective or Unit to Unit Calls)	In a trunked radio system the console is treated like any other unit and has a unit ID. The console can both make and receive I calls. The I Call Panel and I Call Manager Panel under the Special Calls Menu assist with several features associated with making and receiving I Calls and other statistics.
Intercom Call	Allows two way personal console-to-console communications.
Call History	Displays the select and unselect module call history.
Patch	Modules patched together can communicate with one another.
Simulselect	Dispatcher can communicate to the modules simulselected, but they cannot communicate with one another.
Instant Transmit	Instant transmit allows the dispatcher to communicate with groups that are a part of the unselected modules.
Encrypted Calls	Encrypted calls between the dispatcher and field units are only un-encrypted at the source and destination, ensuring secured communications as the voice packets travel through the radio network. (Optional)
Cross Mute	Reduces unnecessary receive audio at the local console by preventing transmissions from other consoles from being heard and prevents audio feedback problems when two or more consoles are placed in nearby vicinity with each other and at least one is equipped with speakers.
Supervisory Control	Any console can be configured as the supervisor, allowing additional functionality such as disabling other consoles, automatically programming modules for declared emergencies, and eavesdropping on individual calls.

Other primary features of the Symphony Consoles include:

- SIP Telephony (Availability in November 2016)
- Conventional operation (Estimated Availability in Spring 2015)
- Auxiliary I/O with a Network Sentry (Estimated Availability in Spring 2015)

- Paging (modules and functionality – local and remote) (Estimated Availability in Spring 2015)
- Detailed History Control (Module, speaker, select and console history)
- Integrated Call Recorder for radio and SIP telephony (SIP telephony availability in November 2016)
- Emergency Controls
- Touch screen support
- All Call & Announcements
- Multiple User Setups
- Licensing
- Configuration (Audio, GUI, Basic)
- Select/Unselect Group Mute

## Symphony Dispatch Platform

The Symphony Dispatch Platform is highly configurable to meet dispatcher needs. The Solid-State processor operates with the Windows operating system and is specially designed to accommodate the various interfaces used in today's dispatch operations. Standard PC accessories, such as keyboard, mouse and/or trackball, are part of the Symphony Dispatch Platform. In addition, the Symphony Dispatch Platform provides automatic gain control of various inputs and simplifies cabling between the Symphony and all possible peripheral options, including:

- Speakers (1/4 - inch TRS jacks) for select and unselect audio
- Headsets (6-wire jackbox, wireless, or USB), including over-the-head and earbud styles
- Telephone interface via 4-wire audio and off-hook contact closure
- Call recorder (select, unselect, and telephone audio)
- Backup dispatch control station (4-wire audio/PTT via dB9 connector) (Optional)
- Six digital inputs
- Five relay outputs

**Figure 13. Symphony Dispatch Platform (SDP)**



Physical characteristics of the SDP include:

- 19-inch rack, desktop, or under-desk mount options
- Channel cabling to provide strain relief for rear connectors

- One rack unit (RU) size
- Audio isolation of 50 dB or greater between audio paths

Other important features include:

- Over-drive protection of all external analog inputs
- Buffering of external interface signal lines
- Opto-isolated I/O inputs
- Automatic gain control for mic/line inputs

## Symphony Dispatch Console Telephone Interface

The Symphony dispatch console has an integrated Call Director that allows the connection of a 4-wire analog phone line. The Call Director will acknowledge the 4-wire and off-hook indications and send audio to the Symphony console headset. This will allow for shared audio through the single headset without the need for a separate speaker. In a future Symphony release, the capability to interface to a SIP phone will be available. This will allow for greater functionality and integration into the Symphony console of the incoming phone line.

***In the November 2016 Symphony release, the capability to interface to a SIP phone will be available. This will allow for greater functionality and integration into the Symphony console of the incoming phone line.***

The SIP telephony integration will include the following features:

- Answer calls
- Make calls
- Speed call lists
- Transfer calls
- Hold
- Instant recall recording for telephone

The Symphony dispatch console currently has an integrated Call Director that allows the connection of a 4-wire analog phone line. The Call Director will acknowledge the 4-wire on and off-hook indications and send audio to the Symphony console headset. This will allow for shared audio through the single headset without the need for a separate speaker.

## Other DIA Requirements (Supported by Non-Symphony Equipment)

1. E911 Support – An Intrado maintained workstation will be placed at each position requiring E911. This device will be provided by DIA
2. Tritech VisiCad CAD system to Intrado interface to provide location data for mobile phones under the phase two ALI standards. These systems will be interfaced by DIA using standard NENA 04-001 interfaces
3. E911 TDD/TTY Support – Supported by the Intrado NG911 solution provided by DIA

## Symphony Dispatch Console User Interface

The Symphony dispatch console is a powerful tool for effective communications between the dispatcher and first responders. Designed with professional dispatchers' workflow in mind, the user-friendly Graphical User Interface (GUI) enables the dispatcher to quickly communicate with a talkgroup or an individual with the press of a button.

The display screen (Figure 14) is composed of panels and communication modules. The panels appear on every page of the display, and their contents do not change from page to page. However, communication modules link to specific pages of the display. When users switch from page to page, the panels remain the same, but the communication modules change. Administrators can configure the number of pages, their respective labels and the number and size of the communication modules on each page.

Figure 14. Symphony Console User Display Screen



## Page Tabs

The Page Tabs at the top of the workspace have two basic functions. First, it allows movement from one page to another. A user clicks on a tab to go to the corresponding page. Second, the tabs change colors to alert the user to the status of non-displayed pages. For example, if a highlighted tab indicates an incoming call or an emergency, the user can click on it to view the page and determine whether any action is necessary.

## Communication Modules

A communication module (Figure 15) is the fundamental component for communicating through the console. It provides incoming call monitoring and outgoing console-originated call transmissions. Each communication module can be individually programmed with a single entity representing a talkgroup, a conventional channel, a radio unit, another console, patches, or simuselects. There are

also three sizes of modules available that will allow more modules on a page while making common controls readily available. When an entity is programmed into a module all related audio routes to the console. Also, a communication module has the capability to transmit instantly to the entity.

On the display screen, rectangular boxes represent the modules. Up to 1,024 communication modules can exist across multiple pages of the display. The module box displays receive and transmit activity.

**Figure 15. Symphony Console Communication Module**



## DIA Dispatch Solution

A total of 39 new consoles will be deployed in the new DIA system. The quantity and locations of these new Symphony consoles are summarized below. Harris will also upgrade the four existing C3 Maestro<sup>IP</sup> consoles. The following list is the final configuration of consoles:

- AOB Primary Dispatch Center – 15 new Symphony consoles
- Concourse A (Backup AOC) – 16 new Symphony consoles
- B Tower – VHF Interoperability – six new Symphony consoles
- Spare Consoles – one new functional Symphony console, one main hardware only console
- Existing C3 Maestro<sup>IP</sup> Consoles – four existing consoles

The new Symphony consoles will come configured for six console talkpaths, a 23” touch-capable monitor, two speakers, vocoder license, and user-definable screens.

## VIDA Network Switching Center (NSC)

### Overview

The current system consists of a P25 VIDA NSC operating with the PR9C System Release, tied to the existing DIA EDACS System via an EDACS<sup>IP</sup> Gateway. The new P25 simulcast system proposed in this document is a one-for-one replacement of the existing EDACS Simulcast system operating on MASTR III hardware.

While the existing core equipment is software upgradeable to SR10A, it does require a labor intensive upgrade path, and will put DIA on a previous hardware configuration in an N-1 state. This configuration could be supported for some time, but would potentially require replacement for future releases. As current Software FX subscribers, DIA can take advantage of special hardware pricing and upgrade to the latest hardware version. Therefore, Harris recommends and is proposing to replace the existing PR9C equipment with a new SR10A switch. There are a few advantages of upgrading to SR10A:

- Support for future P25 Phase 2 TDMA Operation
- Latest Hardware Configuration for Future Releases
- Continued Interoperability support with Metro EDACS Users
- Most current ISSI feature support
- BeOn Application Server for interoperability with Cellular Subsystems

The Network Switching Center is the heart of any Harris mission critical communications network. The Network Switching Center consists of one main hardware component – the VIDA Application Server (VAS) that manages the hardware and software components of the networks, and routes calls among users, and standard LAN/WAN networking equipment. Interoperability Gateways – devices that interface to analog devices (e.g.; legacy radio systems) – can be either centrally located with the NSC equipment, or remotely situated (for various reasons such as connectivity consolidation).

All of the components in the Network Switching Center are commercial-off-the-shelf (COTS) computer and networking equipment that leverage the Internet Protocol (IP) industry, thus providing key benefits.

COTS equipment:

- Has the ability to leverage the continual technological advancements of the computing and networking industry. Each new generation of equipment will have more memory, more processing power, and often will occupy a smaller physical footprint;
- Spreads the R&D costs across a much larger customer base, lowering overall costs to achieve greater technology improvement results, and thus reducing total cost of ownership;
- Allows the use of commercially available parts from a wide variety of sources, which ensures competitive pricing; and
- Provides scalable hardware to accommodate future growth, providing protection for initial investment.

The NSC is a cost-effective means to deploy a scalable radio network as user needs require and budgets dictate. It is easily configurable to accommodate additional sites, talkpaths, and consoles. This highly scalable design provides the foundation of an IP network to serve the communication needs of users, with the capability to scale up to support regional, statewide, province-wide, or even nation-wide systems.

Please note that the NSC software release proposed is SR10A which is the latest and noticeably different from PR9C and other former releases. Additional training on this new platform may be required. DIA may wish to procure additional Harris system engineering and project management services for assistance with implementation. Optional training is noted further in the proposal.

The following sections provide brief descriptions of the equipment that comprises the NSC.

### **VIDA Applications Server (VAS)**

The VIDA Applications Server provides the single point of access for the call switching, as well as management and administrative tasks for a VIDA Network. Using powerful virtual machine technology, several call routing and management applications, which traditionally ran on separate servers, are now consolidated onto a single server. This provides Harris customers with a simplified (hardware configuration) solution and achieves cost savings through reduced maintenance activities, valuable equipment room space conservation, and reduced power consumption.

The VAS routes calls to and from each voice group or mobile data user on a real-time basis, and regulates voice and data traffic on the network. Each voice user belongs to a voice group of peers. Throughout the Unified Administration System (UAS) application, for example, a network administrator assigns the members of a voice group and sets the voice group parameters including priority, hang time, preferred site, and response time; thus governing the behavior of the user devices operating on the network. The VAS maintains a database of these voice group files. The VAS routes the IP voice traffic of one member to all the other members of a given voice group. Other key applications that run on the VAS are discussed below.

The VAS is a server workstation running a Red Hat Linux operating system. It hosts a voice controller application performing routing functions for digital trunked voice messages through an IP backbone. By tracking the radio site location of subscriber unit radios and their voice group affiliation, the VAS ensures delivery of voice messages only to those radio sites necessary to reach the destined radios. In addition to call routing based on user radio (to site) registration, the system can be set up to force certain talkgroup calls to those locations deemed necessary for the purposes of scanning.

The highly scalable design of the VAS supports IP networks of various sizes. One VAS can support a single-region network serving the communication needs of the airport, city, or county agencies. The VAS also supports a wide range of interfaces for third-party products, including trunked logging recorders.

To ensure a robust network, the VAS will be equipped with fully redundant hardware and software operating in a High Availability (HA) configuration. In the unlikely event that the primary VAS or other primary network equipment in the NSC fails, the HA application will enable the secondary VAS to take over network operation. The primary and the secondary VAS will be housed in two separate locations to improve the reliability factor:

- Room A14C70 – Primary Network Switching Center
- AOB Room 45B08 – Secondary Network Switching Center

The voice switching equipment will be equipped with Spectracom 1200-033 master clock unit utilizing a Rubidium oscillator. The clock will connect to the system by way of an Ethernet port.

This voice switching equipment will be housed in an 83” cabinet. The cabinet will be equipped with 120vAC Power Strips which indicate the amount of AC current load on each strip (Server Technology model C-12V1-L30M (12 outlets).



## EXACOM Logging Recorder

The existing EXACOM H-G2 logging recorder supports Harris PR9C code. With the installation of the new SR10 Harris core, the EXACOM software needs to be updated. The new EXACOM software will be fully compliant and is certified for P25 Phase 1. The quoted upgrade price includes one year of factory on-site warranty and maintenance support from EXACOM. Should DIA want to add encryption or Phase 2 support to the logging recorder, Harris will work with DIA to make sure the logging recorder can support this mode of operation.

## Voice Network Interface Controller (VNIC)

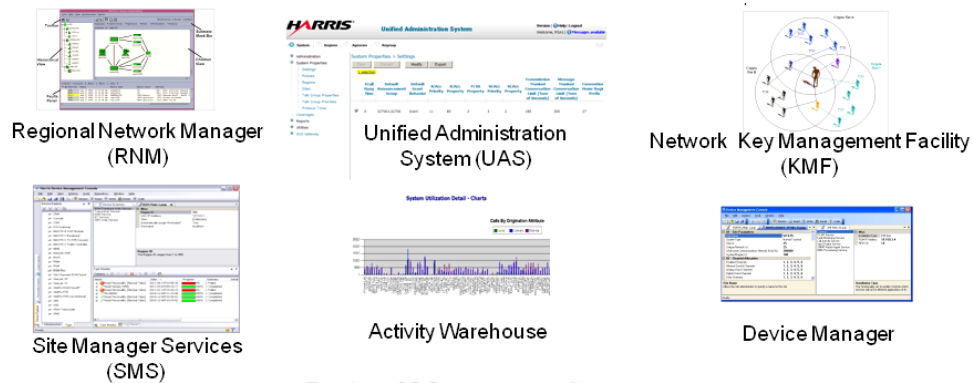
The Voice Network Interface Controller (VNIC) is a voice controller application that runs on the VAS and performs routing functions for digital trunked voice messages through an IP backbone. It tracks the radio site location of voice group members to ensure delivery of voice messages only to those radio sites essential to reach identified radios. The VNIC also supports a wide range of interfaces for third-party products, including dispatch consoles, logging recorders, and Interoperability Gateways.

## Virtual Machine Technology

Virtual machine (VM) technology allows many applications, running under separate operating systems, to co-exist on a single server by managing the server's resources. Processor power, RAM (Memory), and Network Interface resources are allocated to each application; the VM software ensures that no application impacts the operation of the others. VM technology also allows for the addition of software capabilities on the server. For example, a customer adding encryption to the radio system can easily install the optional Key Management Facility (KMF) VM software package on the VAS (contrasting with the conventional need to install a separate server to support that application). Since the VAS is licensed with the Windows Server Data Center, additional Windows applications can be supported without having to re-license the server.

**Figure 16. Applications that Run on the VAS for the NSC**

*Regional Management Server Applications/Operating Systems*



### Regional Management Server

RNM	UAS	AD	SMS/ DM	Activity WH	AD	SUMS	Epolicy Orch.	KMF
Linux	Linux	W2008	W2008	W2008	W2008	W2008	W2008	W2008
Hyper-V®/Windows Server® 2008 DataCenter								

## Regional Network Manager (RNM)

The Regional Network Manager (RNM) provides users with powerful tools that facilitate effective management of a VIDA network. The radio system manager can monitor the overall health of the Network Switching Server, view real-time diagnostics, monitor call activity of trunking systems, and set system/network configuration parameters. Managed network objects continuously monitor their performance grade of service. Through active polling of the objects and receipt of autonomous trap information, the RNM keeps the network operators up to date with the latest status of the network.

Aided with tools such as the Network Viewer, Object List, Fault Browser, History Browser, and Real-Time Viewer, an RNM user can carry out the task of network management much more efficiently. The Regional Network Manager (RNM) monitors the overall health of the system, provides real-time diagnostics, activity monitoring of trunked systems and sets system/network and element configuration parameters. Statistical reports are generated from the RNM and not at the consoles.

A major feature of the RNM is the topology map showing all of the managed objects registered on a VIDA network (i.e., base stations, routers, etc.). The hierarchical relationships between the objects are displayed graphically, and the current status of each object and any related components is shown using color coding.

Harris has assumed the current manager terminals will have the ability to securely access via VPN into the Harris VIDA network. Once the VPN connection is completed the RNM can be accessed through a secure web browser.

**Figure 17. Network Viewer**

*The Network Viewer provides real-time status, health, and fault alarm information for the VIDA network.*

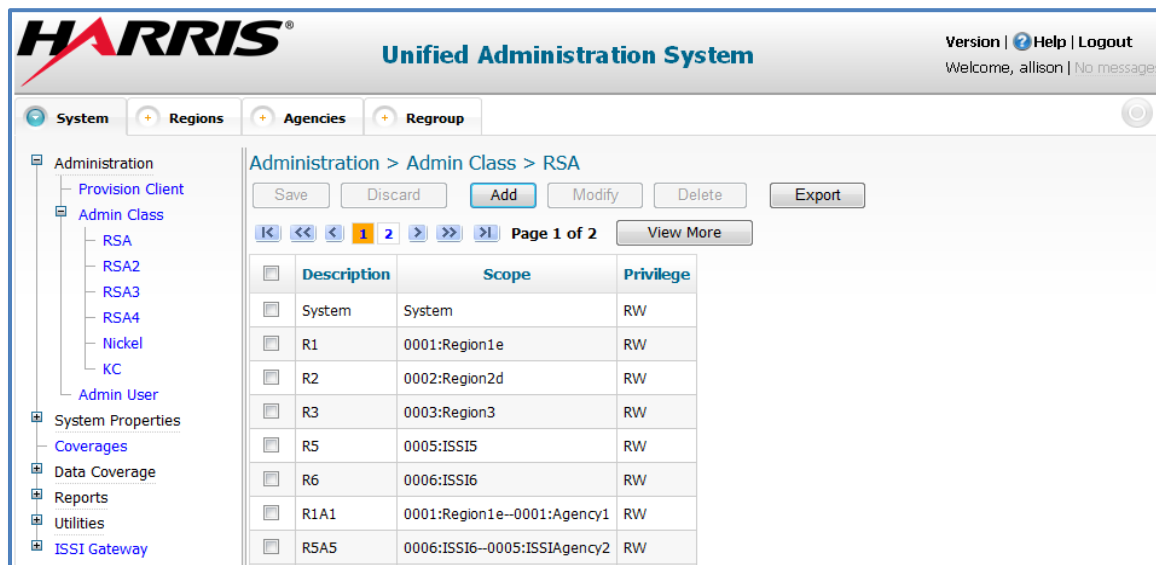
Monitor	Connectivity	Operation	Fault	Performance	Quality
Online	Unreachable	Unknown	Unknown	Unknown	None
Online	Reachable	Master	Major	Low	Ideal
Online	Reachable	Up	Ok	Low	Unknown
Online	Reachable	Up	Ok	Low	Unknown
Online	Reachable	Up	Ok	Low	Unknown
Online	Reachable	Down	Unknown	Low	None
Online	Reachable	Down	Unknown	Low	None

## Unified Administration System (UAS)

The Unified Administrative System (UAS) is a web server based application that provides radio administrators the ability to make modifications to a user's radio parameters from a web browser anywhere on the network. By using the UAS, the administrator can modify a user, or a group of users' priority, system privileges, optional encryption properties, etc.

**Figure 18. UAS Administrator User Privileges Screen**

The UAS functions as the administration point within the radio network. It is accessible from any point within the radio system's IP network.



## Regional Site Manager (RSM)

The RSM is a server that provides an interface for the P25 system between the UAS and the Site Management Interface software, which resides on the Network Sentry. This server is used for single region networks so they can obtain activity data.

The RSM is responsible for communicating the large database of radio system, talkgroup, and individual user information from the UAS to the RF sites. It consolidates site alarms and call activity to report site faults and alarms to the RNM. The RSM Pro includes two system management applications, the Activity Warehouse and the Device Manager, as well as the SAN.

The primary RSM Pro functions are:

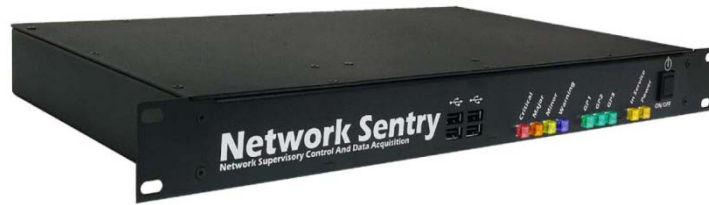
- Database distribution to site RF components
- Call activity monitoring
- Call activity reporting
- Call data archive and restoration

## Network Sentry

A Network Sentry device will be located at each radio site and is responsible for maintenance and download of site data to the RSM and RVM.

The Network Sentry is a powerful, compact computer that provides a full array of digital communications capabilities for fast, accurate, and efficient relay of critical information. This custom rack-mounted computer meets the demanding requirements of front-line system monitoring in a critical communications environment.

**Figure 19. Network Sentry**



The Network Sentry monitors the site call processing local area network (LAN) for call activity and fault messages. It ensures that data such as user, group, and channel configurations transfer reliably to configured site devices.

The Network Sentry provides the following functions at the site:

- Maintenance and download of site configuration data
- Download of subscriber unit and talkgroups
- Archiving and reporting of site call activity data
- Monitoring and display of site faults
- Advanced input/output handling capabilities
- Front panel/LED indicators for alarms

Management of resources is easier and more efficient with the Network Sentry because it is capable of taking full advantage of the sophisticated capabilities of the P25<sup>IP</sup> network. The Network Sentry provides a detailed snapshot of the entire system, showing exact locations of problems and potential problems.

Its fault monitoring services take input from the site call processing LAN, RF Power, Digital Input/Output (I/O), and Channel Test services and present alarms to external management systems via Simple Network Management Protocol (SNMP) to determine the location of the potential problems and identify in detail the severity, status, and reason for the most recent failure. This increases operator awareness, improves response time for maintaining vital communication links, and decreases repair time and system downtime.

The Network Sentry allows users to create a flexible work environment tailored to help improve efficiency and productivity. It is equipped with an array of digital Input/Outputs (I/Os) which can be configured by the user to indicate faults in devices such as tower beacons, doors, temperature alarms, etc. that require remote controlling and monitoring. This information allows users to make quick, informed decisions to meet their needs and to adapt as those needs change.

### **Network Sentry Support of I/O's**

A Network Sentry device can be used to interface your alarm functions and the console. The new Symphony R2, which is part of this proposal, has this support.

Its fault monitoring services take input from the site call processing LAN, RF Power, Digital Input/Output (I/O), and Channel Test services and present alarms to external management systems via Simple Network Management Protocol (SNMP) to determine the location of the potential problems and identify in detail the severity, status, and reason for the most recent failure. This increases

operator awareness, improves response time for maintaining vital communication links, and decreases repair time and system downtime.

The Network Sentry allows users to create a flexible work environment tailored to help improve efficiency and productivity. It is equipped with an array of digital Input/Outputs (I/Os) which can be configured by the user to indicate faults in devices such as tower beacons, doors, temperature alarms, etc. that require remote controlling and monitoring. This information allows users to make quick, informed decisions to meet their needs and to adapt as those needs change.

The Network Sentry can support the following IO types:

- Two 10/100BaseT Ethernet ports with RJ-45 connectors
- Four serial ports, each selectable for RS-232, RS-422, or RS-485
- Four USB 2.0 ports
- 216 Digital I/O
  - 120 TTL inputs
  - 96 digital outputs (Each output is socket selectable as open collector, diode isolated, or straight TTL)
- 40 Analog Inputs
- 12-bit accuracy, 0-10V single ended
- I/O terminates to rear chassis via 68-pin high density connectors
- PC/104 expansion connector
- PC/104-Plus I/O expansion connector
- LED Indicators:
  - Alarms – four (Warning, Minor, Major, and Critical)
  - General Purpose – three (GP1, GP2, and GP3), user defined
  - In service and power
- Digital Output Ports:
  - 96 discrete relay-compatible output ports
    - ◆ 16 – Source: 20 mA minimum
    - ◆ 80 – Sink: 20 mA minimum
- Two HD-68 rear panel connectors

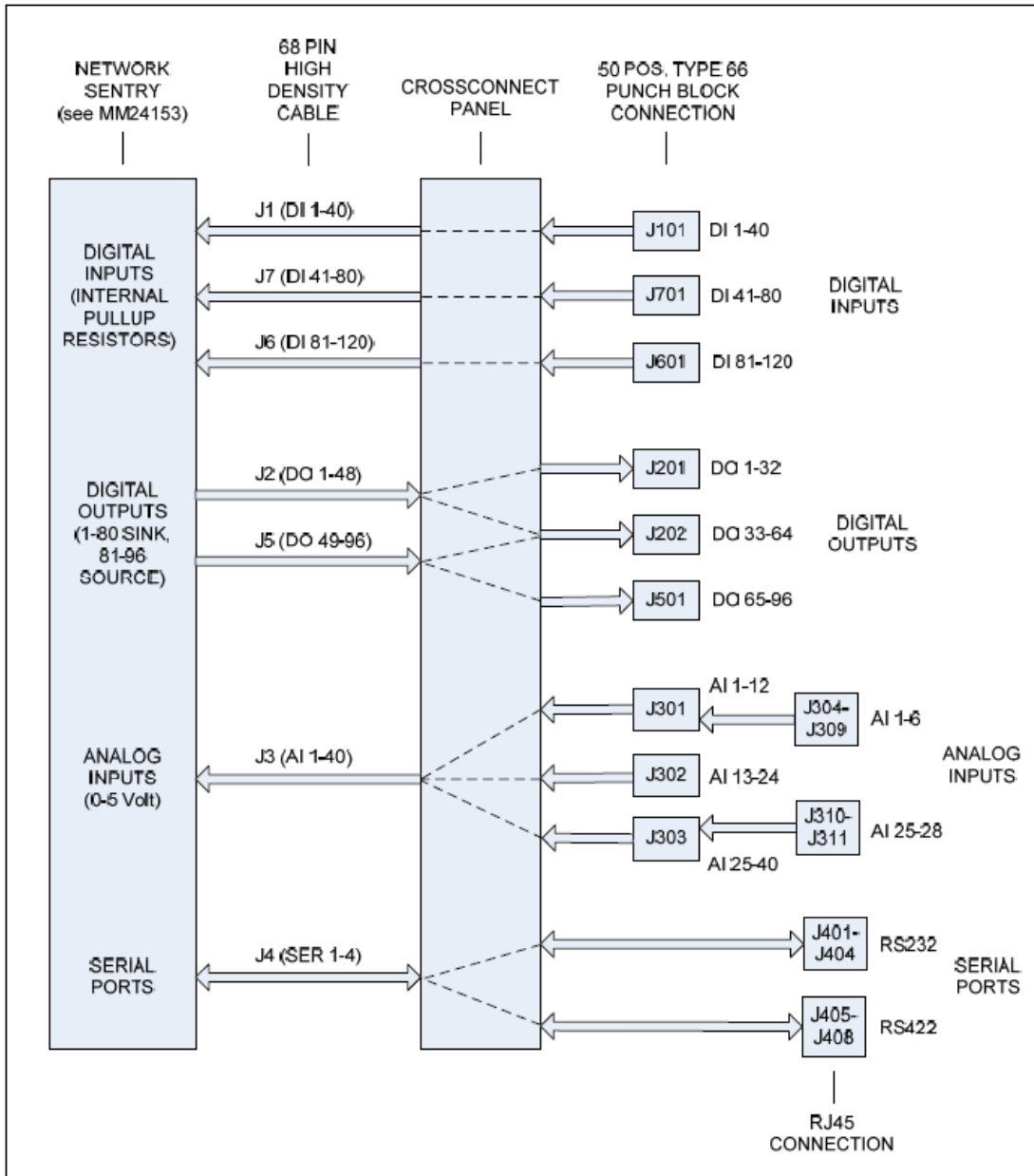
The crossconnect panel CM21874-0330 provides a cable interface point for system related inputs/outputs and external user defined inputs/outputs. The crossconnect panel mounts on the rear of the Site Interface Cabinet. The crossconnect panel is connected to the SMI Network Sentry back plane via eight High Density 68 pin (HD-68) SCSI cables. J1 – J8 of the Network Sentry connect to the corresponding crossconnect panel connectors, J1 – J8. J403 of the crossconnect panel connects to J3 of the Sure Call Shelf.

There are a total of four network sentries included in this proposal at the following locations.

- Control Point
- Transmit Site #1
- Transmit Site #2
- Auxiliary Receive Site

If additional Network Sentries are required, Harris can provide an additional price quote to DIA.

**Figure 20. Signal Connection Overview**



## Active Directory

Active Directory (AD) will be the primary method of controlling access to the VIDA network. This centralized service will perform authentication and authorization of users and devices to restrict unauthorized network access.

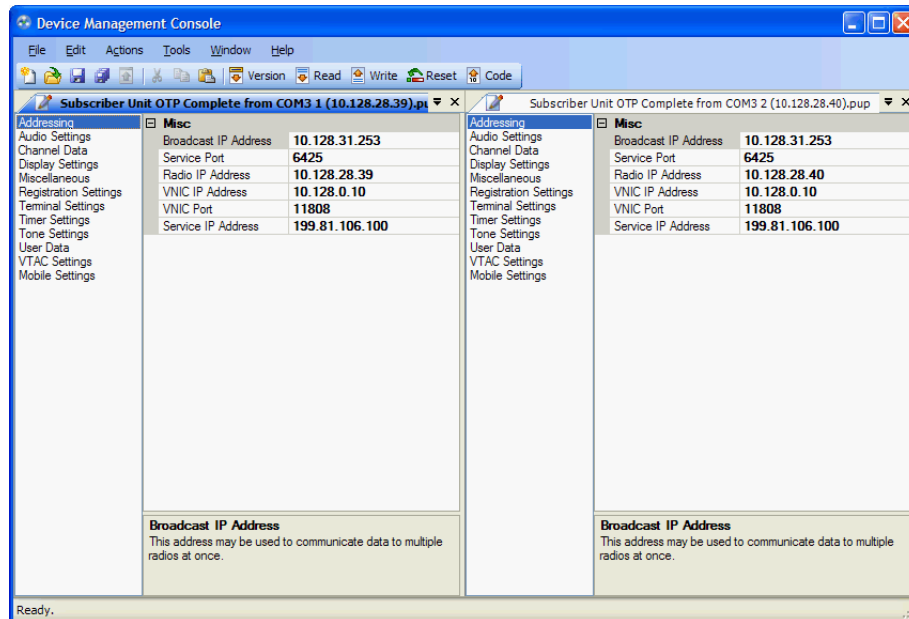
Active Directory allows administrators to create multi-level role-based accounts. These differentiated roles are not only keyed to a user but to the machine they are accessing. The differentiated roles and centralized user management permits an administrator to not only control access to infrastructure devices, but to generate and push security policies and establish trusted websites and certifications. Active Directory Group Policies allow not only differentiation by user role, but the tandem application of joint machine and user profiles.

## Device Manager

Device Manager simplifies configuration management in the system. The Device Manager provides centralized management and control for configuration management activities, such as updating device software and configurations across the network. One of the major challenges faced by users tasked with maintaining a radio system is the wide variety of device interfaces and behaviors they must address on a daily basis. The Device Manager addresses this challenge through tool unification and the promotion of consistent application behaviors across devices.

The Device Manager is a Windows-based application that facilitates the loading of code updates and personalities to many infrastructure devices throughout the network. The application also provides consistency by using Windows menus and controls for all devices.

Figure 21. Device Management Console



## Disaster Recovery

Because radio systems are critical for operations, our team understands the importance of quickly recovering systems to bring the users and the system functionality back to full operational status. For

this reason, Harris provides an option for an effective enterprise backup solution that provides a cost-effective restore capability for the network’s critical system infrastructure. Unitrends is an affordable and easy to use data protection solution with the ability to grow as needed. While typically an option, Harris believes this is an important feature for the DIA system, so it has been included in the base bid, and not offered as an option.

**Figure 22. Unitrends Disk Backup Appliances**

*Unitrends is an affordable, easy-to-use data protection solution.*

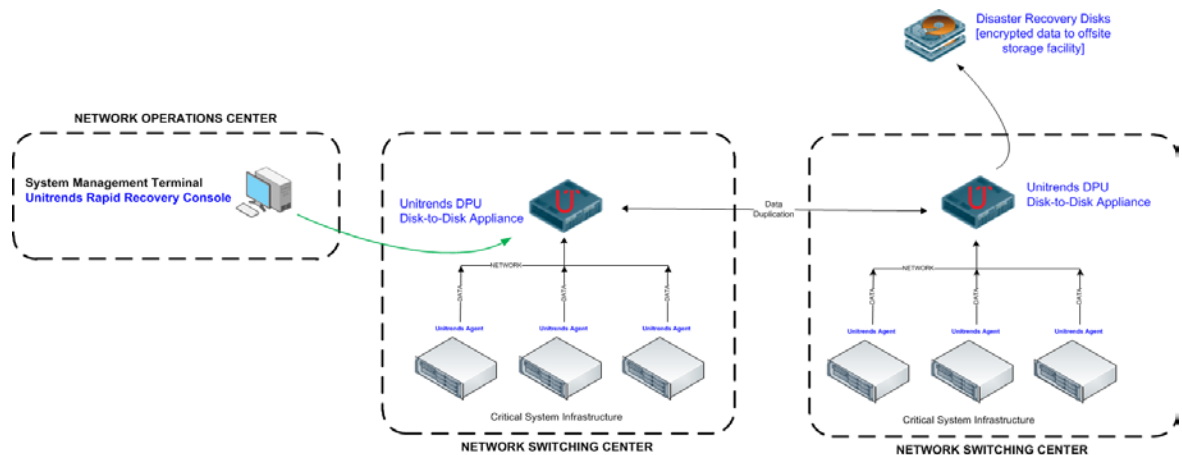


Software Agents residing on critical VIDA network devices send data securely over the network to the Unitrends DPU Disk-to-Disk Backup Appliance in the Network Switching Center. The DPU de-duplicates the data for storage efficiency.

Standards-based AES 256-bit encryption is then performed automatically, protecting data from unauthorized access and theft, and the data is stored on a redundant array of independent disks, for availability, and greater speed and reliability than tape-based systems. The DPU also “de-duplicates” the data for storage efficiency (ensures that only one copy of duplicate data is stored).

**Figure 23. Backup Architecture**

*Disk-to-disk BareMetal™ restoration over the network can rapidly restore failed servers.*

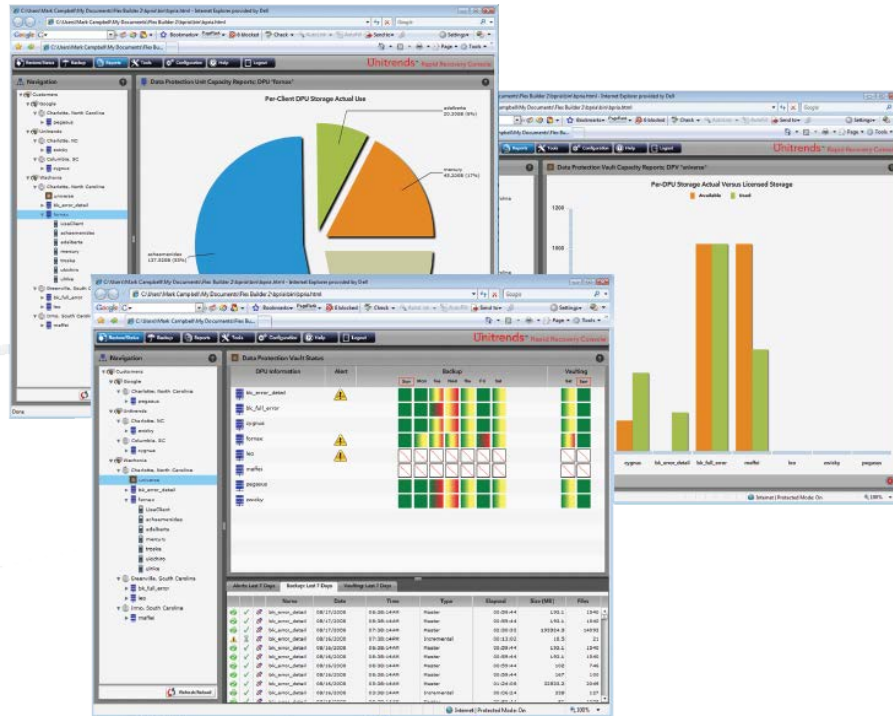


Once stored on the DPU, the data is available for rapid system restoration. For offsite disaster recovery protection, the DPU is used in conjunction with another DPU in the secondary data center. Data is copied from the local DPU to the removable drives on the remote DPU, where they can be removed and sent to a secure off-site storage facility.



All Unitrends backup and recovery operations are centrally monitored and managed from the centralized Rapid Recovery Console. In the event of loss of equipment data, network operators can use the Rapid Recovery Console to restore the data and configuration to get the network device operating again.

Figure 24. Backup Architecture



## System Backhaul

Harris assumes DIA will provide connections to all sites, and to all dispatch consoles. Redundant connections from these sites are not required but would increase overall system reliability. Each of these network connections will require a minimum bandwidth as stated in Figure 25 and provided via Ethernet from the DIA-provided Backhaul network.

Figure 25. Backup Architecture

Location	Required Bandwidth (Mbps)
Main Site (Antenna Farm – Tower 1)	3.914
AOC Backup Dispatch (16 positions)	2.016
AOB Primary Dispatch (15 positions)	1.890
VHF Site (Tower 4)	1.536
B Tower VHF Interop	1.536
Backup Site (Concourse A)	1.536
IMC and EMG (AOB 10 <sup>th</sup> Floor)	1.536

Location	Required Bandwidth (Mbps)
Primary Network Switching Center (A14C70)	10.000
Secondary Network Switching Center (AOB 45B08)	10.000

There are several types and manufacturers of backhaul systems, and the Harris P25 system flexibility allows it to support each of them. The Harris network can support interconnections via dedicated or shared microwave, fiber, or leased lines or any combination of these types. There are advantages to each kind, and it is important to consider both reliability of the equipment and the cost to determine what is most acceptable to DIA. For design purposes for this proposal, Harris is assuming that the backhaul that the DIA will use will be fiber.

Harris is currently assuming the RF Site to Switch connections are via fiber, and that DIA is doing the fiber to Ethernet conversion on both ends.

## P25 Compliance

Harris takes an active role in the evolution of the APCO Project 25 (P25) standards as the user requirements change with the new available technologies. We are committed to providing robust infrastructure and subscriber equipment to our customers at a lower cost while providing the flexibility and support of multiple P25 compliant radios.

The use of standards-based equipment increases interoperability with other agencies. Harris has implemented numerous interoperability solutions throughout the country, and we are committed to providing the best technology at the right price to DIA.

By selecting Harris, DIA will align itself with a leader in Project 25 systems development and enjoy the benefits of a fully-compliant P25 radio system with completely open interfaces and support for the widest array of end user radios and auxiliary equipment on the market.

## Interoperability

P25<sup>IP</sup> is an open standard defining a common means for radios to talk to radio systems and radio systems to talk to one another. The proposed system for DIA supports both means of communications. For the subscribers, we support the P25 common air interface (CAI) standard. For communications with other radio systems in the area Harris supports are supporting the P25 standard known as Inter-Sub-System Interface (ISSI). Support of both of these standards gives DIA multiple ways to interoperate with other agencies. In addition to ISSI, Harris offers other VIDA solutions for interoperability. Figure 26 summarizes the various interoperability interfaces proposed:

**Figure 26. Interoperability Interfaces**

Harris Interoperability Solution	How DIA Users will Interoperate
P25 Subscribers	By roaming to neighboring P25 network and communicate on that foreign system.
ISSI	By allowing P25 Denver core agencies (or any entity that has P25 and ISSI) to roam into the DIA system and communicate with DIA P25 units. Foreign roaming units will be able to communicate to their dispatch command and units located back on their home P25 system as well.

Harris Interoperability Solution	How DIA Users will Interoperate
Interoperability Gateway ( <i>NetworkFirst</i> )	Allows DIA P25 users to communicate with entities that are not using P25 technology regardless of frequency band (i.e. VHF analog conventional units).
EDACS Migration Gateway	Allows DIA P25 users to communicate with DIA EDACS users during the migration transitioning. Allows IP dispatch consoles to dispatch to both EDACS and P25 users.
VIDA Transcoder	Supports communication between P25 <sup>IP</sup> Phase 1 and analog EDACS and interoperability gateway for the conventional interfaces.
DIA IMC switch connected to the regional EDACS StarGate switch	Currently allows neighboring EDACS users to roam into the DIA EDACS system and communicate with DIA EDACS units. Foreign roaming units are also able to communicate to their dispatch command and units located back on their home EDACS system as well.

The current MARC VIDA Core is being upgraded to SR10A, utilizing the same virtual technology outlined in this proposal. The DIA IMC has been disconnected from the StarGate and operation of the PR9C and EDACS IP Gateway will be maintained. Interoperability with the Metro Core (MARC) will occur via an ISSI connection between DIA and the MARC SR10A core in this proposal. Once the final cutover to P25 is complete, all EDACS including the IMC and EMG will be decommissioned.

## P25 Terminal Interoperability

Interoperability at the radio level provides an immediate level of interoperability with other agencies in the same frequency band. Simply put, any of the terminals proposed by Harris can connect to any other certified P25 system in the area<sup>1</sup>.

For example, DIA users can change ‘channels’ on their radio and be on the wide area network system assuming they are authorized to be on it. Similarly, a user from the MARC core network can switch ‘channels’ on their radio and talk on the DIA system.

## P25 ISSI Interoperability

As needed, other P25 agencies or networks (including MARC) may interface to the DIA P25<sup>IP</sup> network through the new ISSI Gateway. Each Harris ISSI Gateway supports connecting to a total of ten ISSI networks and up to 1000 talk-paths. These can be accommodated by adding more private network connections and configuring the ISSI Gateway for the additional network through purchase of additional licenses. Further expansion and redundancy occurs by adding additional Gateways to the system. Note that additional Gateways can be located anywhere the network reaches for geographical redundancy.

Harris also supports ISSI connections over the public Internet, though we do not recommend it both for reliability purposes and the

**The Harris' ISSI gateway can expand to accommodate ten agencies. Additional gateways can provide further expansion.**

<sup>1</sup> Note: Other systems in the area must be programmed to allow other radios on their system; the DIA radio must have the proper frequency band in it and the DIA radio must be programmed to work on the other system.

necessity for additional network security equipment.

Harris is committed to providing additional ISSI features and functionality to the Gateway through system releases of software. These updates are available for purchase either on a subscription or per update basis. We call our software update subscription service Software FX.

Harris also commits to working cooperatively with other agencies and vendors to assure ISSI connectivity between systems. Harris has included the necessary licensing for the DIA side of the ISSI. The Metro Core (MARC) ISSI would need to add the necessary licensing to account for another connection between the two systems.

### Interoperability Gateway (NetworkFirst)

Two Harris NetworkFirst interoperability gateways are included in this proposal. The gateways are configured with five talkpath ports (Tower 4) and four talkpath ports (Antenna Farm) to interface with an existing VHF transceiver or a logging interface. These interoperability gateways can expand to 12 talkpath ports if necessary in the future, and additional gateways can be added as needed. Ensuring interoperability across dozens of jurisdictional boundaries is a critical need for public safety agencies nationwide. Yet the choices often seem limited: either pursue the very expensive “put everyone on the same radio system” approach or compromise with a stop-gap interoperability “patch” solution that extends the life of existing infrastructure but offers only limited performance. A Harris NetworkFirst system allows agencies to maximize their investment in existing infrastructure and gain on-demand interoperability with multiple jurisdictions and with the flexibility of either a field officer or the dispatcher setting up the interoperability talkgroup.

**Figure 27. Interoperability Gateway**



The NetworkFirst system is an Internet Protocol (IP) based interoperability solution for mission-critical users of land mobile radio systems. Through the digitization of voice signals and packet-switching technology, it allows users with any brand radio and on any frequency band to interoperate with each other on a common VIDA network.

Proven in public safety use since 2004, this advanced solution:

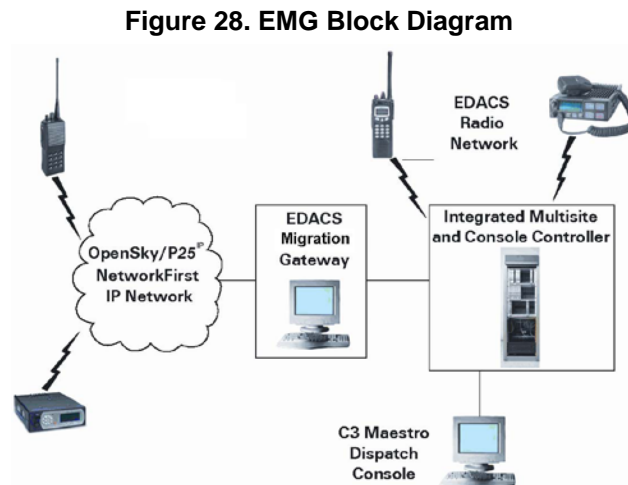
- Links historically independent radio systems via a robust, reliable IP network
- Is standards based (IP and APCO P25)
- Is certified by the U.S. Dept. of Homeland Security (DHS) as a Qualified Anti-Terrorist Technology (QATT)
- Is a native P25 compatible interoperability solution, hence qualifying for DHS funding
- Maximizes the use of your existing investment in radios, stations, and sites
- Uniquely allows interoperability connections to be invoked either by designated field officers from their portable radios or by a central dispatcher
- Uniquely allows for end-to-end encryption between P25 users

- Uniquely provides priorities in interoperability connections, supporting public safety command structures
- Supports transmission of emergency alarms across systems
- Is not just a simple patching device – the NetworkFirst system utilizes the familiar and flexible “talkgroup” paradigm familiar to mission critical users
- Can be configured with a highly reliable geographically redundant switch configuration
- Reduces backhaul-link bandwidth by up to one-fourth compared to ‘bridging’ devices

NetworkFirst system connects users at the system level, so it does not matter what frequencies or brands of radio system are being connected. Analog or digital, trunked or conventional, Brand X or Brand Y, they are all the same to a NetworkFirst system. Users simply go to a preset interoperability talkgroup and begin to communicate. Training is minimal.

## EDACS Migration Gateway

Harris will provide the EDACS Migration Gateway (EMG) hardware and EMG software for free, to replace the existing EDACS IP Gateway. The EMG is the new trunked network product that uses standard off-the-shelf components to allow inter-talkability between the airport’s EDACS network and the proposed P25<sup>IP</sup> network. Existing interface cards in the IMC can be re-used for connection to the new EMG server.



The EDACS Migration Gateway allows an existing EDACS customer to smoothly migrate to a P25<sup>IP</sup> system and transition dispatch. The EDACS Migration Gateway supports dispatching to both the EDACS and the P25<sup>IP</sup> system from either the existing Maestro<sup>IP</sup> or the proposed Symphony dispatch console.

The EDACS Migration Gateway uses a dual E5-2640 processor based server and Cisco<sup>®</sup> networking equipment to receive P25 voice packets and direct them to the IMC, where they are vocoded and routed to the existing wireline consoles as analog voice and to EDACS RF sites as analog calls. EDACS radio and dispatcher-originated calls are sent to the IMC and into the EMG to be vocoded and formatted into voice packets for distribution throughout the P25 radio network. The EMG can support up to 24 concurrent calls in each direction (full duplex).

## VIDA Transcoder

The VIDA Transcoder is a network product that uses standard off-the-shelf components and sophisticated digital voice coding software to allow customers to deploy VIDA networks using multiple air interfaces and digital voice formats. For DIA, the VIDA Transcoder allows a single VIDA network to support communication between any two of the following voice vocoder formats:

- P25 Phase 1 (full rate IMBE format)
- P25 Phase 2 (half rate IMBE format)
- Analog EDACS
- Legacy conventional analog sites and terminals

This is needed for DIA because EDACS and legacy conventional analog audio are converted to a digital audio format (such as ADPCM Codex) by the EDACS Migration Gateway and the Interoperability Gateway describe above in the previous sections. This digital format needs to be transcoded to communicate with P25 IMBE format.

In most critical communication systems, the audio quality is of utmost importance. The VIDA Transcoder conversion translates parameters like pitch, gain, sub-bands, voiced/unvoiced decisions, etc. to provide the highest level of audio quality.

The VIDA Transcoder is “network architecture” independent. Any given network architecture will be supported by its configuration. This is accomplished using the “agency model” for configuration/allocation. The agency model maps all user entities to a specific agency, and the agencies are mapped to specific VIDA Transcoders. The agency model allows for efficient and dynamic allocation in order to balance/control VIDA Transcoder call loading. VIDA Transcoder redundancy and multiplicity is also inherent with this model because a specific VIDA Transcoder can support a single agency, multiple agencies, or “all” agencies. The agency model also adapts well to networks with security requirements associated with agencies.

## Harris BeOn Application

Harris is leading the industry in providing connectivity between 3G and 4G cellular systems and Land Mobile Radio (LMR) systems. Our Primary platform for this capability is BeOn, which is a Harris application that securely connects users with cellular smart phones to defined interoperability talkgroups on VIDA networks, such as the proposed DIA radio system to provide Push-to-Talk (PTT) connectivity. So that DIA might explore the value of such connectivity, Harris has included a BeOn server and ten user licenses as part of this proposal package to DIA **at no cost**. DIA will have to provide the smart phones used on the system. Additional user licenses can be added at additional cost.

**Figure 29. BeOn Phone Requirements and Recommendations**

Feature	Status
Android Version 2.3 or Better	Required
3G Capability	Required
4G Capability	Recommended

Feature	Status
Loud Speaker (for Noisy Environments)	Recommended
Rugged Device	Recommended
Extended Life Battery	Recommended
Large Side Buttons	Recommended

Phones that are compatible on the BeOn System are listed below:

- Samsung Galaxy S2, S3, Captivate, Skyrocket
- Droid Charge (Verizon)
- HTC ThunderBolt
- Casio GZ'One (must be Commando)
- LG Revolution (Verizon)

**Figure 30. BeOn Application**



## System Performance Verification

The System Performance Verification, defined by the contract as the Functional Acceptance Test Plan (ATP), will be overseen by the Harris System Engineer (SE). The SE will also direct the system optimization process and other tests to ensure that all system parameters are correct and fully meet the technical and contractual requirements. In addition, the SE will provide technical support to Harris' Technical Publications department for provision of technical, as-built drawings.

The new server hardware will be factory staged, preconfigured, and factory tested for functionality per the attached test procedure. Functional testing will be performed during factory staging, as well as after installation to verify system operation. The Functional Acceptance Testing Procedure (FATP) document is supplied in the ATP section of this proposal. This document describes the testing procedures that will be run on the system in the factory prior to shipment.

The SE is responsible for:

- Creating documents for Customer Design Review such as:
  - Frequency Plan
  - Combiner Plan
  - Antenna Drawings
  - Rack Drawings
  - Electrical Power Loads/BTUs
  - Acceptance Test Plan
  - Coverage Maps
  - Network Plan
  - Microwave/Fiber/T1 Layout
  - System Block Diagrams
  - Finalizing system design and reviews
  - Performing coverage prediction and acceptance testing
  - Providing fleet map planning support
  - Configuring the system
  - Providing implementation support
  - Creating final system documentation

## System Implementation

Harris is proud of our reputation for completing projects on time and on budget. Our project management philosophy is well planned and organized, centered on the Program Management Body of Knowledge (PMBOK). Our approach is to apply the tailored knowledge, skills, tools, and techniques to project activities and to meet project requirements. Successful project management requires effective management of the appropriate processes throughout a project's evolution. Harris' tools and techniques facilitate the application of the skills and capabilities described in PMBOK knowledge areas. Please refer to the Statement of Work provided following this section.

## Software FX

DIA currently has a Software FX contract for \$12,000 annually, which is 60% off the original EDACS only fee. This current contract was set to expire in December 2013. The current PR9C VIDA core is under warranty, but Harris has quoted a new Software FX contract for \$65,000 annually to cover the existing PR9C and IP Gateway equipment, as well as the existing EDACS equipment, and this new agreement would cover DIA through December 2014. Once DIA upgrades their new core equipment to SR10A, the software FX and SUMS support would be included for free for one year the first year post-acceptance. If the SR10A core is deployed and accepted prior to the December 2014



FX contract date, then Harris would pro-rate the \$65,000 fee. After one year of acceptance the first year post-acceptance, the new Software FX agreement to cover the SR10A core, P25 Simulcast system, and ISSI would be \$105,000.

## Assumptions

The Harris response is based on the information obtained from meetings with DIA. It includes an innovative solution based on the following assumptions and risk considerations:

- DIA is responsible for providing floor space, civils (shelter, power, backup power, towers, etc.), and site improvements at existing repeater sites as well as at future and new repeater sites. All site development and equipment installs provided by DIA must be per Harris' supplied specifications. Further details on related issues are outlined in the Project Management and Implementation document provided with this quote.
- Equipment will require a power source (and applicable backup power sources) to be supplied by DIA. The MASTR V equipment, NSC, and dispatch consoles require 120VAC.
- Harris will neither provide any coverage analysis nor coverage guarantees with this quote.
- Harris is responsible for new P25 infrastructure equipment installation and removal of decommissioned EDACS equipment and C3 Maestro consoles at all sites. Harris has no responsibility regarding the DispatchWorks consoles.
- DIA is responsible for terminal equipment (mobile, portable and desktop control station) removal and installations.
- DIA is aware that the VIDA software release proposed is SR10A which is the latest and noticeably different from PR9C and other former releases. DIA technicians and/or engineers should attend training on SR10A. DIA should consider procuring Harris system engineering and project management services for assistance with implementation.
- Harris will not provide any telephone interconnect equipment.
- Harris assumes that other manufacturer's P25 systems provided by neighboring or state agencies are truly P25 Compliant (or can be upgraded to be compliant). If these P25 systems are compliant, then they will be capable of directly interfacing with the proposed Harris IP network using the P25-standardized inter-RF sub-system interface (ISSI) recommend by Harris.
- DIA is responsible for backhaul (microwave, fiber, WAN/LAN, site connectivity, console connectivity, interoperability connectivity, etc.).
- Harris will not be responsible for any interference as a result of DIA's selection of frequencies and frequency spacing.
- Harris will be responsible for performance verification to assure proper functionality of the equipment installed by Harris. A recommended sample Acceptance Test Procedure (ATP) is provided with this quote.
- Harris will not be responsible to stage, configure, or make operational any equipment not purchased through Harris.



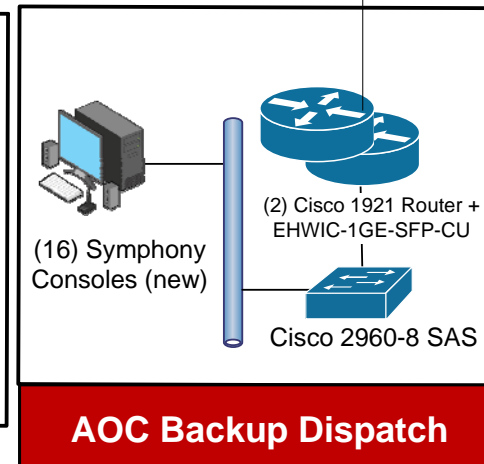
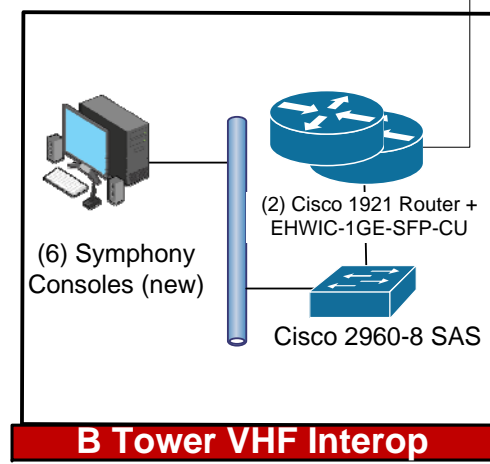
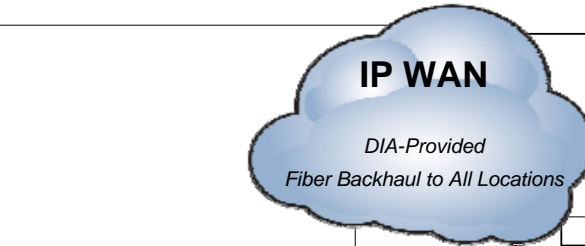
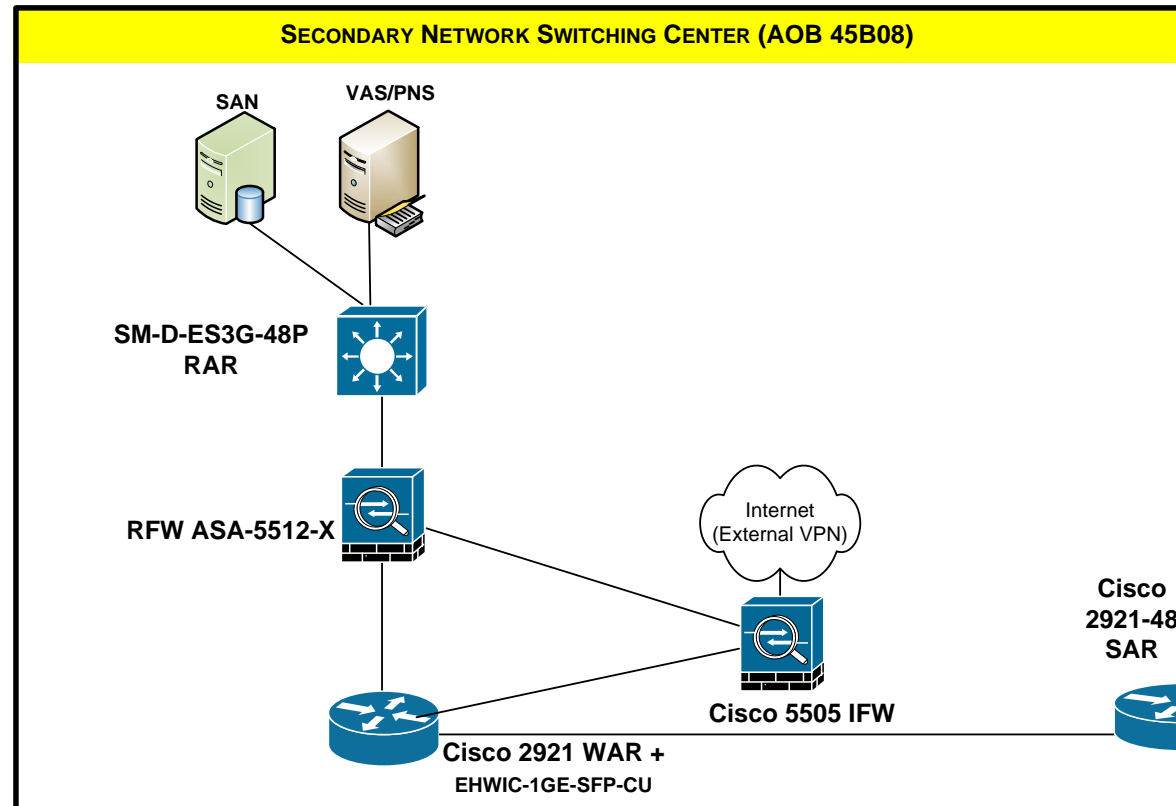
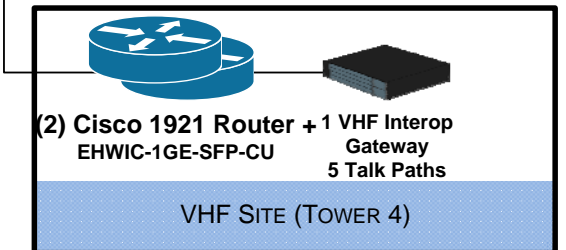
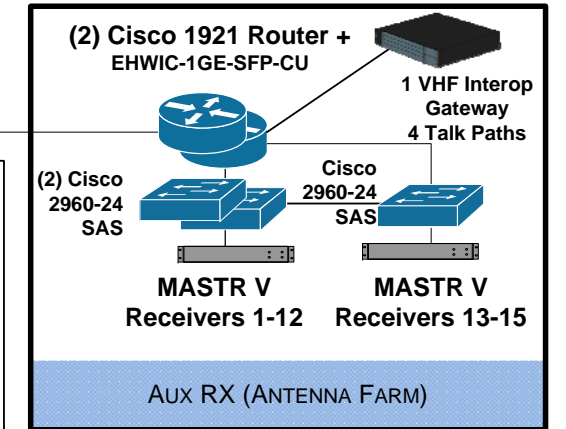
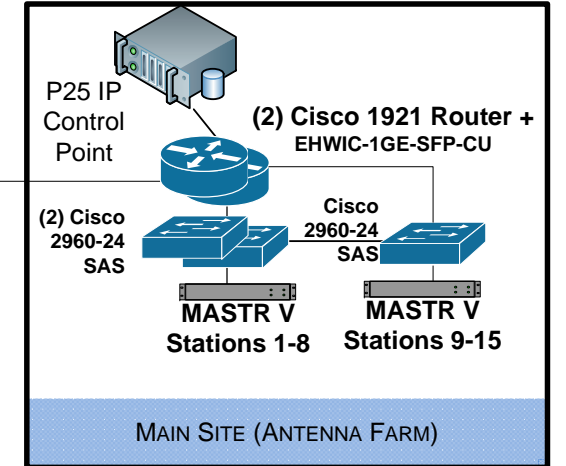
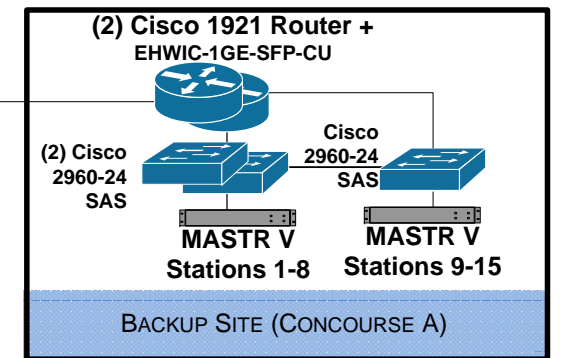
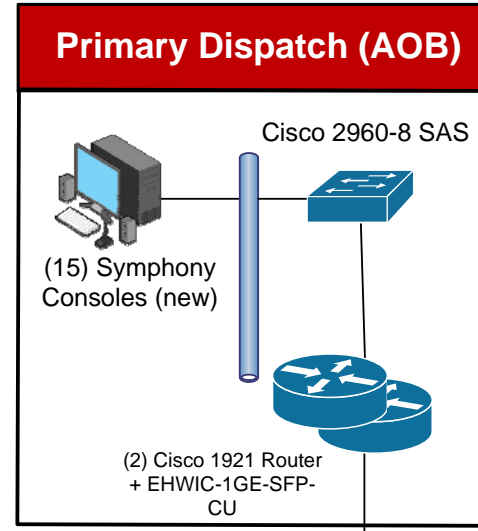
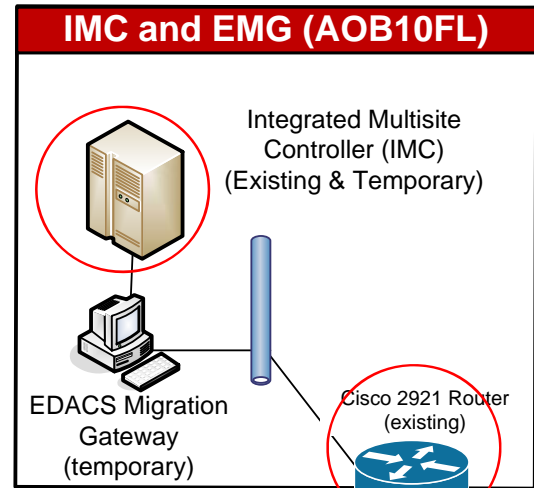
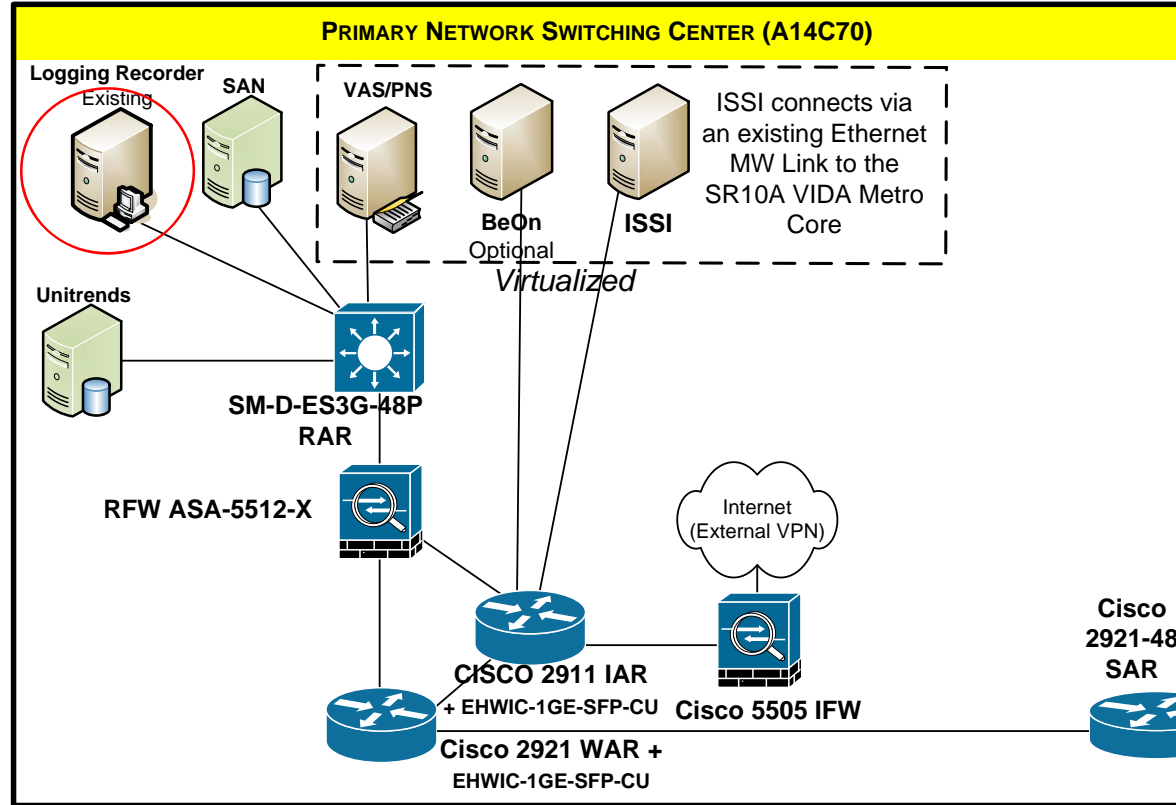
## Denver International Airport System Drawings

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- 2 DIA Network Diagram
- 3 Existing System Block Diagram
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# Final SR10 Configuration



**LEGEND**  
**SAR:** Site Access Router  
**SAS:** Site Access Switch  
**IFW:** Internet Firewall  
**RAR:** Region Access Router  
**WAR:** WAN Access Router  
**RFW:** Region Firewall  
 ○ : Circled = Existing

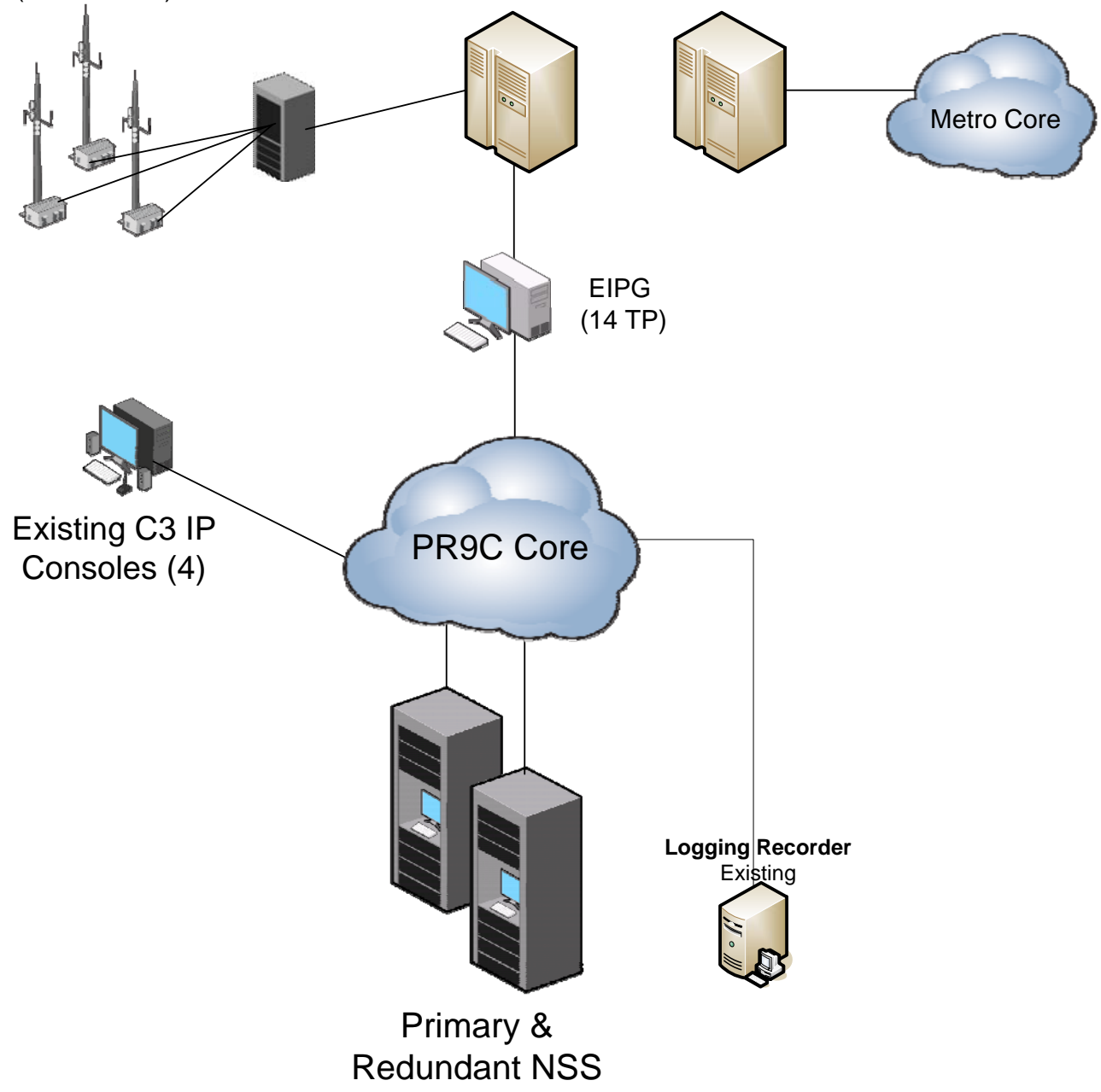
<b>HARRIS</b> RF COMMUNICATIONS DIVISION PUBLIC SAFETY & PROFESSIONAL COMMUNICATIONS		MBP 13182
PRELIMINARY ENGINEERING SKETCH COMPANY CONFIDENTIAL		DENVER INTERNATIONAL AIRPORT
PREPARED BY: Silverman, Kenneth	DIA NETWORK DIAGRAM	
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EDACS Simulcast Sites  
(15 channels)

DIA/IMC

Stargate

# Existing Configuration:



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DATE: 4/20/2015	REV M	SHEET # 3 OF 12
SKETCH #:		

EDACS Simulcast Sites  
(15 channels)

DIA/IMC

Stargate

Metro Core

EIPG  
(14 TP)

EMG (14 TP)

Existing C3 IP  
Consoles (4)

PR9C Core

SR 10 Core

Logging Recorder  
Existing

Primary &  
Redundant NSS

Primary &  
Redundant NSS

## Step-1 Summary – New Core:

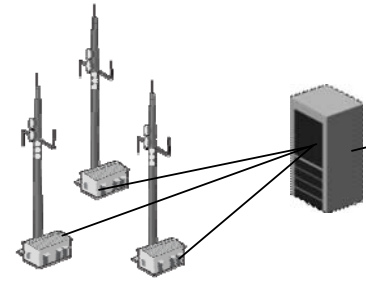
- Build out SR10A VIDA core equipment alongside existing PR9C core
- Add EDACS Migration Gateway (EMG) to support SR10A Platform.
- Upgrade EXACOM logging recorder
- PR9C core still controls system

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## Step-2 Summary: Dispatch Upgrades:

- Add 6 Symphony Consoles to Tower B (VHF Interoperability)
- Move Existing C3 IP Consoles and upgrade software for SR10
- Cutover EDACS system to SR10 core
- Logging recorder moved to SR10 core & software update
- Decommission SR9 Core
- Add 15 Symphony Consoles to Airport Office Building (AOB)
- Add 16 Symphony Consoles to Airport Operations and Control (AOC)

EDACS Simulcast Sites  
(15 channels)



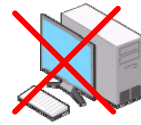
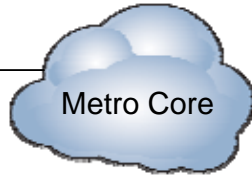
DIA/IMC



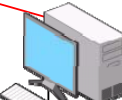
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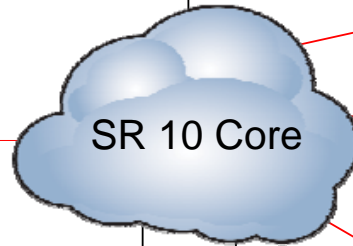
Metro Core



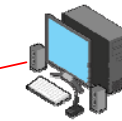
EMG (14 TP)



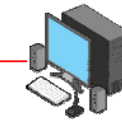
SR 10 Core



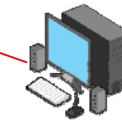
**AOC: 16 New Symphony Consoles**



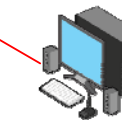
**AOB: 15 New Symphony Consoles**



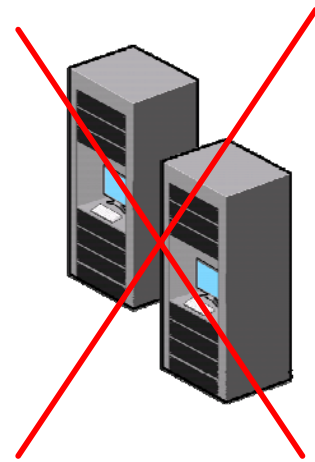
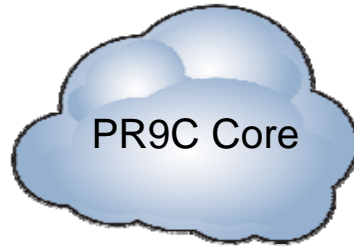
**TOWER B: 6 New Symphony Consoles**



**EXISTING: C3 IP Consoles (4)**



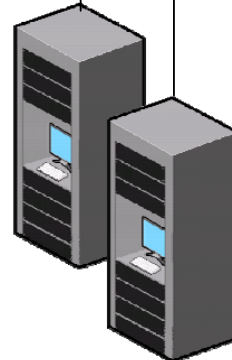
PR9C Core



Logging Recorder  
Existing

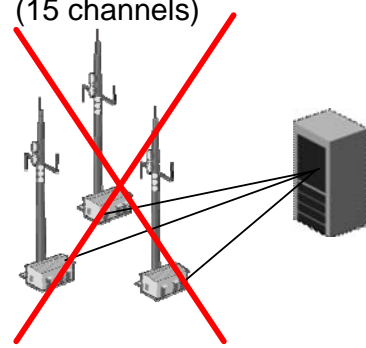


Primary &  
Redundant NSS

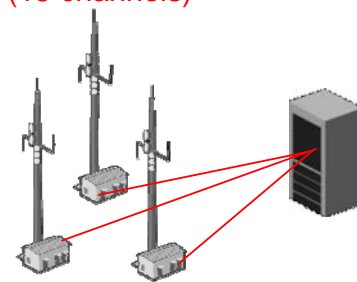


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EDACS Simulcast Sites  
(15 channels)



New P25 Sites  
(15 channels)



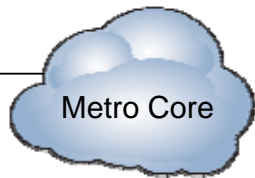
DIA/IMC



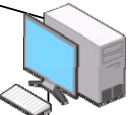
Stargate



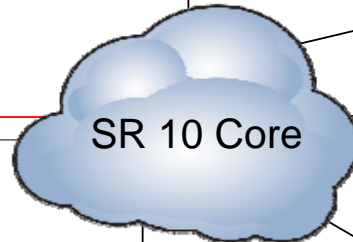
Metro Core



EMG (14 TP)



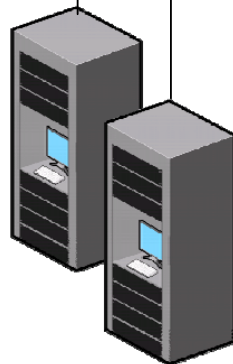
SR 10 Core



Logging Recorder  
Existing



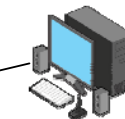
Primary &  
Redundant NSS



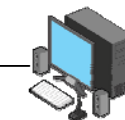
## Step-3 Summary: Upgrade EDACS Simulcast to P25 IP Simulcast:

- Build out new simulcast system in parallel
- Move 2 RF frequencies from EDACS to P25 during testing
- Test system coverage and functionality
- Cutover users to P25
- Dismantle EDACS Simulcast

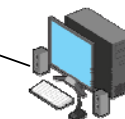
**AOC: 16 New Symphony Consoles**



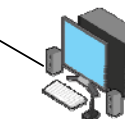
**AOB: 15 New Symphony Consoles**



**TOWER B: 6 New Symphony Consoles**



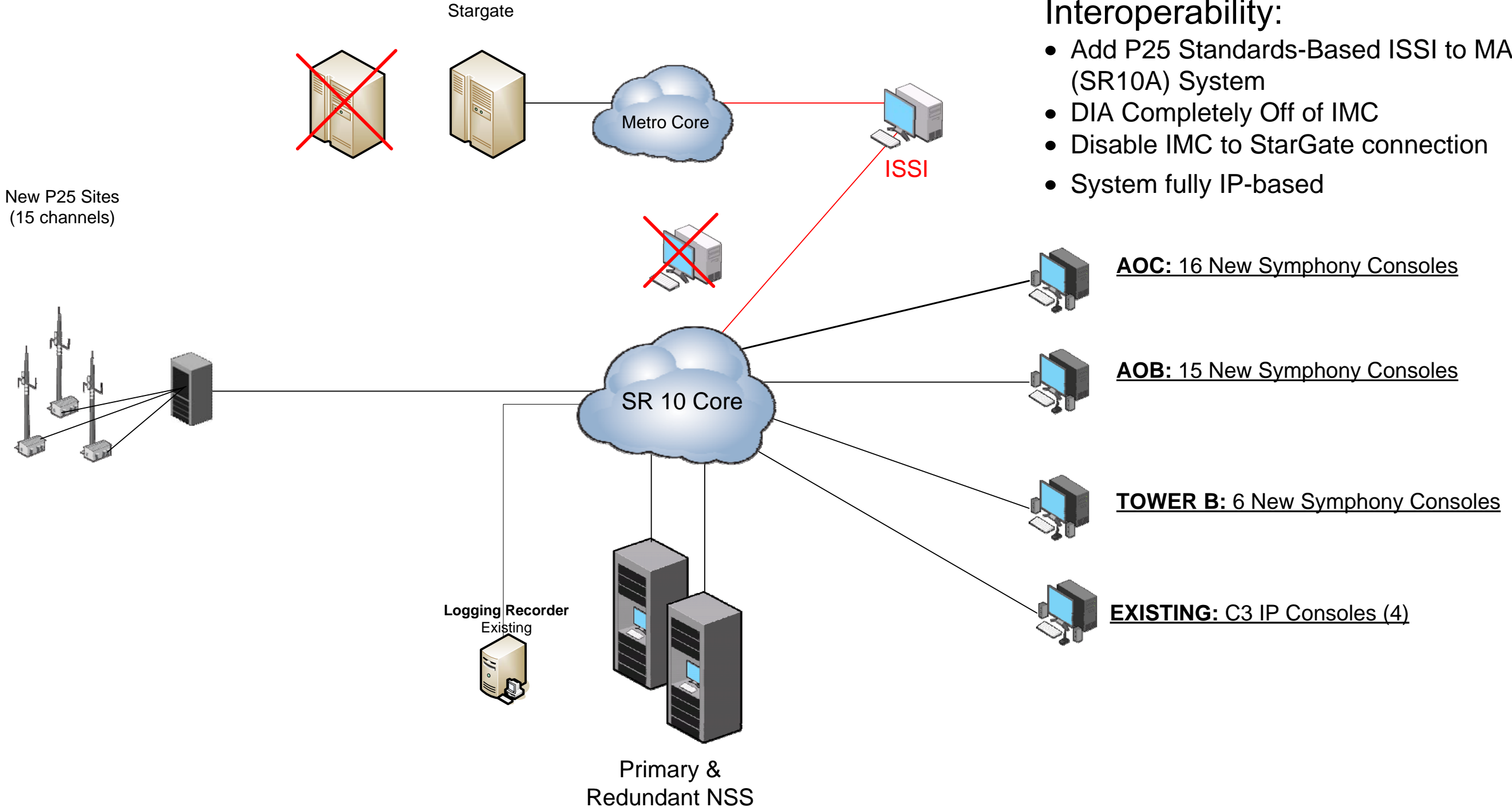
**EXISTING: C3 IP Consoles (4)**



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SKETCH #:		

# Step-4 Summary: Metro Core Interoperability:

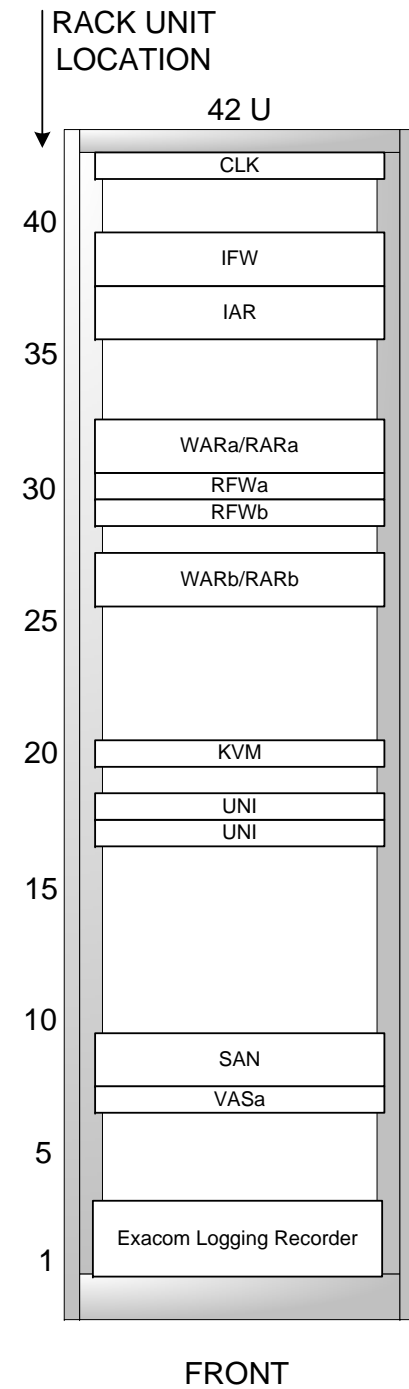
- Add P25 Standards-Based ISSI to MARC (SR10A) System
- DIA Completely Off of IMC
- Disable IMC to StarGate connection
- System fully IP-based



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## VIDA PREMIER GEOGRAPHICALLY SEPARATED HA PRIMARY RACK-UP

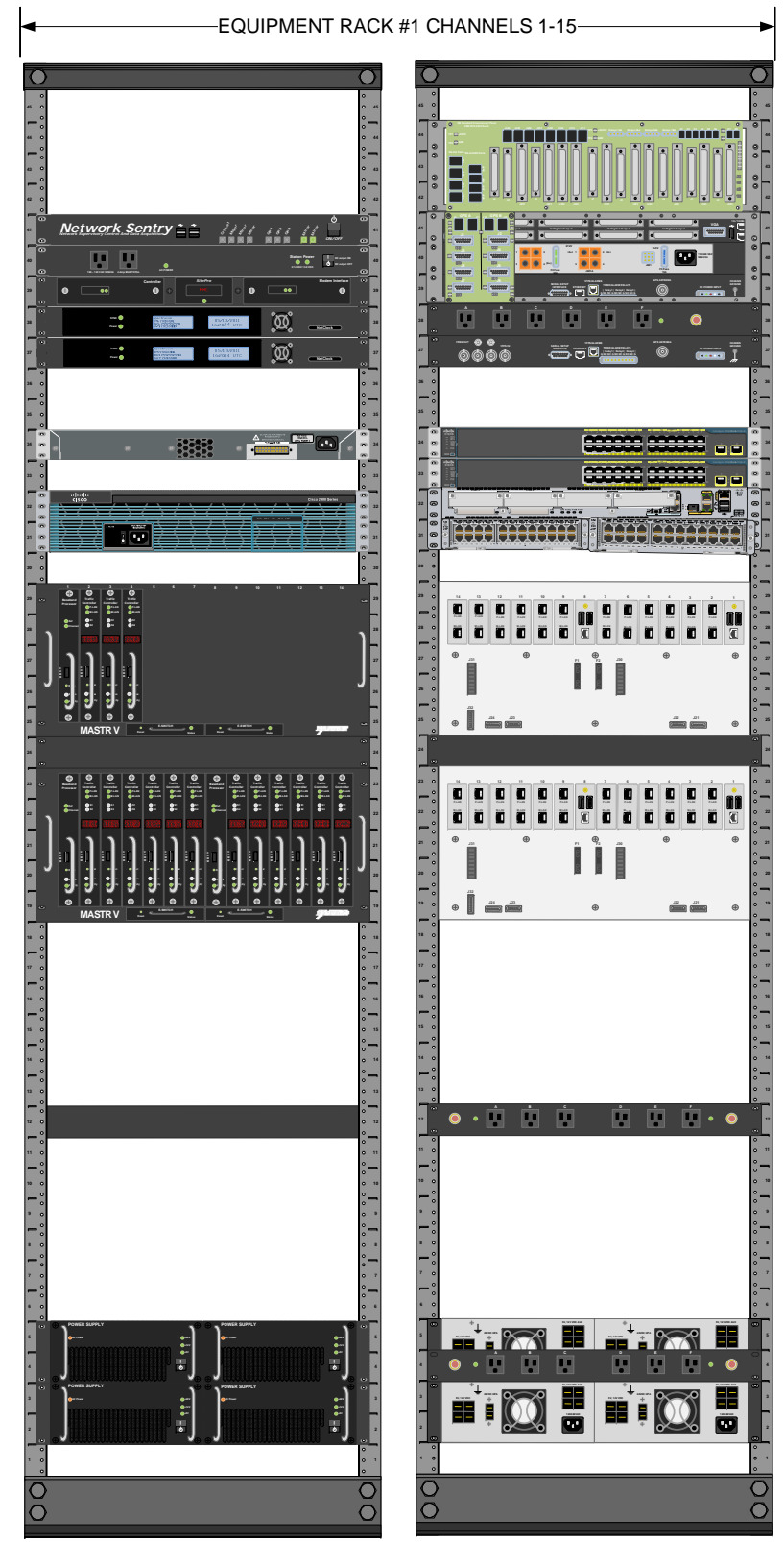


REF. DES.	LOCATION (R.u. No.)	LOCATION IN CABINET (FRONT/REAR)	DESCRIPTION	HARRIS NUMBER	VENDOR
CLK	42	Front	Spectracom Securesync GPS 1200	A30-1338-001	SPECTRACOM
IFW	38	Front	ASA 5505 Security Plus Appliance	CM-027501-500	CISCO
IAR	36	Front	Cisco 2911 Router with AC Power and Security Bundle	CM-027501-401	CISCO
WARa/RARa	31	Front	Cisco 2921 Router with SM-D-ES3G-48-P – with Encryption	14032-0001-12	CISCO
RFWa	30	Front	Cisco ASA5512X With Security Plus License	14032-0003-01	CISCO
RFWb	30	Front			
WARb/RARb	26	Front			
KVM	20	Front	Monitor/Keyboard/Mouse/KVM Switch	CM-009172-006	TRIPPLITE
UNI	18	Front	UNITRENDS HARRIS 712 DPU	CM-027501-702	UNITRENDS
UNI	17	Front	Recovery Archive - 1U Archive Drive Shelf	CM-027501-702	UNITRENDS
GWB	11	Front	Interop Gateway	CM-013189-001_B	TTM Technologies
EMG	10	Front	EDACS Migration Gateway	14031-0001-01	Dell
SAN	8	Front	NetApp SAN FAS2220	14031-0002-01	NETAPP
VASa	7	Front	VIDA Application Server	14031-0001-03	DELL



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PREPARED BY: Silverman, Kenneth	NSC- PRIMARY RACK	
DATE: 4/20/2015	REV M	SHEET # 8 OF 12
SKETCH #:		

# P25 IP Control Point Rack – Proposed Configuration



- Network Sentry
- Network Sentry power supply
- NETCLOCK/GPS (CLK)
- NETCLOCK/GPS (CLK)
- Cisco 2960
- Cisco 2921
- CP Shelf 2  
Controllers 13-15
- Fan Tray
- CP Shelf 1  
Controllers 1-12
- Power strip
- Power supplies

Front Rail

Back Rail

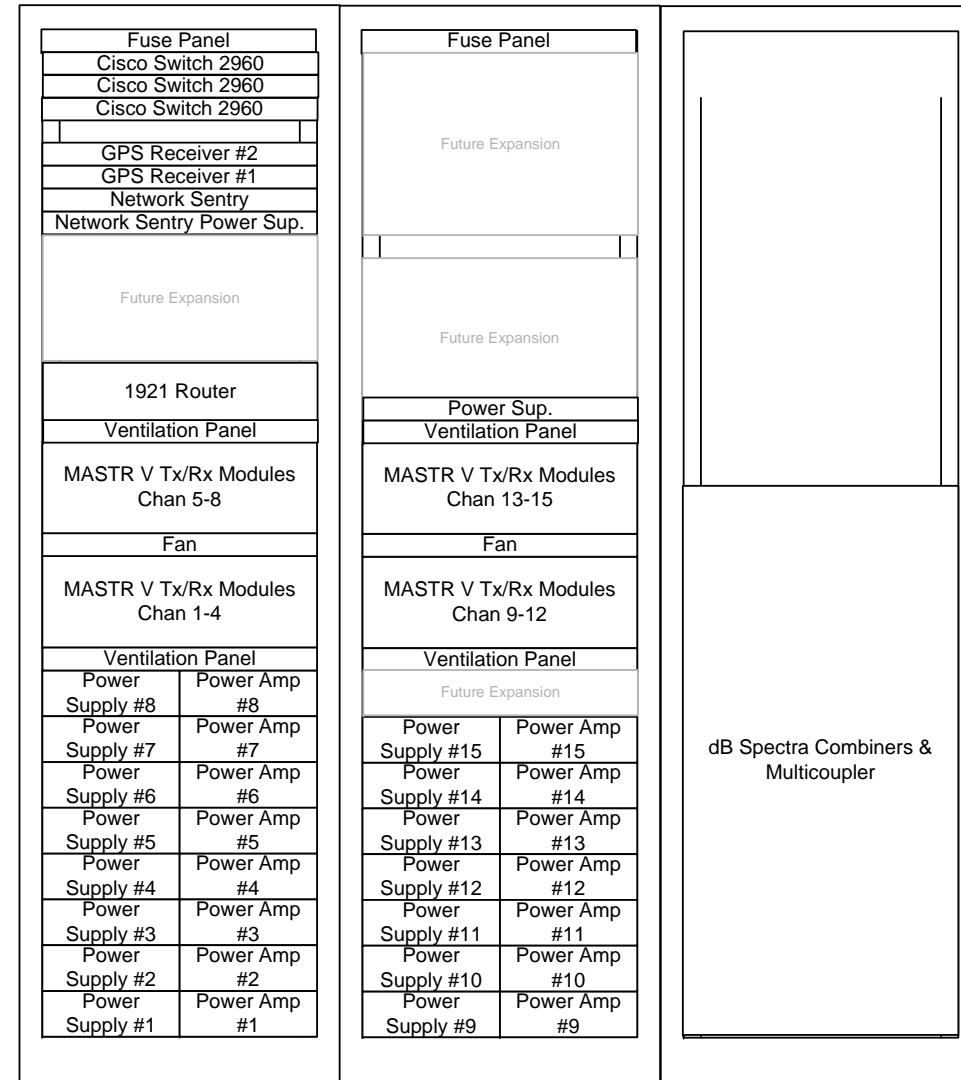
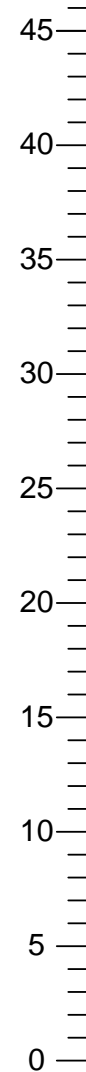


<b>HARRIS</b> RF COMMUNICATIONS DIVISION PUBLIC SAFETY & PROFESSIONAL COMMUNICATIONS		MBP 13182
PRELIMINARY ENGINEERING SKETCH COMPANY CONFIDENTIAL		DENVER INTERNATIONAL AIRPORT
PREPARED BY: Silverman, Kenneth	P25 IP CONTROL POINT RACK	
DATE: 4/20/2015	REV M	SHEET # 9 OF 12
SKETCH #:		

# DIA – RF Racks

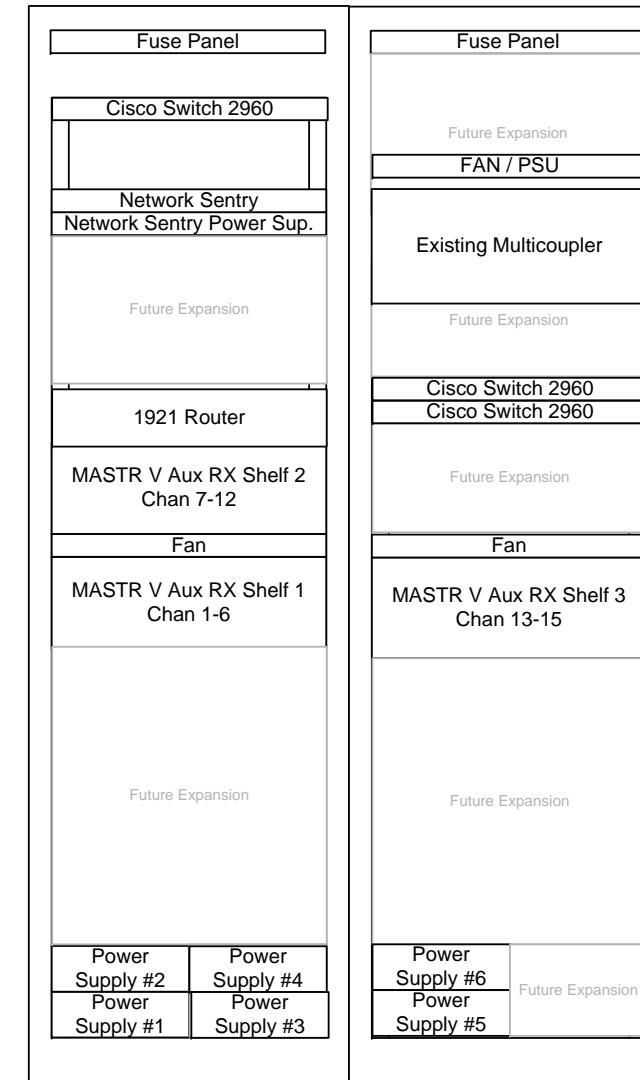
## 15 Channel P25 IP Simulcast

## 15 Channel P25 IP Aux RX



P25 IP Simulcast Rack 1      P25 IP Simulcast Rack 2      P25 IP Simulcast Rack 3  
 Height : 84 in.                      Height : 84 in.                      Height : 84 in.  
 Width : 19 in.                      Width : 19 in.                      Width : 19 in.  
 Depth : 12 in.                      Depth : 12 in.                      Depth : 12 in.

P25 IP Racks

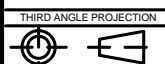


P25 IP Aux RX Rack 1                      P25 IP Aux RX Rack 2  
 Height : 84 in.                      Height : 84 in.  
 Width : 19 in.                      Width : 19 in.  
 Depth : 12 in.                      Depth : 12 in.

P25 IP Racks

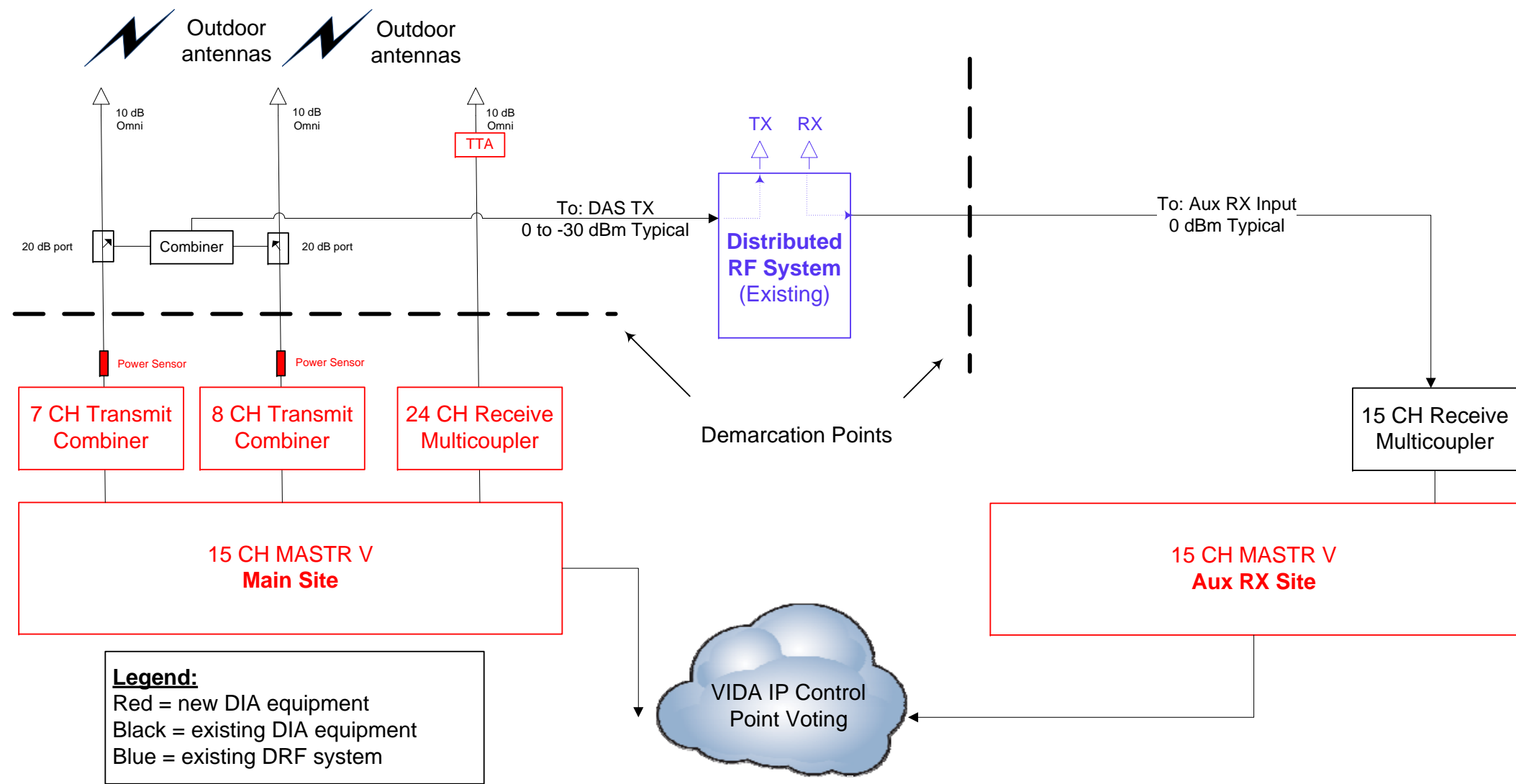
**NOTES:**

(1) – THIS IS A REPRESENTATIVE DRAWING. INSTALLED RACK-UP AND FINAL FLOORPLAN TO BE DETERMINED DURING FINAL SYSTEM DESIGN.

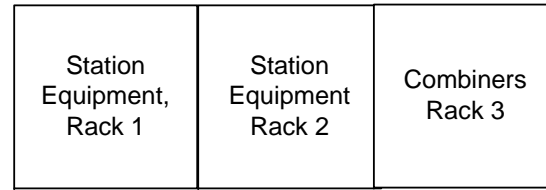


<b>HARRIS</b>		RF COMMUNICATIONS DIVISION PUBLIC SAFETY & PROFESSIONAL COMMUNICATIONS	MBP 13182
PRELIMINARY ENGINEERING SKETCH COMPANY CONFIDENTIAL		DENVER INTERNATIONAL AIRPORT	
PREPARED BY: Silverman, Kenneth		P25/SITE RACK-UPS	
DATE: 4/20/2015			
SKETCH #:	REV M	SHEET # 10 OF 12	

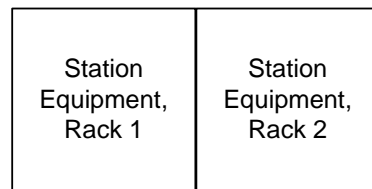
# DRF Interface at Main Site (Antenna Farm)



# MASTR V Site Floor Plans



Fifteen Channel  
Simulcast Site



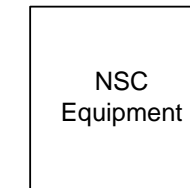
Fifteen Channel  
Aux RX Site

Site Name	Required Power	Required BTUs
Concourse A, Room A14C70	9 amps	6,684
AOB, Room 45BOA	8 amps	6,223
AOB, 10th Floor	4 amps	2,921
Concourse A, Room 6000	46 amps	31,854
Building B, Tower 1	61 amps	44,629
AOC Backup Dispatch (Optional Consoles)	32 amps	26,184
Tower 4	6 amps	4,395
Tower B	17 amps	13,368

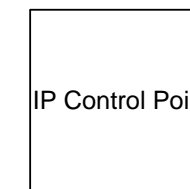
# NSC Floor Plans



Primary Premier Switch



Secondary Premier Switch



IP Control Point



<b>HARRIS</b> RF COMMUNICATIONS DIVISION PUBLIC SAFETY & PROFESSIONAL COMMUNICATIONS		MBP 13182
PRELIMINARY ENGINEERING SKETCH COMPANY CONFIDENTIAL		DENVER INTERNATIONAL AIRPORT
PREPARED BY: Silverman, Kenneth	FLOOR PLANS / POWER / HEAT	
DATE: 4/20/2015	REV M	SHEET # 12 OF 12
SKETCH #:		

# Responsibilities Matrix

The Responsibilities Matrix:

- Describes the general project responsibilities of both parties to perform that are not associated with any specific site
- Summarizes the site facilities
- Defines the specific site development and equipment installation activities Harris has proposed
- Defines the responsibilities of all parties for the implementation of the P25 project for each site or location

## General Requirements

Harris will be responsible for the implementation of:

- A P25, Phase 1, 2-site, 15-channel Simulcast system with 15-channel Aux Rx site
- A new SR10A VIDA Network Switching Center
- Two Interoperability gateway chassis
- EDACS Migration Gateway interface to existing EDACS system
- ISSI interface for interoperability to the Metro Area Radio Cooperative (MARC)
- Symphony Dispatch Consoles at three locations within the airport facility

DIA will be responsible for developing profiles, programming, and installing terminals operating on the new P25 system. Additionally, DIA will be responsible for the existing Distributed RF (DRF) system, or any future DRF system within the airport terminal. The demarcation point between the new P25 system and the DRF system shall be at the directional couplers that feed the DRF system and the multicoupler of the Auxiliary Receive Site. Harris utilizes WCQPSK modulation for P25 Simulcast Systems. DIA will be responsible for verifying that this modulation is compatible with the existing or any future DRF system. Harris support regarding the DRF system is not part of this proposal.

Figure 1 describes the general project responsibilities of both parties, which are not specifically associated with an individual site.

**Figure 1. General Requirements Responsibility Matrix**

Tasks	Harris	DIA	Comments
Designate a Harris project manager	X		
Designate a DIA project manager		X	
Manage the Harris project team	X		
Establish project communications protocol and maintain communications log as required	X		

Tasks	Harris	DIA	Comments
Conduct internal weekly project review meetings and submit weekly status reports	X		
Conduct weekly project update calls	X		
Participate in weekly project update calls		X	
Conduct monthly project reviews	X		
Participate in monthly project reviews		X	
Report project progress as compared to project schedule	X		
Update project schedule monthly	X		
Manage and control the flow of products and equipment from the factory to meet the project schedule	X		
Review change orders with Harris project manager and provide approval		X	
Monitor and manage risks using the Harris Risk Management Plan	X		
Review and approve submitted design documents within two weeks or respond with revisions		X	
Provide written approval for major milestones such as CDR, staging, ATP, and final acceptance		X	
Provide timely responses to issues and questions		X	
Coordinate with federal, state, and local government agencies, as required		X	
Designate system administrators		X	
Provide access to all buildings and sites, including temporary ID badges for Harris project team		X	
Provide parking permits for Harris project team for any restricted parking areas		X	
Provide adequate road access for delivery vehicles		X	
Arrange for temporary parking to off-load equipment at all buildings and sites		X	
Clean up site and remove all installation debris	X		
Remove any hazardous material found on site		X	
Provide adequate electrical power outlets within six (6) feet of the equipment rack / console installation locations.		X	
Ensure all sites are functional for new equipment in accordance with the following Harris standards: - Concrete Communications Shelter Construction Guidelines and Practices LBI-39184		X	

Tasks	Harris	DIA	Comments
- Standards for Site Construction LBI-39148 - Tower Requirements & General Specifications LBI-39185 - Antenna Specifications LBI-38983			
Provide P25 WCQPSK signal over the air at the directional couplers and aux receive multicoupler	X		
Interface the delivered P25 signal with existing and any future DRF system		X	
Operations of the existing and any future DRF system		X	
Provide backhaul meeting the following specifications: - Physical interfaces will be copper Ethernet at either 100Mbps/full duplex no-negotiation or 1Gbps/full duplex - Multi-Site Latency - Latency within the system will need to stay constant to avoid jitter. For standard implementations, latency should be less than 150 msec. - Multi-Site Jitter - Overall jitter will average 0 and never build up to more than 60 msec. Streams with excessive jitter will result in packet loss and Harris will not be responsible for voice quality issues. - Bandwidth – as noted per site in Figure 2.		X	

**Figure 2. Per Site Bandwidth Requirements**

Location	Required Bandwidth (Mbps)
Main Site (Antenna Farm – Tower 1)	3.914
AOC Backup Dispatch (16 positions)	2.016
AOB Primary Dispatch (15 positions)	1.890
VHF Site (Tower 4)	1.536
B Tower VHF Interop	1.536
Backup Site (Concourse A)	1.536
IMC and EMG (AOB 10 <sup>th</sup> Floor)	1.536
Primary Network Switching Center (A14C70)	10.000
Secondary Network Switching Center (AOB 45B08)	10.000

### Grounding and Lightning Protection

All proposed RF sites are current DIA RF sites and equipment locations. As such, Harris assumes that there is an existing, facility ground point within 12’ of the installed equipment meeting Harris’ standards and will connect all equipment racks provided under this offering to that ground point.



## Towers and Antennas

All proposed RF sites are current DIA RF sites and equipment locations. As such, Harris assumes that all sites will have adequate tower, antennas, and feed lines in place for the new P25 system equipment. If needed, the project team can work with DIA to provide additional quotes removal, replacement, or addition of antennas. Harris has not priced any tower analysis, strengthening, or antenna work in this offer.

## Fixed Equipment Installation

Harris will be responsible for the installation of all fixed equipment contained in the following detailed description of work as approved in the CDR. Installation will be scheduled in conjunction with the delivery of equipment after staging and completion of site development work required at each site. Installation of all equipment will be done in a neat and professional manner, employing a standard of workmanship consistent with Harris' installation standards and in compliance with applicable NEC, EIA, FAA, and FCC standards and regulations.

## P25 Simulcast RF Infrastructure

The proposed P25 RF system will be a direct replacement for the existing EDACS RF System. Frequencies, channel allocation and RF design will not change. Due to the shared frequencies, capacity between the two systems will be shared during the migration process until all terminal units have been transitioned to the new P25 system and EDACS decommissioned.

Given that the P25 system will be a direct replacement of the EDACS system, there will be little impact to current FCC licensing other than the emission designator for P25. As part of this proposal, Harris will provide DIA with the necessary FCC paperwork for the license modification. DIA will submit that paperwork to the appropriate frequency coordination agency / FCC as the licensee along with any required fees.

## VHF Interoperability

There are existing VHF conventional channels that DIA desires to interface into the VIDA system for dispatch capabilities from the Symphony consoles. This functionality will be completed through the implementation of Interoperability Gateways located at two existing VHF repeater sites.

## Network Switching Centers

As part of this project, Harris will be upgrading the current PR9C core to the SR10A platform for compatibility with the remainder of the MARC Harris users. As part of the SR10A upgrade Harris will implement an EDACS Migration Gateway to interface the existing EDACS and new P25 systems during the migration period. The existing EXACOM logging recorder will also require a software update for SR10A which Harris has included.

Harris is also providing a P25 ISSI interface between DIA and the MARC systems for interoperability. This interface will support interoperability requirements between DIA and area users that had previously been accomplished via Stargate on the EDACS network.

## Dispatch

Harris will be providing Symphony Dispatch consoles to support dispatch operations on the new P25 system. These consoles will support radio dispatch functionality to P25 talkgroups, VHF conventional channels as well as a common headset interface to the DIA phone system.

Each Symphony dispatch position will be equipped with a Symphony Console Controller, Monitor, six wire operator headset boxes and backup desktop microphone.

Figure 3 lists the systems to be installed as part of the SOW:

**Figure 3. Major System Components**

Site Name	Site Purpose
Concourse A, Room A14C70	Primary NSC ISSI Gateway Upgraded Logging Recorder
AOB, Room 45BOA	Secondary NSC
AOB 10 <sup>th</sup> Floor	EDACS Migration Gateway Console Location
Concourse A, Room 6000	15-channel P25 RF Site
Building B, Tower 1 (Antenna Farm)	IP Simulcast Control Point 15-channel P25 RF Site 15-channel Aux Rx RF Site VHF Interoperability Gateway
AOC Back-up Dispatch	Dispatch Center
Tower 4	VHF Interoperability Gateway
Tower B	Console Location

Harris will furnish all required cables including power, RF, and control. Manufactured control and audio cables with molded connectors that plug into distribution panels will avoid the need for punch block connections. Cable ties will secure each cable run, with excess material folded back and neatly coiled. The final as-built documentation package will include all cables, with each properly labeled.

Installation technicians will properly ground all cabinets, racks, enclosures, and transmission-line surge protectors to the site's single-point grounding system. Ground connections will be connected using approved irreversible compression connectors or irreversible lugs and splices. All painted surfaces where ground connections are made will be scraped clean of paint. Dissimilar metal connections will require treatment with an anti-oxidant compound.

### User Gear Programming and Installation

Radio programming, installation and talkgroup structure definition are the responsibility of DIA. Harris will develop the Symphony Console configurations based upon inputs from DIA.

### Site Development

It is understood that DIA will handle completion of all site development and improvements for each site as required. DIA will be responsible for the electrical requirements at each of the equipment locations based upon Harris provided specifications. Each location is expected to have UPS power in

addition to generator backup already in place. DIA will be responsible for all Ethernet backhaul requirements as defined by Harris for system interconnect within the Airport. Additionally, DIA will provide the necessary escort resources, site access, etc. for Harris to complete the system implementation in a timely fashion.

Figure 4 denotes the existing site facilities that will be re-used and those which require new facilities. Figure 5 provides the power requirements and BTUs for each proposed site location.

**Figure 4. Improvement Overview**

Site Name	Tower	Shelter or Equipment Room	Generator	UPS
Concourse A, Room A14C70	N/A	Existing	Existing	Existing
AOB, Room 45BOA	N/A	Existing	Existing	Existing
AOB, 10th Floor	N/A	Existing	Existing	Existing
Concourse A, Room 6000	Existing Rooftop	Existing	Existing	Existing
Building B, Tower 1	Existing Guyed Tower	Existing	Existing	Existing
AOC Backup Dispatch	N/A	Existing	Existing	Existing
Tower 4	Existing	Existing	Existing	Existing
Tower B	N/A	Existing	Existing	Existing

**Figure 5. Power and BTU Calculations Per Site (Estimate)**

Site Name	Required Site Power	Required BTUs
Concourse A, Room A14C70	9 amps	6,684
AOB, Room 45BOA	8 amps	6,223
AOB, 10th Floor	43 amps	34,959
Concourse A, Room 6000	46 amps	31,854
Building B, Tower 1	61 amps	44,629
AOC Backup Dispatch	43 amps	34,727
Tower 4	6 amps	4,395
Tower B	17 amps	13,368

## Site Details

The DIA P25 Radio project involves the installation of equipment at eight physical locations within the Airport. The four major system installation categories for the DIA project are P25 Simulcast RF

Infrastructure, VHF Interoperability, Network Switching Centers and Dispatch. Each category along with each site location will have a description of work to be completed at each physical site along with Harris and DIA responsibilities.

### Concourse A, Room A14C70

Room A14C70 currently houses the Primary PR9C NSC and EXACOM Logging Recorder. The current PR9C NSC will be replaced with a SR10A NSC. The existing EXACOM logging recorder will undergo a software upgrade for compatibility with SR10A.

During the NSC migration from PR9D to SR10A, there will be intermittent outages to supported devices including the C3 Maestro remote console located at the City of Denver’s Josephine location as well as the EXACOM logging recorder. Harris will work with DIA to develop an appropriate workaround during this period.

Harris will reuse and leverage DIA’s existing UPS, HVAC, and back-up power at this location.

**Figure 6. A14C70 Site Summary**

	Description
Site Name	Concourse A, Room A14C70
Site Owner	DIA
Site Equipment	Primary NSC ISSI Gateway Upgraded Logging Recorder
Tower	N/A
Shelter	Re-use existing equipment room
Generator	Re-use existing generator
UPS	Reuse existing MGE UPS
Grounding	Re-use existing interior and exterior grounding
HVAC	Re-use existing HVAC system

**Figure 7. Site A14C70 System Installation Responsibility Matrix**

Tasks	Harris	DIA	Comments
Install NSC	X		
Install ISSI Gateway	X		
Upgrade existing Logging Recorder	X		

**Figure 8. A14C70 Site Development Responsibility Matrix**

Tasks	Harris	DIA	Comments
Provide existing site plans		X	
Provide adequate shelter/equipment room utility AC electrical power, single-point ground system, HVAC, and backup generator power		X	
Upgrade existing interior ground system, if necessary		X	
Provide additional cable ladder for new equipment row, if necessary	X		
Prepare and submit electrical permits		X	
Provide adequate floor space for the new equipment		X	
Provide backup power for new equipment		X	
Provide demarcation blocks for connection to existing legacy radios to be used in interoperability system		X	

### Airport Office Building (AOB), Room 45BOA

Room 45BOA is an existing equipment room located in the Airport Office Building (AOB). Room 45BOA supports the backup NSC for the current PR9D core. As part of this project, Harris will replace this equipment with the SR10A backup NSC. Harris will reuse and leverage DIA's existing UPS, HVAC, and back-up power at this location.

**Figure 9. AOB 45BOA Site Summary**

	Description
Site Name	AOB 45BOA
Site Owner	DIA
Site Equipment	Secondary NSC
Tower	N/A
Shelter	Re-use existing equipment room
Generator	Re-use existing generator
UPS	Re-use existing UPS
Grounding	Re-use existing interior and exterior grounding
HVAC	Re-use existing HVAC

**Figure 10. A45BOA System Installation Responsibility Matrix**

Tasks	Harris	DIA	Comments
Install Secondary NSC	X		

**Figure 11. A45BOA Site Development Responsibility Matrix**

Tasks	Harris	DIA	Comments
Provide existing site plans		X	
Provide adequate shelter/equipment room utility AC electrical power, single-point ground system HVAC, and backup generator power		X	
Upgrade existing interior ground system, if necessary		X	
Provide additional cable ladder for new equipment row, if required	X		
Prepare and submit electrical permits		X	
Provide adequate floor space for the new equipment		X	
Provide backup power for new equipment		X	
Provide demarcation blocks for connection to existing legacy radios to be used in interoperability system		X	

### Airport Office Building (AOB), 10<sup>th</sup> Floor

In addition to the secondary NSC, the Airport Office Building (AOB) will also house an EDACS Migration Gateway. This location currently supports the EDACS IMC and Interoperability Gateway to the PR9C core. As part of this project, Harris will replace the Interoperability Gateway with the EDACS Migration Gateway for compatibility with SR10A. This will involve an IMC R9 upgrade as well for compatibility. This upgrade was completed in late 2013 on the other area EDACS systems.

Harris will install a switch, along with 15 Symphony consoles in this location, with a common headset interface to the phone system, if desired. Harris will leverage DIA's existing UPS, HVAC, and back-up power at this location.

**Figure 12. AOB 10<sup>th</sup> Floor Site Summary**

	Description
Site Name	AOB 10 <sup>TH</sup> Floor
Site Owner	DIA
Site Equipment	VHF Interoperability Gateway Symphony Consoles
Tower	N/A
Shelter	Re-use existing equipment room

	Description
Generator	Re-use existing generator
UPS	Re-use existing UPS
Grounding	Re-use existing interior and exterior grounding
HVAC	Re-use existing HVAC

**Figure 13. AOB 10<sup>th</sup> Floor System Installation Responsibility Matrix**

Tasks	Harris	DIA	Comments
Install Symphony Consoles (15)	X		
Install VHF Interoperability Gateway	X		

**Figure 14. AOB 10<sup>th</sup> Floor Site Development Responsibility Matrix**

Tasks	Harris	DIA	Comments
Provide existing site plans		X	
Provide adequate shelter/equipment room utility AC electrical power, single-point ground system, HVAC, and backup generator power		X	
Upgrade existing interior ground system, if necessary		X	
Provide additional cable ladder for new equipment row, if necessary	X		
Prepare and submit electrical permits		X	
Provide adequate floor space for the new equipment		X	
Provide backup power for new equipment		X	
Provide demarcation blocks for connection to existing legacy radios to be used in interoperability system		X	

## Concourse A, Room 6000

This location will continue to serve as a Simulcast RF site location. The new 15-channel P25 RF simulcast site will be located at the end of the equipment row next to the current EDACS combiner system. Given its proximity to the current combiner, Harris will reuse this combiner. The Multicoupler and Tower Top Amp system at this location will be replaced as part of this project. As with the Building B, Tower 1 site; the existing antenna systems will be reused and configured to support both EDACS and P25 through the migration phase. Additionally, the existing HVAC, back-up power, and generator will all be leveraged to save money and ease migration.

There is evidence of water intrusion in the area available for the new equipment racks in this room. Harris recommends that DIA take the necessary steps to resolve the apparent water issue to ensure an appropriate environment for the equipment. As a precautionary measure, Harris will install a

temporary “water diverter” above the new equipment to provide limited protection. Additionally, a halo grounding system is missing in this room. Harris guidelines now recommend a split halo configuration for interior grounding to protect equipment from lightening damage.

**Figure 15. Concourse A, Room 6000 Site Summary**

	Description
Site Name	Concourse A (Room 6000)
Site Owner	DIA
Site Equipment	15-channel P25 RF Site
Tower	Re-use existing rooftop antenna location
Shelter	Re-use existing equipment room
Generator	Re-use existing generator
UPS	Re-use existing UPS
Grounding	Re-use existing interior and exterior grounding
HVAC	Re-use existing HVAC

**Figure 16. Concourse A, Room 6000 System Installation Responsibility Matrix**

Tasks	Harris	DIA	Comments
Install RF Site Equipment	X		

**Figure 17. Concourse A, Room 6000 Site Development Responsibility Matrix**

Tasks	Harris	DIA	Comments
Provide existing site plans		X	
Provide a current mapping of installed antennas and cabling		X	
Provide adequate shelter/equipment room utility AC electrical power, single-point ground system HVAC, and backup generator power		X	
Upgrade existing interior ground system, if necessary		X	
Provide additional cable ladder for new equipment row, if required	X		
Prepare and submit electrical permits		X	
Provide adequate floor space for the new equipment		X	
Provide backup power for new equipment		X	
Provide demarcation blocks for connection to existing legacy radios to be used in interoperability system		X	



## Building B, Tower 1 (Antenna Farm)

This site location will house a 15-channel P25 Simulcast site, Simulcast Control Point equipment along with 15-channel Aux Rx site.

Harris is providing the P25 site equipment along with a new combiner and multicoupler at this location. A new combiner is proposed for this location to reduce system downtime associated with the migration logistics from EDACS. In addition to the multicoupler, a new Tower Top Amp will be provided and installed by Harris to bring that equipment up to current standards.

In addition to the P25 Simulcast site equipment, Harris will provide a 15-channel MASTR V based Aux Rx site as an interface into the existing DRF system. There will be a new multicoupler provided as part of the Aux Rx site to bring equipment up to current standards.

Harris will reuse the existing antenna systems at the Tower 1 site with the exception of the Tower Top Amp which will be replaced as part of this project. There are two RF transmit antennas located at this site tied to a 7-channel combiner and 8-channel combiner respectively. As part of the system migration process, one combiner/antenna will be allocated to the existing EDACS system, the other to the new P25 system. As mentioned previously, system capacity will be limited during the transition period as there will be two systems operating in parallel until all terminal equipment is migrated to P25. Harris recommends that this migration period be limited to minimize potential queuing on either system.

The new receive multicouplers for the P25 site and Aux Rx site will be sized to accommodate an input from the existing EDACS multicoupler. This will allow both RF systems to utilize the same Rx antenna system during the migration period.

In addition to the P25 RF Site, this co-located site currently supports 4 VHF repeaters for Air to Ground operations. As part of this proposal, Harris will implement an Interoperability Gateway chassis with dual routers for redundancy along with dual Unified Audio Cards (UAC) configured in a main/backup configuration for added redundancy.

Harris will utilize the existing shelter, generator, HVAC, and back-up power (UPS) at this location.

**Figure 18. Tower 1 Site Summary**

	Description
Site Name	Antenna Farm / Building B / Tower 1
Site Owner	DIA
Site Equipment	P25 IP Simulcast Control Point 15-channel P25 RF Site 15-channel Aux Rx Site VHF Interoperability Gateway
Tower	Re-use existing guyed tower
Shelter	Re-use existing shelter
Generator	Re-use existing generator

	Description
UPS	Re-use existing MGE UPS
Compound	Existing compound will be used
Grounding	Re-use existing interior and exterior grounding
HVAC	Re-use existing HVAC

**Figure 19. Tower 1 Shelter**



**Figure 20. Tower 1**



**Figure 21. Tower 1 System Installation Responsibility Matrix**

Tasks	Harris	DIA	Comments
Install P25 <sup>IP</sup> Simulcast Control Point	X		
Install P25 RF Site Equipment	X		
Install Aux Rx Site Equipment	X		
Install VHF Interoperability Gateway	X		

**Figure 22. Tower 1 Site Development Responsibility Matrix**

Tasks	Harris	DIA	Comments
Provide existing site plans		X	
Provide up-to-date tower and foundation drawings along with a current mapping of installed antennas and cabling		X	
Provide adequate shelter/equipment room utility AC electrical power, single-point ground system HVAC, and backup generator power		X	

Tasks	Harris	DIA	Comments
Upgrade existing interior ground system, if necessary		X	
Provide additional cable ladder for new equipment row, if required	X		
Prepare and submit electrical permits		X	
Provide adequate floor space for the new equipment		X	
Provide backup power for new equipment		X	
Provide demarcation blocks for connection to existing legacy radios to be used in interoperability system		X	

### Airport Operation and Control (AOC)

The new facilities at Airport Operation and Control (AOC) will house the back-up dispatch facilities. Harris will install a switch, along with 16 Symphony consoles in this location, with a common headset interface to the phone system, if desired. Harris will leverage DIA's existing UPS, HVAC, and back-up power at this location.

**Figure 23. AOC Site Summary**

	Description
Site Name	AOC (Back-up Dispatch Center)
Site Owner	DIA
Site Equipment	Symphony Consoles
Tower	N/A
Shelter	Re-use existing equipment room
Generator	Re-use existing generator
UPS	Reuse existing UPS
Grounding	Re-use existing interior and exterior grounding
HVAC	Re-use existing HVAC

**Figure 24. AOC System Installation Responsibility Matrix**

Tasks	Harris	DIA	Comments
Install Symphony Consoles (16)	X		

**Figure 25. AOC Site Development Responsibility Matrix**

Tasks	Harris	DIA	Comments
Provide existing site plans		X	
Provide adequate shelter/equipment room utility AC electrical power, single-point ground system, HVAC, and backup generator power		X	
Upgrade existing interior ground system, if necessary		X	
Provide additional cable ladder for new equipment row, if necessary	X		
Prepare and submit electrical permits		X	
Provide adequate floor space for the new equipment		X	
Provide backup power for new equipment		X	
Provide demarcation blocks for connection to existing legacy radios to be used in interoperability system		X	

## Tower 4

The facilities at Tower 4 will house five VHF conventional channels for various Airport operations. Harris will install an Interoperability Chassis at this location as well with dual routers for redundancy along with two UAC cards to support up to eight conventional channels. Harris will reuse and leverage DIA's existing UPS, HVAC, and back-up power at this location.

**Figure 26. Tower 4 Site Summary**

	Description
Site Name	Tower 4
Site Owner	DIA
Site Equipment	VHF Interoperability Gateway
Tower	N/A
Shelter	Re-use existing equipment room
Generator	Re-use existing generator
UPS	Reuse existing UPS
Grounding	Re-use existing interior and exterior grounding
HVAC	Re-use existing HVAC

**Figure 27. Tower 4 System Installation Responsibility Matrix**

Tasks	Harris	DIA	Comments
Install VHF Interoperability Gateway	X		

**Figure 28. Site Development Responsibility Matrix**

Tasks	Harris	DIA	Comments
Provide existing site plans		X	
Provide adequate shelter/equipment room utility AC electrical power, single-point ground system, HVAC, and backup generator power		X	
Upgrade existing interior ground system, if necessary		X	
Provide additional cable ladder for new equipment row, if necessary	X		
Prepare and submit electrical permits		X	
Provide adequate floor space for the new equipment		X	
Provide backup power for new equipment		X	
Provide demarcation blocks for connection to existing legacy radios to be used in interoperability system		X	

## Tower B

Tower B will house additional back-up dispatch facilities. Harris will install a switch, along with six Symphony consoles in this location, with a common headset interface to the phone system, if desired. Harris will leverage DIA's existing UPS, HVAC, and back-up power at this location.

**Figure 29. Tower B Site Summary**

	Description
Site Name	Tower B
Site Owner	DIA
Site Equipment	Symphony Consoles
Tower	N/A
Shelter	Re-use existing equipment room
Generator	Re-use existing generator
UPS	Reuse existing UPS
Grounding	Re-use existing interior and exterior grounding
HVAC	Re-use existing HVAC

**Figure 30. Tower B System Installation Responsibility Matrix**

Tasks	Harris	DIA	Comments
Install Symphony Consoles (6)	X		

**Figure 31. Tower B Site Development Responsibility Matrix**

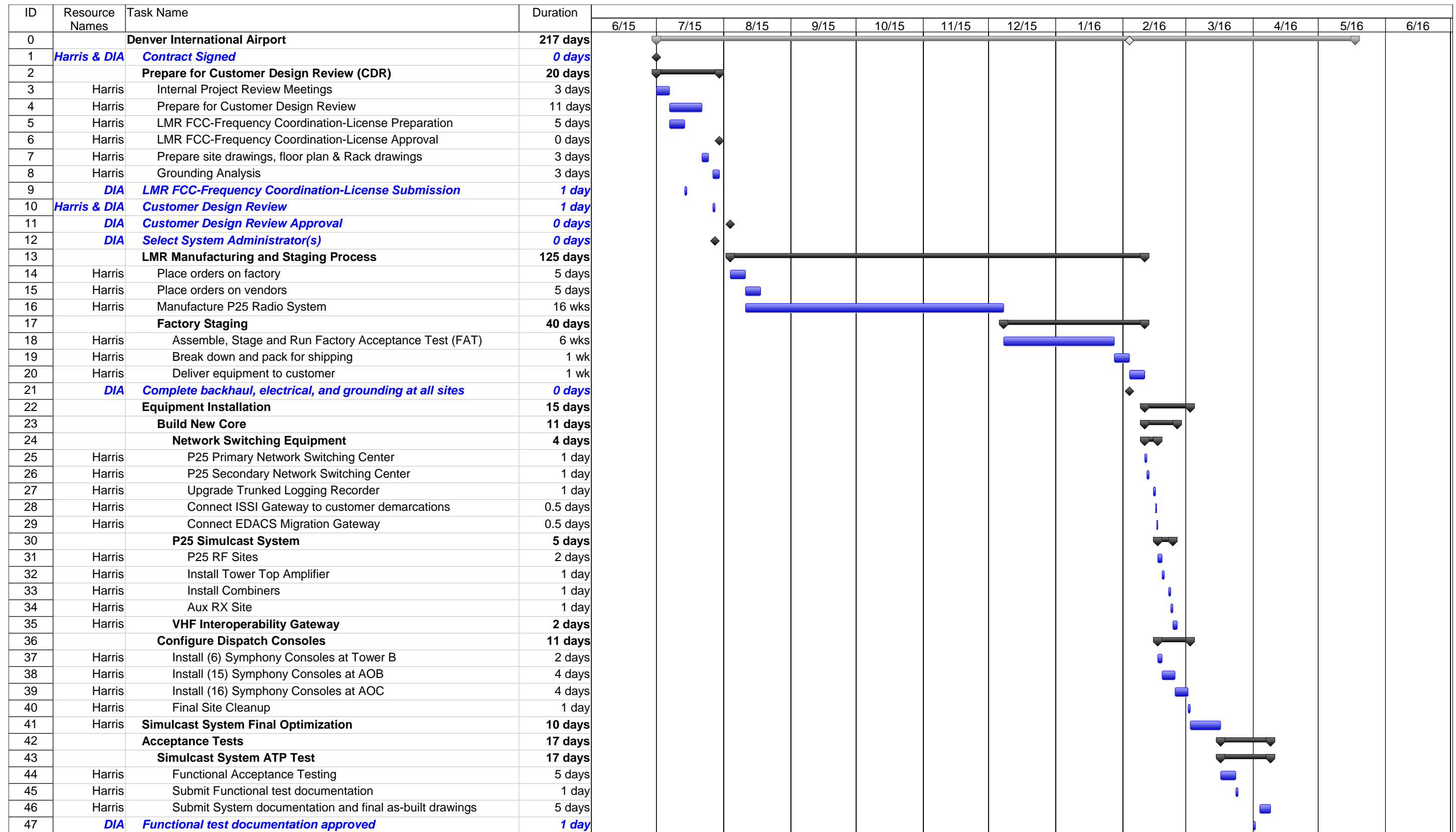
Tasks	Harris	DIA	Comments
Provide existing site plans		X	
Provide adequate shelter/equipment room utility AC electrical power, single-point ground system, HVAC, and backup generator power		X	
Upgrade existing interior ground system, if necessary		X	
Provide additional cable ladder for new equipment row, if necessary	X		
Prepare and submit electrical permits		X	
Provide adequate floor space for the new equipment		X	
Provide backup power for new equipment		X	
Provide demarcation blocks for connection to existing legacy radios to be used in interoperability system		X	

## Schedule

Harris has provided a preliminary project schedule as part of this scope of work in the form of a Microsoft Project Gantt chart. The preliminary high-level schedule shows the time frame of each project step. A more detailed schedule will be presented during the CDR. This schedule will take into account the results of site surveys, list each major milestone, and define each party's responsibility, allowing the reader to quickly understand the timing and required inter-relationships. The detailed schedule will also incorporate the feedback given by DIA during the initial project meetings. Throughout the project, the project manager will review project progress as compared to the schedule. In order to maintain the project schedule, he will take necessary actions to focus on and resolve problems (actual and potential). The customer will receive monthly project updates.

Please refer to the attached project schedule for this P25 project.





ID	Resource Names	Task Name	Duration	6/15	7/15	8/15	9/15	10/15	11/15	12/15	1/16	2/16	3/16	4/16	5/16	6/16
				48	Harris	<b>Resolve punch list items</b>	<b>5 days</b>									
49		<b>EDACS to P25 Migration</b>	<b>21 days</b>													
50	Harris & DIA	Phase 1 Migration (7-channels)	29 edays													
51	Harris & DIA	Phase 2 Migration (8-channels)	1 eday													
52	Harris & DIA	Metro Core Interoperability	1 eday													
53		<b>System Acceptance</b>	<b>1 day</b>													
54	Harris	Submit final documentation	1 day													
55	DIA	<b>Sign Letter of System Acceptance</b>	<b>0 days</b>													
56		<b>Warranty Begins</b>	<b>0 days</b>													
57		<b>Training</b>	<b>194.5 days</b>													
58		<b>On-site System Manager Training</b>	<b>194.5 days</b>													
59	Harris & DIA	P25IP System Administration Course	4.5 days													
60	Harris & DIA	P25IP Fleetmapping Workshop	3 days													
61	Harris & DIA	Unified Administration System Course	2 days													
62	Harris & DIA	Regional Network Manager Course	2 days													
63	Harris & DIA	Console Configuration Course	2 days													
64	Harris & DIA	ISSI Configuration & Administration Course	1 day													
65	Harris & DIA	Active Directory Course	1 day													
66		<b>On-site Maintenance Training</b>	<b>17.5 days</b>													
67	Harris & DIA	P25 System Maintenance	7 days													
68	Harris & DIA	Regional Network Manager Course	2 days													
69	Harris & DIA	Network Operation & Maintenance Course	4 days													
70	Harris & DIA	MASTR V Station Maintenance Course	1.5 days													
71	Harris & DIA	P25IP Simulcast System Maintenance Course	3 days													
72		<b>Dispatcher Training</b>	<b>4 days</b>													
73	Harris & DIA	Console Equipment Operator Training	4 days													

## Price Schedule

Harris is pleased to provide Denver International Airport with the following firm fixed price proposal. Pricing is valid for 90 days from submittal date of April 21, 2015. This offer is based upon the Terms and Conditions provided.

SR10A Network Switching Core	Unit Sale	Qty	Ext Sale
<b>Network Control Equipment (including Software and Licenses)</b> - Premier NSC Server (Primary) - Premier NSC Server (Secondary) - Storage Array Network (Qty 2) - VIDA NSC Security (Qty2) - Network Management Terminals (Qty 2) - Interoperability Gateway (Qty 2)	\$558,893.04	1	\$558,893.04
Dispatch Equipment	Unit Sale	Qty	Ext Sale
<b>Symphony Console System - AOB Consoles</b> - 23in Touch Capable HD Monitor - Speaker, Nano (Qty 2 per Console) - Headset, Ear Bud Style - Adapter, 6-Wire Jackbox to Headset - Jackbox, 6-Wire with Aux Inputs	\$26,140.25	15	\$392,103.75
<b>Network Connection Equipment - AOB Consoles</b> - Router, 1921, Advanced Security, AC Power (2) - Switch, Cisco 2960 - 1-PORT, EHWIC, CU/OPTICAL GIGABIT ETHERNET - Kit, Mtg Hdwr	\$6,988.00	1	\$6,988.00
<b>Symphony Console System - AOC Consoles</b> - 23in Touch Capable HD Monitor - Speaker, Nano (Qty 2 per Console) - Headset, Ear Bud Style - Adapter, 6-Wire Jackbox to Headset - Jackbox, 6-Wire with Aux Inputs	\$26,140.25	16	\$418,244.00

Dispatch Equipment (continued)	Unit Sale	Qty	Ext Sale
<b>Network Connection Equipment - AOC Consoles</b> - Router,1921,Advanced Security,AC Power (2) - Switch,Cisco 2960 - 1-PORT,EHWIC,CU/OPTICAL GIGABIT ETHERNET - Kit,Mtg Hdwr	\$6,988.00	1	\$6,988.00
<b>Spare Operational Symphony Console - AOB</b> - Harris assumes co-location at AOB, no network gear provided.	\$26,140.25	1	\$26,140.25
<b>Spare Non-Operational Symphony Consoles</b> - Harris assumes this is replacement hardware only, and includes the Symphony hardware and CPU.	\$8,995.50	1	\$8,995.50
<b>Symphony Console System - Tower B Dispatch Consoles</b> - 23in Touch Capable HD Monitor - Speaker, Nano (Qty 2 per Console) - Headset,Ear Bud Style - Adapter,6-Wire Jackbox to Headset - Jackbox, 6-Wire with Aux Inputs	\$26,140.25	6	\$156,841.50
<b>Network Connection Equipment - Tower B Consoles</b> - Router,1921,Advanced Security,AC Power (2) - Switch,Cisco 2960 - 1-PORT,EHWIC,CU/OPTICAL GIGABIT ETHERNET - Kit,Mtg Hdwr	\$6,988.00	1	\$6,988.00
<b>Spare Network Connection Equipment</b> - Router, Cisco 2911 w/Ethernet Switch - Router, Cisco 2921 w/Encryption - Router,1921,Advanced Security,AC Power - Cisco Module LH/X Single/Multi-Mode Fibr (Qty 2) - Cisco Module 4-Port GIG (Qty 3) - 1-Port Optical Gigabit Ethernet (Qty 2) - Cisco Module SX Multimode Fibr - ASA 5505 Firewall - Switch,Cisco 2960	\$29,433.00	1	\$29,433.00
- IP Control Point Equipment	\$481,233.25	1	\$481,233.25
- 15 Channel Transmit Site #1	\$442,310.25	1	\$442,310.25
- 15 Channel Transmit Site #2	\$442,310.25	1	\$442,310.25
- 15 Channel Auxillary RX Site	\$230,333.80	1	\$230,333.80

Other Items	Unit Sale		Ext Sale
ISSI	\$137,812.50		\$137,812.50
Logging Recorder Upgrade to SR10A	\$13,400.00		\$13,400.00
EDACS Migration Hardware Upgrade	\$8,593.75		\$8,593.75
Software FX Maintenance - Annual Fee Year 1	\$65,000.00		\$65,000.00
Harris Professional Services - SR10, P25, Symphony (AOB, AOC, Tower B, Spares) - Installation - Project Management - System Engineering	\$1,125,867.50		\$1,125,867.50
System Purchase Discount			(\$708,476.34)
<b>PROJECT TOTAL</b>			<b>\$3,850,000.00</b>

## Options

Maintenance Option	Qty	Price	
Extended Maintenance Plan - Year 2	1	\$96,687.00	
Software FX Maintenance Plan - Year 2	1	\$105,000.00	
Training Price Options	Qty	Harris Facility Price <sup>(1)</sup>	On Site Price <sup>(2)</sup>
<b>System Manager Training Price Options</b>			
- P25 <sup>IP</sup> System Administration Course	1	\$2,000.00	\$19,725.00
- P25 <sup>IP</sup> Fleet Mapping Workshop <sup>(3)</sup>	1	N/A	\$12,355.00
- Console Configuration Course <sup>(3)</sup>	1	N/A	\$8,675.00
- Unified Administration System Course	1	\$800.00	\$8,675.00
- Regional Network Manager Course	1	\$800.00	\$8,675.00
- ISSI Configuration & Administration Course <sup>(3)</sup>	1	N/A	\$4,985.00
- Active Directory Course <sup>(4)</sup>	1	\$50.00	
Maintenance Technician Training Price Options	Qty	Harris Facility Price <sup>(1)</sup>	On Site Price <sup>(2)</sup>
- P25 <sup>IP</sup> System Maintenance Course	1	\$2,800.00	\$27,485.00
- Regional Network Manager Course	1	\$800.00	\$8,675.00
- Network Operation & Maintenance Course	1	\$1,600.00	\$16,045.00
- MASTR V Station Maintenance Course	1	\$800.00	\$8,675.00
- P25 <sup>IP</sup> Simulcast System Maintenance	1	\$1,200.00	\$12,355.00
- Introduction to Cisco Routing & Switching Course <sup>(5)</sup>	1	\$2,915.00	N/A
- Advanced Cisco Routing & Switching Course <sup>(5)</sup>	1	\$2,395.00	N/A
- Active Directory Course <sup>(4)</sup>	1	\$50.00	
Dispatch Training Price Options	Qty	Harris Facility Price <sup>(1)</sup>	On Site Price <sup>(2)</sup>
Two (2) Sessions in One (1) Day <sup>(3)</sup>	1	N/A	\$4,985.00
Four (4) Sessions in Two (2) Days <sup>(3)</sup>	1	N/A	\$8,675.00
Six (6) Sessions in Three (3) Days <sup>(3)</sup>	1	N/A	\$12,355.00
Eight (8) Sessions in Four (4) Days <sup>(3)</sup>	1	N/A	\$16,045.00
Ten (10) Sessions in Five (5) Days <sup>(3)</sup>	1	N/A	\$19,725.00

Notes:

(1) The Harris Facility Price is tuition for one person to attend a standard course conducted at the Technical Training Center in Lynchburg, Virginia or Las Vegas, Nevada. DIA is responsible for student travel and living expenses.

(2) The On-Site Price includes the instructor's travel and living expenses and student materials to conduct the course at a facility provided by DIA.

(3) This course or workshop is only conducted on site.

(4) This course is completed online and is self-paced.

(5) This course is only conducted in Lynchburg, Virginia.



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Item	No. of Students	Price Year 1	Price Year 2
<b>Web-Based Operational Training Price Options</b>			
- One Year Site License	Up to 500	\$10,125.00	\$5,062.50
- Each additional student above 500		\$20.25	\$10.13



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Functional Acceptance Test Plan  
SR10 System for  
Denver International Airport

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# 1. Customer Approval

This Factory Acceptance Test Procedure has been read and approved for use as the system acceptance test.

## Customer Representative

## Harris Representative

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Printed name and title

\_\_\_\_\_  
Printed name and title

\_\_\_\_\_  
Date

\_\_\_\_\_  
Date

---

## 2. System Acceptance

This Factory Acceptance Test Procedure has been successfully completed.

**Customer Representative**

**Harris Representative**

---

Signature

---

Signature

---

Printed name and title

---

Printed name and title

---

Date

---

Date

---

## 3. VIDA Network Verification Testing (Internal Test Only)

### 3.1 Verify RF System Alarm Indications are Reported to the RNM

**Purpose:** Demonstrate the capability to monitor system faults & alarms at the RNM.

**Expected Results:** System level equipment will indicate faults & alarms at the RNM.

**Setup:** Access to the site under test and the regional RNM. The alarm will need to be generated by equipment being powered down. Note the time of the alarm condition for later tests.

Call up the RNM Domain screen and verify that all map icons are either green or blue.

On the Fault Browser screen delete any prior alarms.

**Execution:**

1. On a client computer, open the Windows Internet Explorer and browse to <https://s0u1rnm.vida.local/nmc> and log in with the appropriate account. Choose the system map and select the 'Launch Application' button. Select the 'Network' tab and expand the tree in the left hand panel until you can see a site object in the right hand panel.
2. Generate an alarm on a device (see chart) by powering down or disabling the device.
3. Verify that the RNM indicates a site alarm for the affected device.
4. Turn the device back ON. Verify that the device alarm clears and displays green.
5. Review alarm details by performing a Right Mouse Click on an Object. Select the desired menu option.
6. Repeat steps 1-4 for all equipment listed in the chart below.
7. Browse to <https://s0u2rnm.vida.local/nmc> and repeat test steps 1-5 for the second RNM.

Record the results below for each site (modify form based on alarm capability).

Tester:		Results:	Date:	
Alarm #	Name	Pass/Fail	Remarks:	
1	Traffic Controller			
2	Router			
3	Switch			
4	Network Sentry			
5	MME			

<b>Results</b>	(Pass/Fail) _____
Tester: _____	Date: _____
Comments: _____	_____
_____	_____

## 4. VIDA High Availability NSC Fail Over Tests

**Purpose:** The purpose of this test is to verify that if the primary Network Switching Server (NSS1), Regional Area Router (RAR1) or Wide Area Router (WAR1) were to fail, the system would detect the failure, and the secondary backup equipment NSS2, RAR2, & WAR2 would route multi-site call traffic.

**Expected Results:** This test will simulate equipment failures and show that the redundant components continue call handling functionality.

**Setup:** This test requires four trunked radios and two test groups configured in the following manner:

- Radio 1: Talkgroup TG64001 P25, logged onto Site 1 for single site call test.
- Radio 2: Talkgroup TG64001 P25, logged onto Site 1 for single site call test.
- Radio 3: Talkgroup TG64001 P25, logged onto Site 1 for multi-site call test.
- Radio 4: Talkgroup TG64001 P25, logged onto Site 2 for multi-site call test.
- Scan mode is turned OFF on test radios.
- Begin with the system in normal mode that is with the Primary Network Switching Server (NSS1) and the Wide Area Router (WAR1) router operational.
- Clear any alarms displayed in the RNM Fault Browser by selecting Actions/Delete/All Alarms.
- MDIS = Mobile Data Intermediate Server (OpenSky Data switching application)
- VNIC = Voice Network Interface Controller (Voice switching application)
- Ensure there is a 20 minute wait period between these failover tests to allow time for database synchronization.

<b>Results</b>	(Pass/Fail)_____
Tester: _____	Date: _____
Comments: _____	
_____	
_____	

## 4.1 Primary Router (WAR1) Failover

**Purpose:** This test will verify that if the WAR fails the second WAR will take over the function of the WAR route IP and call traffic to the multi-site system.

**Expected Results:** The test will simulate WAR failure and show that the redundant WAR will route traffic.

**Setup:** Locate the primary WAR1 router and log as a system level administrator.

### Execution:

1. Use Radio 1 to initiate a call on talkgroup A and verify that the call is heard on the Radio
2. Keep the call active during fail-over.
2. Use Radio 3 to initiate a call on talkgroup B and verify that the call is heard on the Radio
- 4.
3. Simulate power failure to the WAR1 router by disconnecting the Ethernet cable from the WAR1 traffic LAN port.
4. INTERNAL TEST ONLY: power disruption can corrupt hard drive configurations and is deemed too risky to test on fielded systems. Create power failure on WAR1 router by initiating a power off command, turning off the power to the Primary WAR Router (WAR1) or disconnecting the power cord.
5. Verify that after a short delay, the Backup server (NSS2) and (WAR2) automatically takes over as the primary server.
6. On the RNM, verify that the;
  - a. NSS1, MDIS, VNIC, and WAR1 icons turn red.
  - b. NSS2, MDIS, and VNIC icons turn green.
  - c. RNM reports NSS1, MDIS, and VNIC failure messages.
7. Restore NSS1 as the Primary Network Switching Server by reconnecting the War1 traffic LAN cable and simulating power failure to the WAR2 router by disconnecting the Ethernet cable from the WAR2 traffic LAN port (port # ???).
8. INTERNAL TEST ONLY: power disruption can corrupt hard drive configurations and is deemed too risky to test on fielded systems. Reconnect WAR1 traffic LAN cable and create power failure on WAR2 router by initiating a power off command, turning off the power to the WAR2 router or disconnecting the power cord.
9. Verify that the call between Radio 1 and Radio 2 continues to be heard on Radio 2 then drop the test call.
10. After failover, verify that multi-site Group and Individual radio calls can be made between Radio 3 and Radio 4.
11. Restore the power to the Primary WAR1 Router.
12. Verify that NSS1 server comes back into operation as the standby NSS
  - a. Icon turns blue on RNM.



13. Restore NSS1 as the Primary Network Switching Server by reconnecting the WAR1 traffic LAN cable.
14. Wait 20 minutes for the two NSS servers to synchronize and replicate their databases.
15. Verify that the primary and secondary NSS operations are restored after resynchronization.
  - a. Verify that Group and Individual radio calls can be made between Radio 3 and Radio
  - b. NSS1, MDIS, VNIC, and WAR1 icons turn green.
  - c. NSS2, MDIS, VNIC, and WAR2 icons turn green or blue.
16. Clear any alarms displayed in the Fault Browser by selecting: Actions/Delete/All Alarms.

<b>Results</b>	(Pass/Fail)_____
Tester: _____	Date: _____
Comments: _____	_____
_____	_____

## 5.P25 Trunked Calls and Site Features

### 5.1 Group Test Call

- Purpose:** The Group Test Call will show that the site will allow a radio to communicate using a group call.
- Expected Results:** The test will demonstrate that all radios assigned to a common group will hear a call and all radios assigned uncommon groups will not hear the call.
- Setup:** Set Radios 1, 2, and 3 to (Group A) per test group structure. Make sure Scan is turned OFF. All radios should not be in encrypted mode but have encryption keys.

Radio Description	Radio Lid	Talk Group Description	Talk Group ID
Radio 1	998001	TG64001 P25	64001
Radio 2	998002	TG64001 P25	64001
Radio 3	998003	TG64001 P25	64001

**Execution:**

1. PTT Radio 1 and talk. The transmit (TX) indicators should turn on at Radio 1.
2. Audio should be heard in Radios 2 and 3. The ID of Radio 1 should be seen at Radios 2 and 3.
3. Set Radio 3 to (TG64002 P25). PTT on Radio 1 and talk. The transmit (TX) indicators should turn on at Radio 1.
4. Audio should be heard in Radio 2 only. The ID of Radio 1 should be seen at Radio 2 only.
5. Repeat sets 1-4 in encrypted mode.

<b>Results</b>	(Pass/Fail)_____
Tester: _____	Date: _____
Comments: _____	_____
_____	_____

## 5.2 Individual (Private) Call

**Purpose:** The Individual Call test will verify that the site will allow two radios to communicate on a private call.

**Expected Results:** This test will demonstrate that two radios can communicate on a individual call and other radios will not hear the private conversation.

**Setup:** Set Radios 1, 2, and 3 to (64001) per test group structure.  
All radios should not be in encrypted mode but have encryption keys.

Radio Description	Radio Lid	Talk Group Description	Talk Group ID
Radio 1	998001	TG64001 P25	64001
Radio 2	998002	TG64001 P25	64001
Radio 3	998003	TG64001 P25	64001

### Execution:

1. Using the Radio 1, select the pre-stored ID of Radio 2 or enter the Radio 2 ID directly from the keypad, and PTT Radio 1.
2. Verify that Radio 2 receives the call and displays the ID of Radio 1. Verify that Radio 3 remains idle.
3. Release the PTT on Radio 1 and immediately PTT on Radio 2.
4. Verify that Radio 1 receives the call and displays the ID of Radio 2. Verify Radio 3 remains idle.
5. Using the Radio 1, select the pre-stored ID of Radio 3 or enter the Radio 3 ID directly from the keypad, and PTT Radio 1.
6. Verify that Radio 3 receives the call and displays the ID of Radio 1. Verify that Radio 2 remains idle.
7. Release the PTT on Radio 1 but do not immediately PTT Radio 3. Verify that Radio 3 gives a Call Back Alert (WHC-“Who Has Called”) Indication. Then make the return call from Radio 3 back to Radio 1.
8. Verify that Radio 1 receives the call and displays the ID of Radio 3. Verify Radio 2 remains idle.

*Repeat steps 1-8 in encrypted mode.*

<b>Results</b>	(Pass/Fail)_____
Tester: _____	Date: _____
Comments: _____	
_____	
_____	

## 6. Symphony Dispatch Feature Set

### 6.1 Transmitting With a Microphone (Group Calls)

**Purpose:** Confirms the console operator can initiate communication with a terminal radio using the console select functions for Group Calls.

**Expected Results:** Confirms communication with the terminal radio.

**Setup:** Radio set to TG64001 P25 and program a console module with TG64001 P25.

**Execution:**

1. Press the INSTANT TX function (for example right mouse button) on the module with the test group. Verify that a channel access tone is heard, the XMT indicator is displayed and that the call is heard on the radio. Release the Instant TX key.
2. Press the SELECT button on the module with the test group. Verify that the SELECT indication for that module becomes highlighted.
3. Press the SELECT TX function. Verify that a channel access tone is heard, the XMT indicator is displayed and that the call is heard on the radio. Release the SELECT TX function.
4. Make 64001TU the selected talk group by:
5. Select the module for '64001TU'
6. Select 'Module Select'
7. Make sure the module name is highlighted green.

<b>Results</b>	(Pass/Fail)_____
Tester: _____	Date: _____
Comments: _____	_____
_____	_____

## 6.2 Receiving Calls (Unit ID Display, Talk group ID Display, Aliasing)

- Purpose:** Confirm the console operator can receive communications from a terminal radio, using both talkgroup and individual calling.
- Expected Results:** Communications are initiated and received on the appropriate speaker (select or unselect) and the radio's ID is displayed.
- Setup:** Console should have talk groups 64001TU and 64002TU programmed with 64001TU selected and Radio set to TG64002 P25.

### 6.2.1 Talk Group Call

**Execution:**

1. Key the radio and verify that the call is heard at the Unselect speaker and that the calling radio ID and the Call Indicator are displayed.
2. Select the console module with the test group. Switch the radios talk group to 64001TU and key the radio. Verify that the call is heard at the select speaker and that the calling radio's ID and the Call Indicator are displayed.

<b>Results</b>	(Pass/Fail)_____
Tester: _____	Date: _____
Comments: _____	_____
_____	_____

## 6.2.2 Individual (Unit-to-Unit) Call

### Execution:

1. Program a module with the ID of the test radio.
2. Momentarily press the module configured for the radio.
3. Verify the radio ring it will take about 10 seconds and displays 'INDV' and consoles 'ID'.
4. Respond to the console by PTTing the radio, verify that the call is heard at the select speaker and that the calling radio's ID and the Call Indicator are displayed.
5. End the call by pressing the clear button on the radio.

<b>Results</b>	(Pass/Fail)_____
Tester: _____	Date: _____
Comments: _____	
_____	
_____	

## 6.3 Emergency Call and Emergency Alarm

**Purpose:** Confirms the console indicates an emergency declared by a terminal radio and can reset and clear the emergency.

**Expected Results:** The console indicates and can clear the emergency.

**Setup:** This test requires a test radio capable of generating and clearing an emergency (i.e. Supervisor Radio).

Radio Description	Radio Lid	Talk Group Description	Talk Group ID
Radio 1	998001	TG64001 P25	64001

**Execution:**

1. UNSELECT the 6400TU in the console. Using the test radio, declare an emergency on the test group.
2. Verify the module turns red, the 'EMER' flag is briefly displayed in the module, the ID/Name of the test radio is displayed, the emergency message is displayed in the message window, (the message window is under the title "Symphony" and the emergency alert tone is heard on the console.
3. Open the 'Emer Menu', pick the module with the emergency and depress 'Alarm Reset'. Verify the alert tone is silenced on the console, but the emergency is still displayed.
4. With the console, select and transmit on the group with the emergency. Verify the test radio receives the call, and is still in emergency mode.
5. Clear the emergency using the 'EMER CLR' key. Verify the module no longer indicates an emergency.
6. Transmit on the radio and verify the emergency is cleared and normal group calls have resumed.
7. With the test group selected on the console, declare an emergency on the test group by pressing the 'Emer Declare'. Verify the console and radio have the same indications as steps 2 to 4.
8. Acknowledge by hitting 'Alarm reset'.
9. Clear the emergency with the console.

<b>Results</b>	(Pass/Fail)_____
Tester: _____	Date: _____
Comments: _____	_____
_____	_____



## 6.4 System Wide Call (All Call & Announcements)

**Purpose:** Confirm the console can initiate system wide calls.

**Expected Results:** The console can initiate both All Calls and Announcement Calls.

**Setup:** Program console modules with the 'TG64000 P25' talk group.

Radio Description	Radio Lid	Talk Group Description	Talk Group ID
Radio 1	998001	TG64051 P25	64051
Radio 2	998002	TG64052 P25	64052
Radio 3	998003	TG64001 P25	64001
Radio 4	998004	TG64001 P25	64002

**Execution:**

1. Press INSTANT TX on the module with 'TG64000 P25'. Verify that a channel access tone is heard, the XMT indicator is displayed, and that the call is heard at all radios. Release the Instant TX key.
2. Press INSTANT TX on the module with 'TG64051 P25'. Verify that a channel access tone is heard, the XMT indicator is displayed, and that the call is heard at Radios 1. Verify Radios 2, 3 and 4 did not hear the audio. Release the Instant TX key.
3. Press INSTANT TX on the module with 'TG64001 P25'. Verify that a channel access tone is heard, the XMT indicator is displayed, and that the call is heard at Radios 3. Verify that Radios 1 2 and 4 did not hear the audio. Release the Instant TX key.

<b>Results</b>	(Pass/Fail)_____
Tester: _____	Date: _____
Comments: _____	_____
_____	_____

## 6.5 Alert Tones

**Purpose:** Confirm the console can initiate alert tones which can be heard at the terminal radio.

**Expected Results:** The tones can be initiated and heard.

**Setup:** Console 1 programmed with TG64052 and TG64051 selected.

Radio Description	Radio Lid	Talk Group Description	Talk Group ID
Radio 1	998001	TG64051 P25	64051
Radio 2	998002	TG64052 P25	64052

**Execution:**

1. Make TG64051 P25 the selected talk group. Verify that the SELECT indication for that module becomes highlighted in green.
2. Press and hold the foot pedal or SELECTED TX key on the Symphony. Radio 1 will receive the call. While still transmitting, press one of the three ALERT TONE keys (Alert, Pulse, Warble) from the Emergency Menu.
3. Verify the ALERT TONE is received by Radio 1 and also heard on the console (to hear the tones on the console, press and hold the foot pedal and listen for the tone on the SELECT speaker).
4. While not transmitting, press and hold one of the ALERT TONE keys. Verify the console transmits on talkgroup, TG64051 P25, Radio 1 receives the call, and the alert tone is heard by Radio 1 and the console (to hear the tone on the console, press and hold one of the alert tone keys and listen for the tone on the SELECT speaker).
5. When the ALERT TONE key is released, verify the call on Radio 1 drops.

<b>Results</b>	(Pass/Fail)_____
Tester: _____	Date: _____
Comments: _____	_____
_____	_____

## 6.6 Simulselect

**Purpose:** Confirms operation of the console Simulselect feature, which allows multiple talk groups to be selected for communication simultaneously.

**Expected Results:** The console can select multiple talk groups and communication is allowed.

**Setup** Console 1 programmed with talk groups TG64051 P25, TG64052 P25, TG64053 P25, and TG64054 P25.

Radio Description	Radio Lid	Talk Group Description	Talk Group ID
Radio 1	998001	TG64051 P25	64051
Radio 2	998002	TG64052 P25	64052
Radio 3	998003	TG64001 P25	64001
Radio 4	998004	TG64001 P25	64002

**Execution:**

1. Create simulselect group on the 4 test group modules.
2. Place a call on the simulselect group and verify that the call is heard all four radios.
3. Place a call from each radio and verify that only the console hears the calls.
4. Deactivate the simulselect group.

<b>Results</b>	(Pass/Fail)_____
Tester: _____	Date: _____
Comments: _____	
_____	
_____	

## 6.7 Patch

**Purpose:** Confirms the console patch feature creates shared communication between multiple selected talk groups.

**Expected Results:** The patched talk groups can communicate.

**Setup** Console 1 programmed with talk groups TG64051 P25, TG64052 P25, TG64053 P25, and TG64054 P25.

Radio Description	Radio Lid	Talk Group Description	Talk Group ID
Radio 1	998001	TG64051 P25	64051
Radio 2	998002	TG64052 P25	64052
Radio 3	998003	TG64001 P25	64001
Radio 4	998004	TG64001 P25	64002

**Execution:**

1. Create patch on PATCH 1 with all four groups above.
2. Place a call from the newly created patch and confirm that the call is heard on all the radios.
3. Place a call from each radio and confirm that the call is heard on the console and each radio.
4. Deactivate the patch.

<b>Results</b>	(Pass/Fail)_____
Tester: _____	Date: _____
Comments: _____	
_____	
_____	

## 6.8 Console to Console Intercom

**Purpose:** Confirm multiple consoles can communicate using the Intercom feature.

**Expected Results:** Intercoms can be created on the consoles.

**Setup:** Establish two consoles (A and B) to test the Crossmute function. The Consoles must be on the same NSC. Program and select a test group on both consoles.

**Execution:**

1. On Console A, program a module with the console ID of Console B. On Console B, program a module with the console ID of Console A. Select this module on both consoles. Transmit from Console A on the module for Console B.
2. Verify on Console A that 'XMIT' is displayed in the module. Verify that on Console B, 'BUSY' is displayed in the module. Release the transmit from Console A.
3. Answer the call at Console B by transmitting from Console B on the module for Console A.
4. Verify on Console B that 'XMIT' is displayed in the module. Verify that on Console A, 'BUSY' is displayed in the module. Release the transmit from Console B.

<b>Results</b>	(Pass/Fail)_____
Tester: _____	Date: _____
Comments: _____	_____
_____	_____

## 6.9 Call History

**Purpose:** Confirms a history of calls processed at the console.

**Expected Results:** The history is accessible and valid.

**Setup:** This test compares programmed module call activity to the history scroll lists. Utility page, dispatch menu will be selected. Select either the “Select History” or “Unselect History”.

**Execution:**

1. Press the ‘Scroll Up’ and ‘Scroll Down’ buttons to scroll through the Unselect call history list. Compare these calls with known activity.
2. Press the ‘Scroll Up’ and ‘Scroll Down’ buttons to scroll through the selected call history list. Compare these calls with known activity.
3. Press the ‘Esc’ button to exit the history scroll mode.
4. To monitor call history on a single group use the ‘module history’ button on the ‘module modify’ menu. Use the ‘scroll up’ and ‘scroll down’ buttons to scroll through the calls for the picked module. Compare these calls with known activity.

<b>Results</b>	(Pass/Fail)_____
Tester: _____	Date: _____
Comments: _____	_____
_____	_____
_____	_____

## 6.10 User Definable Screens

- Purpose:** Confirms the ability to customize the user GUI on the Symphony.
- Expected Results:** The user GUI on the Symphony is changed and saved.
- Setup:** Verify User Definable Screens (UDS) is installed on a Symphony Dispatch Console. This console may be used to develop and verify the custom screen configurations required by the customer dispatch center operations.

**Execution:**

1. In the Symphony Configuration Editor verify the appropriate message text is defined for the Radio Status message that will be used.
2. Close out of the Symphony application.
  - a. In the UDS modify Screen File #2 (i.e. Setup #3) as follows:
    - b. Use the PAGE pull-down menu and select "BUTTON TEXT and COLOR".
    - c. Change LABEL TEXT for PAGE button number 1 to "Fire Dispatch".
3. Change LABEL TEXT for PAGE button number 2 to "Police Dispatch".
4. In the UDS modify Screen File #2 as follows:
  - a. Use the MODULE pull-down menu and select ADD and RSM to add the previously defined RSM status.
  - b. Position the module where desired on the console screen layout.
  - c. Note: Existing modules may need to be deleted to make room for the new RSM modules.
5. Restart the Symphony application and verify the changes have taken place on the Dispatch Screen.

<b>Results</b>	(Pass/Fail) _____
Tester: _____	Date: _____
Comments: _____	_____
_____	_____

## 7. BeOn Features

- Purpose:** These will test the BeOn features.
- Expected Results:** This test will demonstrate that BeOn works as designed.
- Setup:** This test will show that the BeOn system allows a smartphone to work like a radio.

### 7.1 Transmit Grant Tone

- Purpose:** This test will demonstrate the grant tone on BeOn.
- Expected Results:** When the smartphone PTTs on the BeOn app it will play a grant tone.
- Setup:** Grant tone (Ready to Talk tone) enabled in smartphone radio personality.

Radio Description	Radio Lid	Talk Group Description	Talk Group ID
BeOn_202	998202	TG64151 P25	64151
BeOn_203	998203	TG64151 P25	64151
BeOn_204	998204	TG64151 P25	64151

**Execution:**

1. Press PTT button on smartphone with valid group selected.
2. Verify grant tone is heard at smartphone when working channel access is granted.

Note: If the call is queued, the grant tone will be delayed until the call is assigned a working channel.

<b>Results</b>	(Pass/Fail) _____
Tester: _____	Date: _____
Comments: _____	
_____	
_____	



## 7.2 Group Call

**Purpose:** Confirms the scan function which allows a smartphone to hear audio on selected talk-groups other than the current talk-group.

**Expected Results:** Selected talk-group call audio is heard.

**Setup:** Set smart-phones 1, 2, & 3 to (Group A) per test group structure. Make sure Scan is turned OFF.

Radio Description	Radio Lid	Talk Group Description	Talk Group ID
BeOn_202	998202	TG64151 P25	64151
BeOn_203	998203	TG64151 P25	64151
BeOn_204	998204	TG64151 P25	64151

**Execution:**

1. PTT on BeOn\_202 and talk. The transmit (TX) indicators should turn on at BeOn\_202.
2. Audio should be heard in BeOn\_203, and BeOn\_204 . The ID of BeOn\_202 should be seen at BeOn\_203, and BeOn\_204.
3. Set BeOn\_204 to TG64152 P25. PTT on BeOn\_202 and talk. The transmit (TX) indicators should turn on at BeOn\_202.
4. Audio should be heard in BeOn\_203 only. The ID of BeOn\_202 should be seen at BeOn\_203 only.

<b>Results</b>	(Pass/Fail) _____
Tester: _____	Date: _____
Comments: _____	
_____	
_____	

## 7.3 Individual (Private) Call

**Purpose:** Confirms individual calls can be initiated using BeOn enabled smartphones.

**Expected Results:** Individual calls are confirmed.

**Setup:** Store BeOn\_203's ID on BeOn\_202 or manually enter it.

Radio Description	Radio Lid	Talk Group Description	Talk Group ID
BeOn_202	998202	TG64151 P25	64151
BeOn_203	998203	TG64151 P25	64151
BeOn_204	998204	TG64151 P25	64151

**Execution:**

1. Using the BeOn\_202, select the pre-stored ID of BeOn\_203 or enter the BeOn\_203 ID directly from the keypad, and PTT smartphone 1.
2. Verify that BeOn\_203 receives the call and displays the ID of smartphone 1. Verify that BeOn\_204 remains idle.
3. Release the PTT on BeOn\_202 and immediately PTT on BeOn\_203.
4. Verify that BeOn\_202 receives the call and displays the ID of BeOn\_203. Verify BeOn\_204 remains idle.

<b>Results</b>	(Pass/Fail)_____
Tester: _____	Date: _____
Comments: _____	
_____	
_____	

## 7.4 Group Scan

**Purpose:** Confirms the scan function which allows a smartphone to hear audio on selected talk-groups other than the current talk-group.

**Expected Results:** Selected talk-group call audio is heard.

**Setup:** BeOn\_202 set up with TG64151 P25 and TG64152 P25 in the scan list, TG64151 P25 selected, and group scan initially disabled.

Radio Description	Radio Lid	Talk Group Description	Talk Group ID
BeOn_202	998202	TG64151 P25	64151
BeOn_203	998203	TG64151 P25	64151
BeOn_204	998204	TG64151 P25	64151

**Execution:**

1. Place a call from BeOn\_203 on TG64151 P25.
2. Verify the call is received and audio is heard on BeOn\_202.
3. Place a call from BeOn\_203 on TG64152 P25.
4. Verify the call is not received by BeOn\_202.
5. Enable group scan on BeOn\_202.
6. Place another call from BeOn\_203 on TG64152 P25.
7. Verify that the call is now received and audio is heard on BeOn\_202.

<b>Results</b>	(Pass/Fail) _____
Tester: _____	Date: _____
Comments: _____	
_____	
_____	

## 7.5 Emergency Group Call

**Purpose:** Confirms an emergency can be declared, recognized and cleared by a smartphone.

**Expected Results:** The emergency is declared, recognized and cleared.

**Setup:** BeOn\_204 set up with TG64151 P25 and TG64151 P25 selected.

Radio Description	Radio Lid	Talk Group Description	Talk Group ID
BeOn_202	998202	TG64151 P25	64151
BeOn_203	998203	TG64152 P25	64152
BeOn_204	998204	TG64153 P25	64153

**Execution:**

1. Press the Emergency call button on BeOn\_204 and then PTT BeOn\_204.
2. Verify that BeOn\_204 indicates the “TX EMER” declaration and that it reverts to the home group.
3. Verify that BeOn\_202 and BeOn\_203 indicate a “RX EMER” and hear audio on the emergency home group.
4. Clear the emergency with the Supervisor smartphone (BeOn\_202). Verify the emergency clears in the smartphones.

<b>Results</b>	(Pass/Fail) _____
Tester: _____	Date: _____
Comments: _____	_____
_____	_____

## 8. Trunked Logging Recorder

### 8.1 Group Call

**Purpose:** Confirms group call audio is captured, recorded and accessible on the logging recorder.

**Expected Results:** Calls are captured, recorded, and accessible.

**Setup:** Radio 1 set up with TG64051 P25 and TG64051 P25 selected.

Radio Description	Radio Lid	Talk Group Description	Talk Group ID
Radio 1	998001	TG64051 P25	64051
Radio 2	998002	TG64051 P25	64051
Radio 3	998003	TG64051 P25	64051

**Execution:**

1. PTT radio 1 and talk.
2. Audio should be heard on radio 2. Note the Start time of the call and the approximate duration.
3. Retrieve the call from the Logging Recorder. Verify the Caller, Callee, Start Time, and duration. The Caller should be the LID for Radio 1 and the Callee should be the GID for 64051. Verification should include the LID/GID and its Alias as defined by the UAS. Verify that the call is identified as a Group Call.
4. Playback the audio and confirm that it is all recorded and intelligible.
5. Repeat using Encryption.

<b>Results</b>	(Pass/Fail) _____
Tester: _____	Date: _____
Comments: _____	_____
_____	_____

## 9.P25 ISSI Gateway

**Setup:** This setup applies to the tests contained in this section.

- System X is connected to System Y using the P25 ISSI wireline interface.
- Two radios are required, programmed as follows:

Radio 1:        System X  
                  Talk Group Z  
Radio 2:        System Y  
                  Talk Group Z

### 9.1 System Registration & Interoperability Calling

**Setup:** Log Radio 1 into System X.  
Log Radio 2 into System Y.  
Set both radios to ISSI interop Talkgroup Z:

**Execution:**

1. PTT Radio 1 and verify it communicates with Radio 2 on the system Y. Verify that audio is received on Radio 2. Verify that the Caller ID of Radio 1 is displayed on Radio 2.
2. PTT Radio 2 and verify it communicates with Radio 1 on the system X. Verify that audio is received on Radio 1. Verify that the Caller ID of Radio 2 is displayed on Radio 1.
3. Log Radio 1 into System Y.
4. Log Radio 2 into System X.
5. Set both radios to ISSI interop Talkgroup Z:
6. PTT Radio 1 and verify it communicates with Radio 2 on the system X. Verify that audio is received on Radio 2. Verify that the Caller ID of Radio 1 is displayed on Radio 2.
7. PTT Radio 2 and verify it communicates with Radio 1 on the system Y. Verify that audio is received on Radio 1. Verify that the Caller ID of Radio 2 is displayed on Radio 1.

<b>Results</b>	(Pass/Fail)_____
Tester: _____	Date: _____
Comments: _____	_____
_____	_____

# 10. VIDA Inter-Operability Gateway Test

## 10.1 Local Interoperability

**Setup:** The purpose of this test is to verify correct functionality of the Interoperability Gateway. The Interoperability Gateway connects via four-wire audio connections in its Universal Access Cards (UAC) cards to interoperability radio units (mobile or desktop). The Gateway also connects to a router and the Network Switching Center (NSC) to provide call functionality across the network.

Verify that the following Smartphones and Interoperability Gateway UAC's are set up to communicate as shown.

Smartphone and radio from the interop system are required. The Smartphone is used to send and receive radio communications between the DVUs and corresponding interop radio.

Talk Group	Agency	Transmit (TX) MHz	Receive (RX) MHz	Analog/Digital	Trunked/Conventional

**Execution:**

1. Select Interop group 1 on the radio.
2. Initiate a call from the radio to group 1 and verify that audio is heard on interop group 1 radio.
3. Initiate a call from the interop group 1 radio to group 1 and verify that audio is heard on the radio.

Talk Group	Agency	UAC #	PASS	FAIL

<b>Results</b>	(Pass/Fail) _____
Tester: _____	Date: _____
Comments: _____	
_____	
_____	

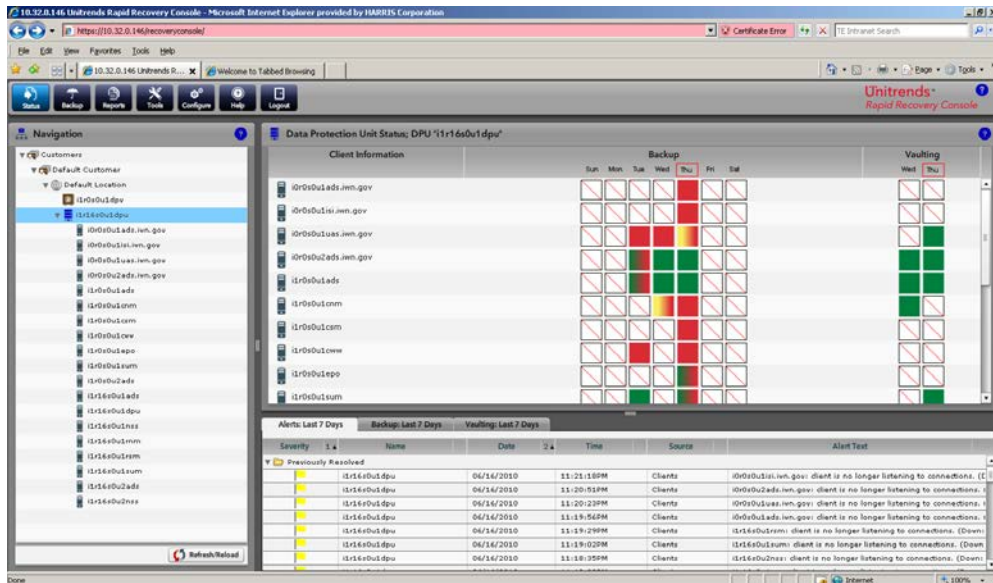
## 10.2 Backup

**Purpose:** The purpose of this test is to verify that the Unitrends server has a schedule for performing backups of network computers, and that it can display the backup status of those computers.

**Setup:** None

**Execution:**

1. Use Internet Explorer on a client PC to navigate to the Unitrends Backup UAC.
2. Log in using proper log in credentials.
3. Go to the Main Screen.
4. Verify that devices are visible and backups are configured.

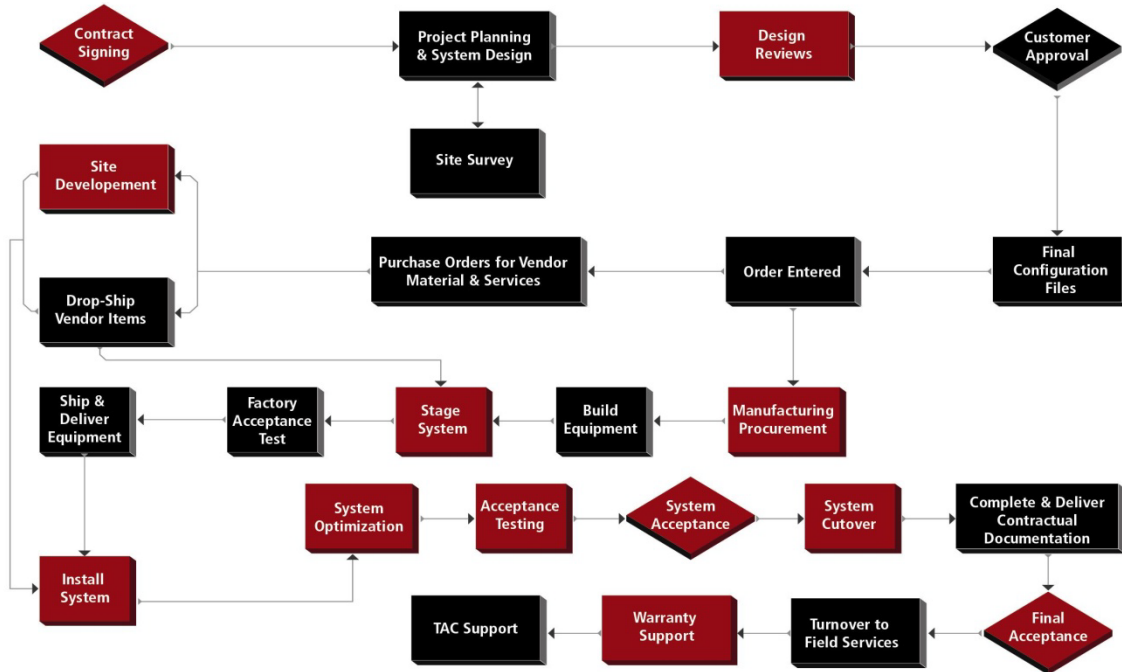




# Project Management Plan

Harris' proposal to Denver International Airport (DIA) provides the system design and implementation services to deploy a fully functional P25 communications system. Harris has highly skilled professionals experienced in designing and installing complex communications systems. Figure 1 denotes the typical steps taken to implement a project such as the one proposed to DIA. Key steps are highlighted in red and further defined below.

Figure 1. Detailed Implementation Plan



## Project Team

A team of experienced and dedicated managers will implement the radio system. The following sections define their responsibilities.

### Project Manager

The project manager's primary responsibility is to manage all phases of the project from the beginning through acceptance, ensuring successful implementation, integration, optimization, and acceptance of the project. Specifically, this manager administers: 1) ordering and shipping of material and equipment; 2) coordinating performance of services in support of the project schedule; 3) executing performance of the progress and quality of work; 4) managing overall project cost; and 5) processing any contract changes. The project manager and DIA's project manager will hold all official communications concerning the project.

### System Engineer

The system engineer has full technical responsibility for the design and technical implementation of the proposed system design. This engineer maintains responsibility for integrating standard Harris

products as well as vendor products (agreed to in the system purchase contract) into a complete operational system. The system engineer participates in all detailed design review meetings; provides technical support to the Harris project manager; oversees the system Acceptance Test Plan (ATP) as defined by the contract; and directs the system optimization process and other tests to ensure that all system parameters are correct and fully meet the technical and contractual requirements. In addition, this professional provides technical support to Harris' Technical Publications department for provision of as-built drawings and other technical documentation deliverables.

## Regional Service Center Manager

The regional service center manager has responsibility for the teams supporting installation, implementation, and warranty support. Where appropriate, Harris' authorized service-center subcontractors will ensure the highest quality workmanship and timely execution of the project. The manager coordinates with the site manager to arrange for installers and technicians on-site when needed and to provide technicians to participate in the ATP. The manager is responsible for warranty and maintenance activities as well as subsequent system maintenance if procured by DIA. He is DIA's primary point of contact and handles all official communications regarding system support.

## Training Manager

The training manager implements and manages Harris' proven, systematic approach to training personnel and agencies. He or she establishes a plan that identifies the appropriate training courses required for the operation, management, and maintenance of the new communications system. The training manager recommends experienced personnel to lead each course as well as establishes a schedule that optimizes the value of these training courses. In addition, he or she ensures distribution of training materials.

## Contract Signing

The project will begin on signing of the contract or when a notice to proceed has been issued, which is the start date from which all schedule activities are measured.

## Customer Design Review (CDR)

The project team will assemble the information obtained during the proposal and contract negotiation phases. This information along with the design effort for the proposal will be crucial in developing the documentation for the Customer Design Review (CDR).

During the CDR, the Harris and DIA teams will finalize the system design by reviewing drawings and documents. The result of this meeting will be a final design package, which DIA will approve before the next phase of the project begins.

**Figure 2. Design Reviews Responsibility Matrix**

Tasks	Harris	DIA	Comments
<b>Prepare for Customer Design Review</b>			
Provide site plans and applicable electrical and layout plans		X	
Provide up-to-date tower and foundation drawings along with a current mapping of installed antennas and cabling		X	
Perform grounding analyses	X		
Develop required drawings	X		
Develop network plans	X		
Develop tower antenna placement plans	X		
Develop frequency plans	X		
Develop site electrical loads	X		
Develop preliminary cutover plan	X		
Develop formal project schedule	X		
Prepare ATP documents	X		
Prepare and submit FCC license applications		X	
Provide answers to Harris questions		X	
<b>Customer Design Review</b>			
System block diagrams	X		
List of deliverable equipment for each site	X		
Network connection plan	X		
Tower antenna placement drawings	X		
Antenna system drawings	X		
Frequency plans	X		
Combiner plans	X		
Site plot drawings	X		
Shelter floor plan drawings	X		
Rack elevation drawings	X		
AC power and BTU loads	X		
Review preliminary cutover plan	X		
Review ATP	X		
Project schedule	X		
Provide appropriate personnel to review documents		X	

Tasks	Harris	DIA	Comments
Provide location for CDR meeting		X	
Approve the design following CDR meeting		X	Within 5 days of the CDR

## Manufacturing and Staging

After final design approval, the project team will procure material and schedule manufacturing using its Enterprise Resource Planning system. The factory will receive orders to manufacture the RF equipment. In addition, vendor/subcontractor items will be ordered. Factory specifications will define the test for each individual rack of equipment.

After manufacturing and test, system engineers will assemble the equipment in the factory staging facility. The system engineers will work with staging technicians to make all intra-rack connections for each site's equipment. Ethernet cable connections will simulate transmission networks and ensure the equipment connects to the network switches. Technicians will set the IP addresses and verify operation of the network and radio system. A test- user database will be entered into the system, with test radios programmed to function on it. Several consoles will be set up to demonstrate dispatch operation. System levels will be verified, and all features will be tested to signify the system is ready for the Factory Acceptance Test (FAT).

Running the FAT will demonstrate the radio system functionality. The FAT will utilize functional ATP tests appropriate to run in the factory staging environment. The ATP defines each test, with instructions on how to set up and to run the test. It also includes the expected results. The test team will score and initial each test.

At the end of staging, the equipment will be prepared for delivery to the installation contractor. Staging will wrap each rack in clear plastic wrap and properly securing it ensures safe transportation. For this effort, Harris will be working with our installers to complete system installation tasks in advance during the staging period in an effort to help minimize installation time on-site at the airport. Our installation partner will receive the equipment from our manufacturing facility, complete an inventory, prep the equipment for installation at each noted site, and store the equipment until shipment. Once DIA completes site preparation and installation dates are confirmed, our installers will deliver the equipment on site and complete the remaining tasks to install the new system equipment.

**Figure 3. Manufacturing and Staging Responsibility Matrix**

Tasks	Harris	DIA	Comments
Insert equipment delivery dates into the Enterprise Resource Planning system	X		
Place orders with the factory	X		
Place orders with key suppliers	X		
Place orders for vendor items	X		
Manufacture all infrastructure equipment	X		

Tasks	Harris	DIA	Comments
Assemble equipment in staging area on a per site basis	X		
Provide appropriate personnel to participate in the FAT test		X	
Run FAT	X		
Provide approval for the FAT test and authorize the system to be shipped		X	Within 5 days of receipt
Break down equipment and ship to storage area	X		
Provide temporary storage prior to equipment installation	X		
Inventory equipment	X		
Validate Harris equipment inventory		X	
Collect all equipment on a per site basis, ready for the installation teams.	X		

**Figure 4. Harris Staging Facility**



## Site Preparation

Once CDR has been approved, DIA and Harris have finalized the system design and identified the list of sites to be utilized. The Statement of Work section at the end of this document details site development activities and responsibilities. For this effort, DIA will own all elements of site improvements and development. As such, Harris has drafted the project schedule to show this effort occurring in parallel with manufacturing and staging, and its completion prior to the next phase of the

project - delivery and installation of the infrastructure equipment. Delays in site improvements and upgrades will impact the project schedule and system installation.

## System Installation

The installation team will install the new equipment at the locations disclosed in the system design and integrate the proposed subsystems as described in the System Description to provide an end-to-end network solution.

Systems for installation include:

- Networking switching system
- P25 simulcast system
- Interoperability system(s)
- Dispatch consoles

After the design reviews and factory tests, the project team's first installation priority will be to work with DIA to coordinate installation of the geographically separated Network Switching Centers (NSC), simulcast control points, and dispatch consoles that require early installation. The project team will establish a site installation plan that prioritizes RF site installations, with proper consideration given to the following:

- Site development status
- Site accessibility
- Interoperability
- Other critical events

The installation plans will be developed during the detailed design phase of the project and presented to DIA for review and approval. Based on site surveys conducted by Harris personnel or its subcontractors, the installation plans will include floor plan drawings, equipment rack-up drawings, antenna location details, grounding standards, as well as installation and commissioning procedures. The installation plan will coordinate all activities of the project team, minimizing impact to the facility and ensuring that system implementation proceeds efficiently. Where currently operational communications equipment co-exists with the installation of the new P25 system, the project team will take great care to ensure that there is little or no disruption in service.

The project manager will provide DIA with a detailed listing of all equipment delivered to the site, including model numbers, serial numbers, equipment locations, firmware and software versions, and installation date.

The project team will work closely with DIA personnel during the installation planning phase of the project. The project manager and system engineer will conduct periodic face-to-face meetings and conference calls to coordinate site availability and implementation processes. With each delivery of equipment, the project team will update and provide the inventory database to DIA.

Harris and its subcontractors will provide the installation and commissioning activities to ensure the P25 project is professionally implemented in accordance with the implementation schedule and the needs of the DIA's stakeholders.

Harris' industry-accepted Site Grounding and Lightning Protection Installation Specifications and Standards LBI-AE/LZT 123 4618/1 will be used in the implementation of the radio system infrastructure. All Harris personnel and subcontractors assigned to the DIA's project will receive training in accordance with these specifications and standards manuals. The project team and quality personnel will periodically review the installation work to ensure implementation of these standards.

## Tower Work

Experienced tower crews will install the tower top amplifier and associated hardware in accordance with Antenna Systems LBI-38983 at the RF sites. Tower crews will carefully avoid damage to all transmission lines during the installation process. They will install adequate service and/or drip loops. In addition, the crews will take proper strain-relief measures at all cable interfaces and shelter entrances.

The coax cables will require professional installation, proper termination, and connection to lightning protectors inside the shelters. Antenna installation crews will properly tighten all RF connectors to the manufacturer's specifications. In addition, they will professionally wrap and seal all outdoor connectors from moisture.

As part of the installation, the RF transmission lines and antennas will be swept with an Anritsu Site Master or equivalent cable-testing device on the appropriate frequency band(s) to ensure proper performance. The baseline test data will be recorded and provided to DIA. A copy will remain on site for future reference.

## Infrastructure Equipment

Upon completion of the site development, installation and connection of the RF infrastructure equipment to the existing antenna systems will take place.

Since DIA intends to re-use existing shelters, facilities, and towers, Harris assumes that all existing conduits, cable trays, AC power feeds, and other equipment are properly grounded. Harris has included in this offering all grounding and lightning protection equipment needed to protect the radio system supplied to DIA.

The MASTR V P25 trunked stations and associated equipment will be mounted in 86-inch standard aluminum EIA 19-inch open-frame racks. Harris assumes that DIA-provided shelters will accommodate the height of these open racks and allow them to be positioned so that the desired 36 inches of free aisle space (in front and in the rear), can be maintained. Using at least four anchor points will anchor the cabinets and racks to the floor.

Upon physical installation of the RF equipment at a site, the installation team will properly align, configure, program, and conduct acceptance testing according to the ATP. DIA personnel and/or their representatives will receive invitations to participate in the ATP. The installation team will record the alignment and test data and provide copies to DIA. Copies of the individual site alignment and test data will be available at the sites. In addition, each site will be provided specific licenses, interconnect drawings, site drawings, and other critical information. Harris recommends periodic inventory of this

important site data as part of the routine preventive maintenance program. This action will ensure that the site data remains accessible to Harris and DIA maintenance resources.

Installation crews will also be responsible for installing and commissioning the NSCs, dispatch consoles, and interoperability gateways, according to the detailed implementation plan.

## Equipment Removal

Harris has created a detailed migration plan for DIA to facilitate a smooth transition to the new P25 radio system. All of DIA’s existing EDACS infrastructure and RF equipment will remain in place until the second phase of the migration is complete and all users have been transitioned over to the P25 system. After cutover, our installation partner will decommission and remove the EDACS system including all RF site equipment and all EDACS C3 Maestro console equipment. Harris is not responsible for removal of DIA’s “DispatchWorks consoles”. DIA will be responsible for the decommissioning and removal of any terminal equipment which includes mobile, portable and desktop control station radios. The type, model number, serial number, and DIA’s inventory number (where applicable) will be recorded. The equipment decommissioned by Harris will be delivered to a location designated by DIA. The project team will work collaboratively with DIA and its user agencies to ensure a smoothly conducted phase-over.

## System Optimization

Upon installation of infrastructure equipment, the system engineer will work with the on-site technicians to optimize the equipment in preparation for acceptance testing.

**Figure 5. System Optimization Matrix**

Tasks	Harris	DIA	Comments
Prepare all installed sites for site inspections	X		
Verify backhaul system is functional and meets reliability specifications		X	
Verify P25 system levels and parameters are set	X		
Verify P25 system alarm and system monitoring system are operational	X		
Verify system database is installed and operating correctly	X		
Verify proper dispatch operation	X		
Verify proper P25 system functional operation	X		
Verify proper network switching operation	X		
Coordinate testing of the desired interoperability channels		X	
Verify proper interoperability from gateways	X		



## Acceptance Testing

System acceptance testing will be performed according to the agreed upon ATP and system contract. The project team will notify DIA when installation and optimization are complete and the system is ready for acceptance testing.

The tests fall into two categories: site inspections and functional test procedures. The procedures are designed to test all major features of the system after installation and optimization of sites.

The system engineer will provide documentation defining each of the test areas. The ATP procedures contain a short description, test methodology, and a record form for logging results and acceptance signatures for each test. A punch list will document any issues found. The goal of the team will be their quick resolution. Follow-up documents will show the correction of open items. Upon satisfactory completion of each testing phase, the project manager will present the system acceptance documentation to DIA's project manager. With DIA's approval, the project team and DIA can proceed with cutover and begin transitioning users onto the new system.

**Figure 6. Acceptance Testing Responsibility Matrix**

Tasks	Harris	DIA	Comments
Provide appropriate team members to participate in acceptance tests		X	
Inspect each RF site, noting discrepancies on the punch list	X		DIA witness
Inspect each dispatch center, noting discrepancies on the punch list	X		DIA witness
Inspect each network center, noting discrepancies on the punch list	X		DIA witness
Submit site inspection results	X		
Approve site inspection results		X	Within 5 days of receipt
Perform functional ATP on radio system, dispatch consoles, and network monitoring	X		DIA witness
Submit functional ATP results	X		
Approve functional ATP results		X	Within 5 days of receipt

## Cutover

### Cutover Planning

One of the key steps in implementing the system is developing a comprehensive transition or cutover plan. Cutover planning will occur in parallel with several of the steps discussed above. DIA will identify individuals to be the system administrators needed to attend training classes on the radio system. The training will teach them to develop talkgroup plans to understand user radio and dispatch console profiles, and to make changes to the system database. DIA and Harris will develop the console profile for the new P25 system.

System administrators will establish plans defining how to program each user radio. Each radio profile contains talkgroups for their work department, control head displays, alias displays, and other information utilizable by each user.

System administrators will establish dispatcher-training plans, vehicle installation schedules, and portable radio distribution plans. The last step in the cutover planning process is to select the order in which user agencies transition onto the system.

If DIA designated maintenance personnel will be performing any maintenance activities, then Harris trainers will train them during the planning phase of the project.

## Cutover Activation

Harris envisions a two phase system cutover, this initial phase will be based upon a split P25/EDACS configuration as defined by the current combiner configuration. Seven channels will be allocated to the P25 system and eight to the EDACS system. Harris will provide one week of support during the initial cutover phase to assist with any questions/issues that may arise during the transition.

DIA will distribute P25 radios to predefined departments identified in the Phase 1 cutover, this phase should not exceed 300 units to ensure that system capacity levels are maintained.

Phase 2 of the cutover process would involve the remainder of the radio users at DIA. During Phase 2, it will be necessary to decommission the EDACS equipment and transition all remaining capacity to the P25 system. This would be a planned event whereby all remaining agencies transition to the P25 system at a predetermined time. At the cutover point, DIA would power down all remaining channels on the EDACS system, transfer the combiner jumper from EDACS to P25 at the PolyPhaser and place the remaining P25 channels into service. Harris would provide support during this period which is expected to take less than 30 minutes.

Given the limited capacity that will be available on the system infrastructure, Harris recommends that the duration between cutover of Phase 1 and 2 not exceed 30 days.

**Figure 7. Cutover Responsibility Matrix**

Tasks	Harris	DIA	Comments
Identify system administrators		X	
Provide training and workshops	X		
Attend training and workshops		X	
Develop user and console programming profiles		X	
Develop and enter system database		X	
Identify interoperability channels desired during cutover		X	
Program all mobiles and portables		X	
Distribute radios to DIA at planned events		X	
Install mobiles per installation plan		X	Including removal of EDACS

Tasks	Harris	DIA	Comments
			Mobiles and desktop control stations.
Ensure vehicles adhere to installation schedules		X	

## Training Options

Developing the knowledge and skills of DIA personnel who will operate, manage and maintain the new radio system are critical elements to successfully migrate to a P25<sup>IP</sup> radio system, which will be facilitated by the experience DIA has operating on the current EDACS radio system. To perform these tasks, high-quality, performance-based training is required that builds and enhances personnel competence. In addition, training enables DIA to optimally use the features and capabilities of P25<sup>IP</sup> to meet and exceed your communication requirements.

Harris' Technical Training Department offers an extensive spectrum of training courses for system managers, maintenance technicians, dispatchers and radio users on our P25<sup>IP</sup> communications system. Standard training courses on are conducted regularly at our training facilities in Lynchburg, Virginia, and Las Vegas, Nevada. Additionally, most of the courses offered can be conducted on site at a facility provided by DIA. On-site courses can be customized to meet specific DIA training requirements.

The advantages and disadvantages to conducting the training on site or attending the training at a Harris training facility are summarized in the following table:

**Figure 8. Training Location Advantages and Disadvantages**

Conduct Training On Site	
<p><b>Advantages</b></p> <p>More cost effective if five or more students attend a course when considering travel &amp; living expenses.</p> <p>Curriculum can be customized to the customer's specific system configuration.</p>	<p><b>Disadvantages</b></p> <p>Customer must provide the training facility including access to system equipment.</p> <p>Students are subject to be removed from class.</p>
Attend Training in Lynchburg or Las Vegas	
<p><b>Advantages</b></p> <p>Students can attend when their schedule permits and they don't have to attend at the same time since multiple sessions are delivered each year.</p> <p>The Technical Training Center has dedicated training facilities including radio systems and laboratories for hands-on training.</p> <p>Allows networking with other customers.</p>	<p><b>Disadvantages</b></p> <p>Not as cost effective as on-site training if five or more students attend a course at the same time when considering travel &amp; living expenses.</p> <p>Fixed course curriculum.</p>

Harris recommends and provides training in the following categories:

- System Manager Training

- Maintenance Technician Training
- Dispatcher Training
- Web-Based Operational Training

## System Manager Training

System managers have the overall responsibility for defining and maintaining the system’s configurable parameters. The importance of this role has increased significantly as communication systems have become larger and more complex. The responsibilities include the following:

- defining the fleet map and associated properties
- planning radio feature usage and personalities
- configuring dispatch consoles
- developing operating procedures
- maintaining unit and group databases
- generating reports
- controlling radios (e.g., enabling and disabling units), and
- monitoring system performance

The following is a list of recommended courses for system managers. The course length indicates whether the training can be attended at a Harris training facility and/or conducted on site.

**Figure 9. System Manager Training Program**

Course Name	Harris Facility	On Site
P25 <sup>IP</sup> System Administration Course	4½ days	4½ days
P25 <sup>IP</sup> Fleet Mapping Workshop	-	3 days
Unified Administration System Course	2 days	2 days
Regional Network Manager Course	2 days	2 days
Console Configuration Course	-	2 days
ISSI Configuration & Administration Course	-	1 day
Active Directory Course	Self-paced (Online)	

Please note that if DIA maintenance technicians perform the functions of the system manager, then Harris recommends that the DIA maintenance technicians do not attend both the *P25<sup>IP</sup> System Administration* and *P25<sup>IP</sup> System Maintenance* courses. In this case, the technicians should only attend the *P25<sup>IP</sup> System Maintenance* course.

## Maintenance Technician Training

DIA will require highly trained technicians in order to troubleshoot and perform maintenance on the P25<sup>IP</sup> radio system. Formal classroom and hands-on instruction are recommended that will provide

technicians with the knowledge and skills needed to conduct preventative maintenance, troubleshoot problems, and take corrective action. The recommended maintenance training program is comprehensive, building from an introduction to the theory of operation, to an analysis of block diagrams and component interconnection, leading to training on advanced troubleshooting procedures.

The following is a list of recommended courses for maintenance technicians. Please note that some DIA maintenance technicians have already attended some of these courses (e.g., the *Network Operation & Maintenance* course). The course length indicates whether the training can be attended at a Harris training facility and/or conducted on site.

**Figure 10. Maintenance Technician Training Program**

Course Name	Harris Facility	On Site
P25 <sup>IP</sup> System Maintenance Course	7 days	7 days
Regional Network Manager Course	2 days	2 days
Network Operation & Maintenance Course	4 days	4 days
MASTR V Station Maintenance Course	1½ days	1½ days
P25 <sup>IP</sup> Simulcast System Maintenance Course	3 days	3 days
Introduction to Cisco Routing & Switching Course	8 days	-
Advanced Cisco Routing & Switching Course	5 days	-
Active Directory Course	Self-paced (Online)	

## Dispatcher Training

Instructor-led hands-on training sessions on the operation of the Symphony Console are four hours in length. Two sessions are conducted in a single day. This training is conducted using the consoles installed in the dispatch center. Harris recommends that each training session is limited to no more than two dispatchers per console to optimize the hands-on learning. The training includes an overview of the new P25<sup>IP</sup> radio system and the following tasks performed using the Symphony Console:

- Pick and select communication modules.
- Transmit and receive group and individual calls.
- Transmit, receive and clear emergency calls.
- Review call history.
- Modify communication modules.
- Create, modify and transmit on patches and simulselects.
- Initiate and receive intercom calls.
- Change console setups.
- Use special and enhanced console features.

Each participant receives a hardcopy of a Symphony Console Operation Quick Reference Guide.

Our proposal provides price options based on the number of training days required by DIA, which can be determined based on 1) the total number of personnel that require operational training; 2) the number of consoles available to support the training; and 3) limiting each training session to no more than two people per console. These sessions should be scheduled just prior to implementation to allow participants to promptly begin using the skills learned.

## Web-Based Operational Training

A key benefit to DIA is that the transition to the new P25 system will be facilitated by operating experience on the current EDACS system. Radio operations are very similar between EDACS and P25 modes. Therefore, as a cost-savings measure, Harris recommends that DIA use our web-based training program to train radio users.

Web-based training provides a mechanism to effectively deliver training for end users by developing their knowledge of system operation and skills to operate their communications equipment. This will enhance performance and reduce the number of trouble reports. Additionally, web-based training can be used to augment training for new personnel due to turnover.

The web-based training program has numerous benefits that include the following:

- Training can be accessed whenever it is needed (24 hours a day, seven days a week) from any location that has access to the Internet.
- Courses are self-paced, highly interactive, and developed utilizing animation and other multimedia tools to help keep students engaged, which increases retention.
- It is cost-effective, especially when student or instructor travel and living expenses associated with attending standard classroom instruction are considered.
- Training delivery is consistent and structured to ensure learning objectives are met.
- A test is administered at the end of each course to measure student achievement of learning objectives.
- A learning content management system makes it easy to track student progress and generate reports.

Harris proposes to provide DIA with a one-year site license for unlimited access to standard web-based training courses based on the number of students (minimum 500) defined by DIA. The site license is renewable on an annual basis. Each student requires a unique e-mail address in order to register for the training. The web-based training program consists of standard courses on radio and console operation, as well as a *P25 System Overview* course, which was specifically designed for non-technical end users. The site license provides DIA with the following additional benefits:

- Students have access to all courses that are applicable to the DIA system, which is beneficial to radio users who require training on both portable and mobile radios.
- Courses can be added to DIA's training program at no additional cost if the DIA purchases other communications equipment during the term of the license. For example, four months into the term of the site license DIA decides to purchase Unity XG-100P radios. Harris will add this course to the DIA training program at no additional cost.

- Newly developed courses can be added to your training program at no additional cost during the term of the license if the courses are applicable to your system.
- Harris will provide a designated DIA individual with administrative rights to the Learning Content Management System so that DIA can directly monitor student activity and progress in completing courses, and generate reports.

Harris can also provide a quotation on a case-by-case basis if DIA desires to have any course customized. Typical customization tasks include incorporating the customer’s system/group structure, modifying radio button/key functions to reflect actual radio programming, deleting radio functionality not provided or used (e.g., individual call capability), and replacing photographs with customer provided pictures.

## Final Acceptance

With the completion of ATP tests, cutover, and submission of the final drawing package, the project manager will submit the final system acceptance letter for DIA to sign. With the final acceptance, the project manager will arrange a meeting with the field service team to review maintenance support during the warranty period. The team will provide the contact information and procedures used to obtain service during the warranty period. Contact numbers and procedures will be provided for standard business hours and after hours.

**Figure 11. Final Acceptance Responsibility Matrix**

Tasks	Harris	DIA	Comments
Removal of decommissioned EDACS network or site infrastructure equipment	X		
Removal of DispatchWorks console positions		X	
Designate location for delivery of decommissioned equipment		X	
Submit final drawing package	X		
Submit letter of final system acceptance	X		
Provide warranty and contact information	X		
Meet with Harris to review warranty contact procedures		X	
Meet with Harris to outline system support and services requirements		X	
Accept final drawing package		X	Within 5 days of receipt
Sign letter of final system acceptance		X	Within 5 days of receipt

## Warranty Support

Harris understands that it is extremely important to deliver a reliable and redundant communications system as well as proper system hardware and software maintenance throughout the DIA’s implementation, migration, warranty and optional maintenance periods. Whether the DIA chooses to be self-maintained with minimal manufacturer support, requires supplemental maintenance services,

or desires to outsource all operation and management responsibilities, Harris has a full spectrum of service offerings that can help keep the DIA's critical communication system operating at an optimum level. Harris is the low-risk provider because it offers a highly reliable and redundant network which results in the lowest total cost of ownership. For example, Harris' network hardware incorporates commercially available components and subsystems therefore, allowing for ease of on-site maintenance through rapid component swap out and high availability of replacement products.

Harris offers a one-year warranty on infrastructure equipment. Harris offers several tiers of subscriber radios. Our Unity brand radios come with a standard three-year warranty. All other non-Unity radios come with a standard two-year warranty. Warranty coverage for both infrastructure and subscriber radios includes all necessary parts, labor, transportation, shipping to the customer, and other items normally required and/or consumed in maintaining the proposed equipment in order to meet original factory specifications at no cost to the DIA. The warranty period will begin either after final system acceptance, or immediately after purchase of the radio if purchased after system acceptance. Standard warranty response times are 8:00 a.m. to 5:00 p.m. Eastern on business days. Optional maintenance support is available that provides services such as emergency on-site response as well as preventive maintenance and software maintenance service.



**EXHIBIT B**

**SOFTWARE LICENSE AGREEMENT**

## SOFTWARE LICENSE AGREEMENT

This License Agreement (“License Agreement”) is made upon the Effective Date of the Primary Agreement (the “Effective Date”) between Harris Corporation, a Delaware Corporation, through its RF Communications Division, (“LICENSOR”) with offices at 221 Jefferson Ridge Parkway, Lynchburg, VA 24501 and The City and County of Denver (“LICENSEE”). LICENSOR is the owner of certain wireless communications software programs and LICENSEE desires to obtain a license from LICENSOR to use such wireless communications programs.

### 1.0 Definitions.

1.1 “Designated Systems”: Means the Harris system(s), products, and Designated Terminals purchased by Buyer and identified in the Primary Agreement for which the Licensed Programs and documentation are intended to be used.

1.2 “Designated Terminals”: Means the LICENSOR’s Terminals purchased by LICENSEE.

1.3 “Licensed Programs”: The term Licensed Programs shall mean the wireless communications computer programs in software or firmware supplied under this License Agreement by LICENSOR in binary object code format to the LICENSEE (stand alone or in conjunction with the purchase of a LICENSOR wireless communications system.) Licensed Programs shall also include all other material related to the Licensed Programs supplied by LICENSOR to LICENSEE hereunder, and which may be in machine readable or printed form, including but not limited to user documentation and/or manuals.

1.4 “Open Source Software”: Means software with either freely obtainable source code, license for modification, or permission for free distribution.

1.5 “Open Source Software License”: The terms or conditions under which the Open Source Software is licensed.

1.6 “Primary Agreement”: The agreement to which this exhibit is attached.

1.7 “Third Party Software Products”: Shall mean programs that are not developed by LICENSOR which are licensed / purchased by LICENSOR for inclusion in its products.

### 2.0 License Grant for Licensed Programs.

2.1 Subject to the Contract and the performance by Licensee of its obligations hereunder, LICENSOR hereby grants to Licensee, and Licensee hereby accepts from LICENSOR, (a) a personal, non-transferable, non-exclusive, perpetual, limited license to use the Licensed Programs in object code format only and (b) install and execute such Licensed Programs on Licensee’s equipment and (c) are to be used for internal business purposes only. All licensed programs under this License Agreement shall only be used in conjunction with the Designated System. This license does not transfer any right, title, or interest in the Licensed Programs. The license granted authorizes Licensee to use the Licensed Programs in object code format and does not grant any rights to source code.

2.2 LICENSEE will not reproduce, modify, or make derivative works of the Licensed Programs, except that LICENSEE may make one archival, and one inactive backup, copy of the Licensed Programs. In addition, LICENSEE, its agents, Sellers and/or its subcontractors will not attempt to reverse engineer, decompile, or reverse-compile any software contained in the Licensed Programs and any attempt to do so shall be a material breach of this License Agreement. With respect to the Licensed Programs, LICENSEE will not alter, deface, discard, or erase any media, documentation, or LICENSOR or Third Party Licensor's trademarks or proprietary rights notices.

2.3 Third Party Software Products may be subject to additional license terms, which, if applicable, are set out in Product Specific License Terms delivered with each product. Additional Third Party license terms and conditions may be found at [https://premier.pspc.harris.com/infocenter/Licenses\\_1.htm](https://premier.pspc.harris.com/infocenter/Licenses_1.htm). To the extent applicable, LICENSEE shall comply with any additional Third Party Software Product license terms.

2.4 If the Software licensed under this License Agreement contains or is derived from Open Source Software, the terms and conditions governing the use of such Open Source Software are in the Open Source Software Licenses of the copyright owner and not this License Agreement and, to the extent applicable, LICENSEE will comply with the Open Source Software terms License terms. If there is a conflict between the terms and conditions of this License Agreement and the terms and conditions of the Open Source Software Licenses governing Licensee's use of the Open Source Software, the terms and conditions of the license grant of the applicable Open Source Software Licenses will take precedence over the license grants in this License Agreement. If requested by Licensee, Harris will use commercially reasonable efforts to: (i) determine whether any Open Source Software is provided under this License Agreement; (ii) identify the Open Source Software and provide Licensee a copy of the applicable Open Source Software License (or specify where that license may be found).

### **3.0 Protection and Security of Licensed Programs.**

LICENSEE acknowledges and agrees that the Licensed Programs and any materials and/or documentation related thereto, and any portion thereof, supplied by LICENSOR hereunder are proprietary and confidential to LICENSOR or applicable third party licensors and are a valuable commercial asset of LICENSOR or their third party owners. LICENSEE also acknowledges and agrees that LICENSOR and/or the third party licensors have and shall retain all proprietary rights in their respective portions of the Licensed Programs and any materials and/or documentation related thereto. LICENSEE (i) shall respect such proprietary rights, (ii) shall protect LICENSOR and any third party licensor's proprietary rights at least to the extent that it protects its own proprietary information, or such (iii) shall not use the Licensed Programs nor any materials or documentation related thereto except for the purposes for which they are being made available as set forth in this License Agreement and (iv) shall not reproduce, print, disclose, or otherwise make said Licensed Programs or materials and/or documentation related thereto available to any third party, in whole or in part, in whatever form, except as permitted in the terms of this License Agreement.

### **4.0 Warranty**

Seller warrants, for the greater of a period of one year or, if a longer warranty period for the product containing the Licensed Program is set forth in a Primary Agreement, the longer warranty period shall apply commencing with the date of Licensee's acceptance of their Designated System, that any Licensed Program furnished to Licensee under this License Agreement shall be capable of successfully operating on the Designated System in accordance with the logic defined in the operator's manuals when the system is supplied with correct input data. If, on the basis of evidence submitted to LICENSOR within the term of this warranty, it is shown that any Licensed Program does not meet this warranty, LICENSOR will, at

its option, either correct the defect or error in the Licensed Program, free of charge, or make available to Licensee a substitute program. The foregoing warranty is exclusive and in lieu of all other warranties whether written, oral, implied or statutory. **NO IMPLIED OR STATUTORY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, NONINFRINGEMENT, SHALL APPLY, ALL OF WHICH ARE EXPRESSLY DISCLAIMED BY LICENSOR.**

Licensed Programs which have been developed or are owned by a third party licensor and which are sublicensed by LICENSOR to LICENSEE hereunder shall be warranted to LICENSEE only to the extent that the licensor of such sublicensed programs warrants such sublicensed programs to LICENSOR.

In the event that the Licensed Programs do not conform to the representation above, LICENSEE's sole remedy and LICENSOR's sole and exclusive liability shall be to replace such Licensed Programs with the then current released version of such Licensed Programs.

## **5.0 Limitation of Liability.**

5.1 **THE LIMITATION OF LIABILITY PROVISION IN THE PRIMARY AGREEMENT SHALL GOVERN THIS LICENSE AGREEMENT AND SECTION 5.2 SHALL NOT APPLY. IF THERE IS NO LIMITATION OF LIABILITY PROVISION IN THE PRIMARY AGREEMENT, SECTION 5.2 SHALL APPLY.**

5.2 N/A

## **6.0 Term and Termination.**

6.1 LICENSOR reserves the right, in addition to any other remedies it may retain in this License Agreement or may be entitled to in law or equity (including immediate injunctive relief and repossession of all non-embedded Licensed Programs and documentation), to terminate this License Agreement at any time prior to the expiration of any Term in the event LICENSEE breaches any material term or condition or fails to perform or observe any obligations or covenants of this License Agreement and such failure and/or breach is not remedied within thirty (30) days of written notice from LICENSOR.

6.2 Within thirty (30) days after termination or expiration of this License Agreement, LICENSEE will return to LICENSOR all confidential material including but not limited to all copies, partial copies, and/or modified copies (if any) of Licensed Programs and any equipment owned by LICENSOR in LICENSEE's possession.

## **7.0 Assignment/Transfer.**

This License Agreement, the licenses granted hereunder and the Licensed Programs provided to LICENSEE under this License Agreement may not be assigned, sub-licensed, or otherwise transferred by LICENSEE to any third party without LICENSOR's prior written consent, except that this license may be assigned if the Products containing the Licensed Programs are transferred but the new owner or user of the Products may only use the Licensed Programs in accordance with terms of this License Agreement. Subject to the foregoing, any assignee hereunder shall be subject to all of the terms, conditions and provisions of this License Agreement. Any attempt by LICENSEE to assign, sub-license, or transfer the Licensed Programs, or any of the rights or duties contained in this License Agreement, without LICENSOR's prior written consent shall be void.

## **8.0 Severability.**

If any term or provision of the License Agreement is determined by a court or government agency of competent jurisdiction to be invalid under any applicable statute or rule of law, such provision(s) are, to that extent, deemed omitted, but this License Agreement and the remainder of its provision shall otherwise remain in full force and effect.

## **9.0 Waiver.**

No waiver will be implied from conduct or failure to enforce rights. No waiver will be effective unless in writing signed on behalf of the party against whom the waiver is asserted.

## **10.0 Compliance with Laws.**

Licensee acknowledges that the Licensed Programs are subject to the laws and regulations of the United States and Licensee will comply with all applicable laws and regulations, including export laws and regulations of the United States. Licensee will not, without the prior authorization of Harris and the appropriate governmental authority of the United States, in any form export or re-export, sell or resell, ship or reship, or divert, through direct or indirect means, any item or technical data or direct or indirect products sold or otherwise furnished to any person within any territory for which the United States Government or any of its agencies at the time of the action, requires an export license or other governmental approval. Violation of this provision is a material breach of this License Agreement.

## **11.0 Governing Law.**

This License Agreement will be governed by the laws of the United States to extent that they apply and otherwise to the laws of the State of Colorado. The terms of the U.N. Convention on Contracts for the International Sale of Goods do not apply. The parties expressly agree that the Uniform Computer Information Transactions Act ("UCITA") applicable in any jurisdiction shall not apply to this License Agreement.

## **12.0 U.S. Government.**

If Licensee is the U.S. Government, the Licensed Programs and documentation qualify as "commercial items," as that term is defined at Federal Acquisition Regulation ("FAR") (48 C.F.R.) 2.101, consisting of "commercial computer software" and "commercial computer software documentation" as such terms are used in FAR 12.212. Consistent with FAR 12.212, and notwithstanding any other FAR or other contractual clause to the contrary in any agreement into which the License Agreement may be incorporated, Customer may provide to Government end user or, if the License Agreement is direct, Government end user will acquire, the software and documentation with only those rights set forth in the License Agreement. Use of either the software or documentation or both constitutes agreement by the Government that the software and documentation are "commercial computer software" and "commercial computer software documentation," and constitutes acceptance of the rights and restrictions herein.

## **13.0 Agreement.**

This License Agreement may be part of a Primary Agreement between LICENSOR and LICENSEE for the purchased products by LICENSEE from LICENSOR. The Primary Agreement and this License Agreement contain the full understanding of the parties with respect to the subject matter hereof and which supersede all prior understandings and writings relating thereto and which shall become binding on the Effective Date of this License Agreement. No waiver, consent, modification, amendment, or change to the terms of this License Agreement shall be binding unless agreed to in a writing signed by

LICENSEE and LICENSOR. If there is any conflict between the terms of the Primary Agreement and this License Agreement as to the Licensed Programs, the terms of this License Agreement will prevail.

**14.0 Notices.**

Notices shall be provided as set forth in the Primary Agreement. In the event there is no notice provision in the Primary Agreement, notices and other communications between the parties shall be transmitted in writing by certified mail or nationally recognized overnight courier service.

**15.0 Survival.**

Sections 2.2, 2.5, 3, 5, 6, 8, 9, 11, and 13 of this License Agreement shall survive termination of this agreement.

**EXHIBIT C**

**SOFTWARE F/X AGREEMENT**



## SOFTWARE FX AGREEMENT

THIS SOFTWARE FX AGREEMENT ("Agreement") is hereby entered into between Harris Corporation, a Delaware Corporation, through its RF Communications Division ("Harris") and the City and County of Denver ("Subscriber") on the following terms and conditions:

### 1. SCOPE OF AGREEMENT

During the term of this Agreement, as set forth in Section 11, Harris agrees to provide Subscriber with the following:

- A. Harris Software Update benefits including software updates, documentation updates and other services, as set forth in Section 3 of this Agreement, for the software developed and provided by Harris and contained within the Subscriber's Designated Harris System(s) as described in **Schedule A** to this Agreement; and
- B. Harris Security Update Management Service including patch management services for the updating of security related patches, as set forth in Section 4 of this Agreement, to the Subscriber's Designated Harris System(s) as described in **Schedule A** to this Agreement.

### 2. DEFINITIONS

As used in this Agreement, the following terms shall have the meanings set forth below.

- A. "Contract" means the Agreement for the purchase of the Designated System(s).
- B. "Current Software Release Levels" means the most recent Software release announced by Harris as being commercially available. "Commercially available" does not include interim releases provided as emergency fixes or software released for beta test or noncommercial or similar purposes.
- C. "Designated System(s)" means the Harris system(s) purchased by Subscriber and identified in Exhibit A to this Agreement. The Designated System does not include Third Party Software Products. Excluded Products or other systems to which the Designated System may be linked.
- D. "Enterprise Configuration" means a radio system level configuration that is capable of supporting Large county, multi-county, regional or state wide installations.
- E. "Excluded Products" means third Party Products contained in the customer's system that were not sold by Harris to Subscriber.
- F. "Harris Licensed Programs" means all Harris Software programs and associated documentation nonexclusively licensed to Subscriber by Harris for use solely with Subscriber's Designated System.
- G. "Harris Software Updates" means any commercially available corrections, modifications or enhancements to the Licensed Programs generally released and/or provided by Harris.



- H. "Harris Network Solutions Provider" (NSP) means an entity authorized by Harris to sell certain Harris products and systems as an authorized NSP in accordance with the provisions of a NSP Agreement between Harris and such person or entity.
- I. "IAVA" Information Assurance Vulnerability Alert. An IAVA is an announcement of a computer application software or operating system vulnerability notification in the form of alerts, bulletins, and technical advisories identified by DoD-CERT, a division of the United States Cyber Command.
- J. "Optional Feature" means those Harris Software features, not currently contained in the Subscriber's Designated System, available for Current Software Release Levels that are available to Subscriber at an additional cost.
- K. "Product Vulnerability Alerts" (PVAs) means security vulnerabilities reported against a product supplied by the Seller. Notifications of these PVAs are obtained from multiple sources; governmental, vendor, independent and open source databases.
- L. "PVA Evaluation" means the Seller's process for evaluation of a potential Product Vulnerability Alert affecting products provided by the Seller.
- M. "RCE" means Harris's Regional Centers of Excellence. RCEs are Harris master distributors of all Harris land mobile radio products and services.
- N. "STIG" means Security Technical Implementation Guide. A STIG is a methodology for standardized secure installation and maintenance of computer software and hardware
- O. "Security Updates" means software updates that mitigate, address and/or resolve product security vulnerabilities in system components offered by the Seller. These updates may include Vendor Patches and/or Vendor Work-Arounds.
- P. "Security Update Distribution" means the Seller providing Security Updates to which the Subscriber is entitled under the terms of this Agreement, affecting components of the Subscriber's Designated System as defined in Schedule A.
- Q. "Software Updates" means all Harris provided software updates to either Harris designated SW system components or SUMS Software updates.
- R. "SUMS" means Harris's Security Update Management Service. Harris's automated patch management system that provides periodic, security-related software updates.
- S. "SUMS Software Updates" means periodic, security-related software, including but not limited to, operating system updates, antivirus signatures, and other security related Windows-based 3rd party updates (Adobe, Java, Flash).
- T. "Tech-Link" is the technical information section of Harris's web site. Access is restricted to authorized subscribers via user ID and password login.
- U. "Third Party Software Products" means software owned by a party other than Harris Corporation.
- V. "Vendor Patches" means software updates provided by third-party software vendors that mitigate, address and/or resolve PVA(s).
- W. "Vendor Work-Arounds" means configuration and/or procedural changes provided by third-party software vendors that mitigate, address and/or resolve PVA(s).

### 3. HARRIS SOFTWARE UPDATES

- A. Harris Software Releases Included. With respect to each Licensed Program, and subject to the conditions of this Agreement, Harris will provide the Software Updates described below during the term of this Agreement. All Updates shall be shipped to Subscriber's Software FX contact designated in Exhibit A of this Agreement via protective packaging containing a quantity of programmed Software media (e.g., Proms, Tapes, Compact Discs or DVDs) necessary for Subscriber to fully implement the Software Updates within its Designated System. In addition, each shipment of Software Updates shall contain at least one set of Software release notes detailing the contents of the Software Update and providing installation instructions.
- i. Software Updates Upon Enrollment. As determined by the system audit described in Section 6.A.i. of this Agreement, Harris shall provide to Subscriber the Software Updates needed, if any, to bring the Licensed Programs within Subscriber's Designated System up to Harris's Current Software Release Levels. Such Updates will be provided at no additional cost to Subscriber provided Subscriber has enrolled in the Software FX program within the enrollment deadline specified in Section 9.A of this Agreement. [ **To be tailored dependent upon customer's HW FX enrollment**] – [and provided **Subscriber has installed, at Subscriber's expense, the compatible hardware necessary to accommodate the Software Updates.**]
- ii. Subsequent Software Updates. During the term of this Agreement and subject to Subscriber's performance of its obligations, Harris shall provide to Subscriber Software Updates, released by Harris subsequent to Subscriber's enrollment in Software FX, for the Licensed Programs contained within Subscriber's Designated System. Such subsequent Software Updates may include:
- a. Enhancements and/or corrections to existing features for all Designated System backbone components and/or radios;
- b. New features or improvements to existing features implemented via the system components already contained within Subscriber's Designated System.
- B. System Level Release Documentation: Prior to the general release of a major system release by Harris for Harris Licensed Programs, Harris shall make available a system level release document announcing the impending release, and detailing its contents and impact, if any, on any other Harris hardware or Software components. Subscriber acknowledges that older hardware may not have sufficient capacity for the operation of the Software Updates. **NOTHING IN THIS AGREEMENT OR OTHERWISE REQUIRES HARRIS EITHER TO DESIGN UPDATES THAT REMAIN COMPATIBLE WITH DESIGNATED SYSTEM HARDWARE OR TO PROVIDE ADDITIONAL HARDWARE UNDER THIS AGREEMENT, AND SUBSCRIBER WAIVES ANY SUCH DUTY OR OBLIGATION BY HARRIS.**

### 4. HARRIS SECURITY UPDATE MANAGEMENT SERVICE

- A. Security Update Distributions Inclusions. Subject to the conditions of this Agreement, Seller will provide periodic SECURITY UPDATES described below during the term of this Agreement. All SECURITY UPDATES shall be provided to Subscriber's contact designated in Exhibit A. SECURITY UPDATES shall contain software necessary for the Subscriber to fully implement the Security Update within the Designated System and at least one set of Software release notes detailing the contents of the SECURITY UPDATES and providing installation instructions.
- i. Security Updates Upon Enrollment. As determined by the system audit described in Section 6.A.i. of this Agreement, Seller shall provide to Subscriber the SECURITY UPDATES needed, if any, to bring

the Licensed Programs within Subscriber's Designated System up to Seller's current security software release levels. Such updates will be provided at no additional cost to Subscriber provided Subscriber has enrolled in the Software FX program within the enrollment deadlines specified in this Agreement.

ii. Subsequent Security Updates. During the term of this Agreement and subject to Subscriber's performance of its obligations, Seller shall provide to Subscriber SECURITY UPDATES that may include:

a. Vendor Patches and/or Vendor Work-Arounds, enhancements, corrections and/or changes, made by third-party software vendors to software included in Seller provided products subject to the Subscriber's right to receive the third-party software. The Subscriber may be required to have currently executed services/support Agreement(s) with third-party vendor(s) separate from this Agreement.

B. SUMS PRODUCT Features Summary.

a. The Seller will use reasonable efforts to monitor pertinent governmental, vendor, independent and open source databases for PVAs, IAVAs, STIGs and for any subsequent resolutions that affect products provided by the Seller that are part of the Subscriber's Designated System.

b. The Seller will make every reasonable effort to verify that the PVA, IAVA, and STIG resolutions, Vendor Patches and/or Vendor Work-Arounds, do not adversely affect the Seller's stated performance of the Subscriber's Designated System.

c. The Seller will provide Security Update Distributions to the Subscriber at periodic intervals targeting bi-monthly releases. The interval shall be determined solely by the Seller. More frequent Security Update Distributions may be required to address urgent product security vulnerabilities. Security Update Distributions on other than a bi-monthly basis do not constitute a contractual default by the Seller.

d. The Seller will provide Security Update Distributions in a means suitable for use on the target devices of the Subscriber's Designated System. Optional On-Site Support Services may be contracted by the Subscriber, outside of this Agreement, through the Seller or the Seller's RCE or Network Solutions Provider or designated local service provider as set forth in Section 6.A.iv.

e. Prior to the general release by Seller of any Security Updates, Seller shall make available a SUMS PRODUCT release document announcing the impending release, and detailing its contents and impact, if any, on any other Seller hardware or Software components. Subscriber acknowledges that older hardware may not have sufficient capacity for the operation of the Software Updates. **NOTHING IN THIS AGREEMENT OR OTHERWISE REQUIRES SELLER EITHER TO DESIGN UPDATES THAT REMAIN COMPATIBLE WITH DESIGNATED SYSTEM HARDWARE OR TO PROVIDE ADDITIONAL HARDWARE UNDER THIS AGREEMENT, AND SUBSCRIBER WAIVES ANY SUCH DUTY OR OBLIGATION BY SELLER.**

f. The Seller will provide with each Security Update Distribution a Security Release Notes document. This document will detail the PVA resolutions and/or mitigation addressed by this release, installation and installation recovery procedures and software and hardware compatibility information where applicable.

- g. Automated Security Update Distribution Services. The Seller will provide a means of automating the distribution of Security Updates to the target devices within the Subscriber's Designated System. Subscriber shall be responsible for providing the necessary hardware and licenses to run the automated distribution of Security Updates. This hardware shall be part of Subscriber's Designated Harris System or purchased at Subscriber's expense from Seller prior to the initialization of this Software FX Agreement. As set forth in Section 9.C. of this Agreement, it shall be the Subscriber's responsibility to complete the security update process on the target devices (e.g. rebooting the target devices) following the Patch Application instructions in the Release Notes accompanying each Security Update Distribution. Optional On-Site Support Services may be contracted by the Subscriber, outside of this Agreement, through the Seller or the Seller's RCE or Network Solutions Provider or designated local service provider as set forth in Section 6.A.iv.
- h. Assessment Reporting. For those PVAs monitored by the Seller as stated in Section 4.B.h. , the Seller will provide responses assessing the effects of the monitored PVAs on the LMR system and stating Seller's recommendations for required actions. Access to the PVA assessments will be granted through Tech-Link, a restricted web site maintained by the Seller. The Seller does not guarantee assessment response time, but will make reasonable efforts to provide timely assessment responses.

## 5. SOFTWARE RELEASES NOT INCLUDED

- A. Software Releases Not Included. The following Software releases are not included within the terms of this Agreement:
  - i. New Products. Any Software products released by Harris for which an earlier generation or release level is not already contained within Subscriber's Designated System. If Subscriber wishes to implement such Software products within its Designated System, it will need to license such products at the fees then in effect and purchase any necessary compatible hardware for operation of such Software.
  - ii. Third Party Software. To the extent that such Third Party Software Products are available and compatible with the Designated System, Harris reserves the right to charge an additional fee for upgrades to software programs that are licensed by a third party for use with the Harris system yet are not the property of Harris. The Subscriber may be required to have currently executed services/support Agreement(s) with third-party vendor(s) separate from this Agreement. Subscriber must provide evidence of a current services/support Agreement at the seller's request.

## 6. SOFTWARE SERVICES INCLUDED

- A. Services Included. Subject to the terms and conditions of this Agreement and Subscriber's compliance therewith, Harris will provide to Subscriber the services described below.
  - i. System Configuration Baseline and Documentation Update. As part of the initial enrollment process for Software FX, Harris may deem it necessary to conduct a system audit of Subscriber's Designated System(s) to be covered under this Agreement. If said audit is required, Harris, or its RCE or Harris Network Solutions Provider will conduct the audit. This audit will be used to verify Subscriber's first-year Software FX Fee and to determine the Software release levels for Licensed Programs contained within Subscriber's System at the time of enrollment, together with any hardware updates necessary to accommodate Software Updates.
  - ii.

- ii. Installation Phone Support. Subscriber's Software FX subscription shall include telephone support by Harris's Technical Assistance Center (TAC) personnel with respect to the installation of Software Updates. Such support will be available during Harris' normal business hours (8:00 a.m. to 5:00 p.m. Eastern Standard Time Monday through Friday, excluding holidays) and for a period of ninety (90) days from the date the Software Update is released to Subscriber. After-hours emergency support will be available through Harris optional System Maintenance services at prices then in effect, provided that Subscriber is in compliance with the terms of this Agreement.
- iii. Upgrade Planning. If Subscriber is in compliance with the terms of this Agreement and its Designated System is classified as an Enterprise Configuration, Harris, or its RCE or Network Solutions Provider, shall provide an annual consultation service to review Harris' planned Software releases and evaluate the operational and financial impact such releases may have on Subscriber's Designated System. If Subscriber is in compliance with the terms of this Agreement and its Designated System is classified below an Enterprise Configuration, upgrade planning is not included within the terms of this Agreement but can be obtained from Harris at the rates then in effect for such service.
- iv. On-Site Services. Initial Installation Services are optionally available, outside of this Agreement, through the Seller, the Seller's RCE or Network Solutions Provider, or a designated local service provider provided that Subscriber is in compliance with the terms of this Agreement.
- v. Tech-Link. Tech-Link is the restricted access, technical information section of Seller's web site. Seller will provide FX subscribers access, via user ID and password authorization, to FX and SUMS release documentation and downloadable distribution media. Seller will also provide additional authorization to allow subscribers to view PVA, IAVA, and STIG assessment recommendations described in Section 4.B.i.

## 7. SOFTWARE SERVICES NOT INCLUDED

Services Not Included. The following services/products are not included within the terms of this Agreement:

- i. Hardware Upgrades. In the occasional event that a Software Update released requires a corresponding hardware change, Subscriber will need to purchase separately the compatible hardware required. Harris will endeavor to notify Subscriber in advance via the system level release documentation or, if applicable, via Software FX's upgrade planning service of any hardware changes needed in order to implement a Software Update. No such notice will be given for Third Party Software Updates or Excluded Products, and no hardware upgrade may be available.
- ii. Software Update Installation. Installation of Software Updates for terminal products, Software Updates for infrastructure, and Security Updates by Seller are not included, but such installations may be obtained from Seller, or its RCE or Network Solutions Provider, at the rates then in effect for such service, provided that Subscriber is in compliance with the terms of this Agreement.
- iii. Optional Support Services. Other Software support services Subscriber may require, including, but not limited to, training, customized software programming or troubleshooting through Seller's Technical Assistance Center are outside the scope of this Agreement but may be obtainable through other programs offered by Seller.

## 8. SOFTWARE DISTRIBUTION AND INSTALLATION

All Software Updates shall be provided to Subscriber's contact designated in Schedule A. In addition, each shipment of Software Updates shall contain at least one set of Software release notes detailing the contents of the Software Update and providing installation instructions

In the event any Software media contained within Subscriber's Designated System incurs damage, whether from acts of Nature or human error, Harris shall provide replacements for such Software to Subscriber at no additional charge, subject to the terms and conditions of this Agreement.

## 9. CONDITIONS FOR SERVICE

- A. Enrollment Deadline. Subscriber agrees to enroll in Software FX no later than sixty (60) days after the earlier of: (i) the first expiration date of the warranty provided by Harris for any component of Subscriber's Designated System, or (ii) the first expiration date of the warranty provided by Harris for any of the Software within Subscriber's Designated System. If either such warranty already has expired when Subscriber is first offered the Software FX Program, Subscriber will be given a 60-day grace period in which to enroll in Software FX. A Subscriber meeting the enrollment deadline will receive, at no additional charge as described in Sections 3.A.i. and 4.A.i of this Agreement; the Software Updates needed to bring its Designated System up to Harris's Current Software Release Levels to the extent the Designated System hardware is compatible with such Software Updates.
- B. Subscriber Contact. Seller requests that Subscriber identify its Subscriber Contact in Schedule A. Subscriber shall designate a person with sufficient technical expertise to be able to interact knowledgeably with Seller's technical support personnel. To the maximum extent practicable, Subscriber's communications with Seller (with regard to the Software Updates provided under this Agreement) should be through the Subscriber Contact.
- C. Installation. Subscriber agrees to properly install the Software Updates provided by Seller in order of receipt from Seller. Subscriber understands that Software support provided by Seller is limited to Seller's Current and current minus 1 Software Release Levels of Licensed Programs for the Designated System.
- D. Media Labeling. Subscriber agrees that if it makes copies of any Software Update supplied by Harris, for backup purposes, Subscriber will reproduce any copyright notice and/or proprietary notice appearing on and/or in such Update and will label all copies with all information, including part numbers and revision levels, provided on the set of media provided by Harris. Nothing herein grants Subscriber any right to sublicense any Software or to distribute copies to any other person, and such sublicensing and distribution is expressly prohibited.
- E. No Modification of Software. Subscriber agrees not to modify, enhance or otherwise alter any Software unless specifically authorized in the user documentation provided by Harris with such Software Update or unless the prior written consent of Harris is obtained. Under no circumstance shall Subscriber create or permit the creation of any derivative work from any Software or the reverse engineering or replication of any Software.
- F. Harris's obligations under this Agreement are conditional upon Subscriber's compliance with the terms of this Agreement and any Contract then in effect between Harris and Subscriber.
- G. Delegation of Authority. The Subscriber hereby delegates, grants, and assigns to Seller, acting as the Subscriber's agent or to a person or entity authorized by Seller, all approval rights relating to the selection of Vendor Patches. All approvals given to third-party vendors by the seller acting as the subscriber's agent under the terms of this AGREEMENT shall be deemed as being granted by the Subscriber.

## 10. FEES, TERMS OF PAYMENT & TAXES

- A. SOFTWARE FX Fee. Subscriber agrees to pay Harris or its RCE an annual Software FX Fee, in the amount set forth in Exhibit A to this Agreement, plus taxes pursuant to Subsection E below, for Software FX services provided during the term as defined in Exhibit A. Subsequent years' Software FX Fees, beyond Subscriber's first-year fee specified in Exhibit A, may or may not remain at the same rates. Any significant changes made to Subscriber's Designated System(s) configuration will be reflected in the following year's Software FX Fee. If Harris's rates for Software FX should increase, Subscriber will be notified in writing of any such increases at least one hundred twenty (120) days prior to the end of Subscriber's yearly Software FX period then in effect.
- B. Other Charges. Subscriber understands that if it chooses to delay its enrollment in Software FX beyond the deadline described in Section 9.A. of this Agreement, Subscriber will need to license, at the applicable fees then in effect, the initial Software Updates needed to bring its System up to Harris's Current Software Release Levels, as well as any hardware which may be required to accommodate such Updates.
- C. Due Date. Subscriber's first-year Software FX Fee will be invoiced upon receipt of this Agreement signed by Subscriber. Payment will be due thirty (30) days from the date of the invoice. Subscriber's subsequent years' Software FX Fees will be automatically invoiced sixty (60) days prior to the commencement of the subsequent year's term. Payment of all amounts due is a condition precedent to Harris providing any future Software Updates or other services.
- D. Taxes. In addition to all fees specified herein, Subscriber shall pay the gross amount of any present or future sales, use, excise, value-added, or other similar tax applicable to the price, sale or delivery of any products or services furnished hereunder or to their use by Subscriber, unless Subscriber shall otherwise furnish Harris with a tax-exemption certificate acceptable to the applicable taxing authorities.
- E. Discontinuance. Subscriber understands that if Subscriber discontinues and then subsequently resumes participation in the Software FX Program, Subscriber will be required to pay a re-entry fee for any benefits provided to Subscriber upon re-entry to the Software FX Program plus the Software FX Fee for the term then commencing.

## 11. TERM & TERMINATION

- A. Software FX services will be provided by Harris to Subscriber for an initial one-year term, as defined in Exhibit A to this Agreement, and thereafter on a year-to-year basis as provided herein, subject to prior payment in full of all outstanding fees and charges at the time of renewal and compliance with the provisions of this Agreement.
- B. Provided Subscriber is then in full compliance with all of its obligations, Subscriber's Software FX enrollment shall be automatically renewed on a succeeding yearly basis thereafter unless either party notifies the other in writing, at least ninety (90) days prior to the end of the yearly period then in effect, that this Agreement will not be renewed.
- C. Harris shall have the right to suspend or terminate this Agreement upon thirty (30) days' prior written notice if Subscriber fails to pay any fees or charges due hereunder or if Subscriber commits any other breach of this Agreement or commits any breach of any applicable Software license Agreement for any Licensed Program being supported under this Agreement, any contract between Subscriber and Harris or any other obligation of Subscriber to Harris or any of its affiliates.
- D. Harris shall have the right to discontinue providing Software FX services (including Updates) for any Licensed Program supported under this Agreement. Software Updates may be discontinued at any time at Harris's discretion. Other services shall not be discontinued without at least ninety (90) days' prior

written notice by Harris to Subscriber. Notwithstanding any other provision of this Agreement, as Subscriber's sole and exclusive remedy Harris will provide a pro-rata refund of Subscriber's annual Software FX Fee if Harris elects to discontinue providing Software FX services for any Licensed Program supported under this Agreement.

- E. Except as provided in Section 11.D. above, under no circumstances (including any termination of this Agreement) shall any fees paid pursuant to this Agreement be refundable once paid by Subscriber.

## **12. LIMITATION OF LIABILITY**

EXCEPT FOR PERSONAL INJURY OR DEATH, HARRIS' TOTAL LIABILITY ARISING FROM THIS AGREEMENT WILL BE LIMITED TO THE AGGREGATE AMOUNT OF SOFTWARE FX FEES PAID TO HARRIS UNDER THIS AGREEMENT.

## **13. GOVERNING LAW AND DISPUTE RESOLUTION**

This Agreement shall be governed by and construed in accordance with the laws of the State of Colorado, excluding its rules pertaining to conflict of laws. . By entering into this Agreement, Harris and Subscriber hereby expressly waive any rights either party may have to a trial by jury of any civil litigation related to , or arising out of this Agreement.

## **14. NOTICES**

All notices required or permitted hereunder shall be in writing and shall be deemed validly given upon being hand delivered, or upon receipt if sent by facsimile, e-mail or if mailed by certified mail, return receipt requested, to Subscriber at the address set forth in Exhibit A or to Harris Corporation at 221 Jefferson Ridge Parkway, Lynchburg, VA. 24501, Attention: Software Services Group, or to such other address as either party may designate to the other in writing.

## **15. ENTIRE AGREEMENT, EXECUTION AND MODIFICATION**

- A. This Agreement contains the entire and only Agreement between the parties concerning the subject matter hereof, and all prior representations and understandings in connection with the subject matter hereof are superseded and merged herein, and any representation or understanding not incorporated herein shall not be binding upon either party.
- B. This Agreement shall not become effective until signed on behalf of Harris by one of its officers or by an executive duly authorized by Harris's Vice President. No change, modification, ratification, rescission, or waiver of this Agreement or any of the provisions hereof shall be binding upon Harris unless made in writing and signed on its behalf in like manner.
- C. HARRIS DOES NOT ASSUME ANY OBLIGATIONS OR LIABILITIES IN CONNECTION WITH THE SOFTWARE OR SERVICES OTHER THAN THOSE EXPRESSLY STATED IN THIS AGREEMENT, AND DOES NOT AUTHORIZE ANY PERSON (INCLUDING HARRIS'S RCES OR SUBCONTRACTORS OR SUPPLIERS) TO ASSUME FOR HARRIS ANY OTHER OBLIGATIONS OR LIABILITIES.



**SCHEDULE A TO SOFTWARE FX AGREEMENT**

**Designated System**

1. *Term of Software FX Agreement.* The services, as described in the Software FX Agreement to which this Exhibit A is attached, will be provided as described in Section 2 below.
2. *Designated System Fees.* The Designated System(s) for which the Software FX Agreement will apply is (are):

System Name	System Classification	FX Option	FX Fee
Denver International Airport	P25	Year 1	\$65,000.00
		Year 2	\$105,000.00
		Year 3	\$105,000.00
		Year 4	\$105,000.00
		Year 5	\$105,000.00
		Year 6	\$105,000.00 (Optional)

Subscriber's subsequent years' Software FX Fees will be determined in accordance with Section 10.A. of the Agreement.

3. All Notices and Software Updates under this Software FX Agreement are to be provided by Harris to Subscriber under this Agreement are to be sent to:

Contact's Name: Leonard Spomer, IT Manager  
 Company Name: City and County of Denver –  
 DIA Technologies  
 Address: 8500 Pena Blvd, Denver, CO 80249-6340

Telephone: 303-342 2879  
 FAX No. 303-342-2093

**EXHIBIT D**

**SYSTEM MAINTENANCE AGREEMENT**

## SYSTEM MAINTENANCE AGREEMENT

THIS SYSTEM MAINTENANCE AGREEMENT (hereinafter "Agreement") is entered into by and between Harris Corporation, a Delaware Corporation, through its RF Communications Division., located at 221 Jefferson Ridge Parkway, Lynchburg, Virginia 24501, USA, ("Seller"), and the City and County of Denver, Department of Aviation located at 8500 Pena Blvd., Denver, CO 80249 (hereinafter "Customer").

### 1. SCOPE OF AGREEMENT

During the term of this Agreement (hereinafter "Term"), Seller agrees to provide Customer with repair and maintenance services and parts, as set forth in Section 2 of this Agreement, to maintain the Customer's radio system equipment provided by Seller to Customer and listed in Addendum II to this Agreement.

### 2. CONDITIONS OF SERVICE

Seller shall supply all supervision, labor, service facilities, repair parts, test equipment, and supplies necessary to meet the service requirements stated in this Agreement.

#### 2.1 Service Facilities

Seller shall have a full service maintenance facility available and staffed with factory trained service technicians. The location and staffing level shall be sufficient to meet the service requirements stated in this Agreement.

#### 2.2 Right to Subcontract

Seller may subcontract service work to authorized service centers that meet the minimum requirements of a service center set forth in the Seller Authorized Service Center Agreement. Should any subcontractor fail to perform or their work otherwise proves unsatisfactory, Seller will arrange for continuing maintenance of the equipment by qualified technicians for the duration of this Agreement.

#### 2.3 Fixed Equipment Maintenance

Fixed equipment is defined as those site repeater stations and associated equipment, multi-site coordinator, console electronics equipment, radio control stations and other fixed equipment, all as listed in Addendum II, Equipment List, attached hereto and incorporated herein by reference. All work on fixed equipment shall be performed at the location of the equipment whenever possible. Emergency service shall be provided twenty-four hours per day, seven days per

week. Technical personnel must respond to the emergency service request and begin troubleshooting efforts within two (2) hours of the request and be at the location of the failed equipment within four (4) hours of the request if the problem cannot be corrected remotely. This service is included in the monthly maintenance rate. No fixed equipment shall be out of service in excess of 24 hours after notification of equipment failure when the failure results in the inability of mobile units to communicate with each other or with a dispatch center.

## **2.4 Mobile Equipment Maintenance**

Mobile equipment is defined as those vehicular mounted radios, personal portable radios, vehicular repeaters, portable radio chargers and other mobile equipment, all as listed in Addendum II, Equipment List.

Mobile equipment shall be serviced at the customer building where the vehicle is normally assigned, at the vehicle's work location, or at a Seller's authorized service facility during normal working hours as mutually agreed upon by Seller and the Customer. All mobile service requests must be responded to within two working days from the receipt of the repair request. If the mobile radio cannot be repaired within two hours from the beginning of a service action, the radio unit shall be replaced, if requested, with a customer-provided spare unit. Emergency service shall be available twenty-four hours per day, seven days per week. Emergency service on mobile equipment, if requested, will be performed at the rate for demand service set forth in Addendum I, Maintenance Rates, attached hereto and incorporated herein by reference.

## **2.5 Spare Parts and Radios**

- a.** Seller will maintain an adequate stock of spare parts, system-critical modules and mobile and portable radios as a back-up to Customer's spares inventory. The initial purchase of Customer's spares inventory will be at Customer expense.
- b.** Seller will support provisioning of its equipment for a period of five (5) years after final production of mobile and portable radios and seven (7) years after final production of fixed equipment. Third party equipment will be supported in accordance with the individual manufacturer's provisioning policy. Seller will utilize commercially reasonable efforts to assure third party spare parts and equipment availability to support its maintenance obligations under this Agreement. Seller shall not be liable to Customer for third party spare part and equipment obsolescence or unavailability under this Agreement beyond commercially reasonable efforts.

## **2.6 Working Hours**

Working hours are defined as 8:00 a.m. to 5:00 p.m. Monday through Friday excluding holidays. Work performed outside of working hours is defined as emergency service and will be performed at demand service rates.

## **2.7 Demand Services**

“Demand Services” shall mean service requests that are not included in this Maintenance Agreement as described in Section 2.8, Maintenance Responsibilities, of this Agreement. The installation, removal, or reinstallation of equipment not associated with repair / maintenance efforts as defined in this Agreement shall be considered Demand Service and be performed by Seller, following reasonable notice, and at the rates listed in Addendum I to this Agreement. Service work made necessary because of abuse or neglect not under the control of Seller will be performed at the hourly rate for demand service, plus the purchase of parts. Special work, not otherwise covered, will be performed at Seller prevailing rates.

## **2.8 Maintenance Responsibilities**

Seller agrees to provide the following services and perform the tasks described as part of this Maintenance Agreement in accordance with the limitations and definitions of Sections 2.7 and 6.4 of this Agreement.

- a. Seller shall check, on a daily basis, the radio system’s alarm status and report any alarm conditions to the customer. Investigation and troubleshooting of alarms shall begin in order of severity and impact to the overall system’s ability to maintain effective communications. Seller will inspect/test the communication equipment and make such repairs, adjustments and replacements of components as may be necessary to maintain and/or restore the system to normal operating conditions.
- b. Seller shall repair, maintain and service all equipment listed in Addendum II, Equipment List, attached hereto.
- c. Seller shall perform preventative maintenance inspections and tests as recommended by the OEM and required by applicable FCC regulations; as a minimum, these inspections and tests will be performed annually for equipment listed in Addendum II.

## **2.9 Service Records**

The following service records shall be maintained and made available to the Customer upon request:

Monthly mobile service activity, by vehicle number, including model number, serial number, work performed and time required to restore service.

Monthly emergency service activity including failure type, corrective action taken and time required to restore service.

The results of preventive maintenance tests and inspections shall be provided, upon request by the Customer within 30 days of completion.

Service records for work performed as described in Section 2.9 shall be retained for the duration of this Agreement and any subsequent renewal periods.

#### **2.10 Software Upgrades**

Seller will provide labor to install and test software upgrades, whether for corrective or enhancement purposes, provided that Customer subscribes to a Seller software services agreement that provides the upgraded software.

#### **2.11 Database Reprogramming**

Mobile radio or system database corrections will be provided by Seller at no cost to Customer, during the term of this agreement, if the correction is necessary because of an error or omission on Seller's part. Database changes made at Customer's request will be performed at the hourly rates listed in Addendum I to this Agreement.

#### **2.12 General**

All services provided under this Agreement are only applicable to the land mobile radio products and systems sold and provided by Seller to Customer and listed in Addendum II to this Agreement. Prior to contract signing, Seller reserves the right to request a complete serial number listing of all equipment to be covered under this agreement.

#### **2.13 Special Conditions**

Any and all special service conditions are listed in Addendum III to this Agreement, the provisions of which are incorporated herein by reference.

### **3. CUSTOMER FINANCIAL OBLIGATIONS**

**3.1** Customer shall pay the annual maintenance fee as set forth in Addendum I to this Agreement in advance, on or before the effective date of this Agreement as set forth in Section 5.1 hereof. Fees for demand services, as set forth in Addendum I

to this Agreement, are payable within thirty (30) days of receipt of Seller's invoice.

- 3.2 Seller may at any time hereafter revise the rates set forth in Addendum I by giving Customer written notice thereof not later than ninety (90) day prior to the expiration of a yearly period, provided that the revised rates are mutually agreed upon in writing and said revised rates shall be effective for the next yearly period, unless either party exercises its option to terminate the Agreement.
- 3.3 Any other payments under this Agreement are due within thirty (30) days of receipt of Seller's invoice.
- 3.4 All late payments under this Agreement shall bear interest at a rate of one and one-half percent (1.5%) per month.

#### 4. **WARRANTY**

- 4.1 Seller warrants that all services performed under this Agreement will be done in an efficient and workmanlike manner. Under no circumstances will Seller's liability to Customer exceed the amounts paid by Customer under this Agreement for the applicable service that causes the Customer's claim. **IN NO EVENT SHALL SELLER BE LIABLE TO THE CUSTOMER FOR ANY SPECIAL, CONSEQUENTIAL, INCIDENTAL, INDIRECT OR EXEMPLARY DAMAGES INCLUDING, BUT NOT LIMITED TO, LOSS OF PROFIT OR REVENUES, LOSS OF USE OF THE EQUIPMENT OR ANY ASSOCIATED EQUIPMENT, COST OF CAPITAL, COST OF SUBSTITUTE GOODS, FACILITIES, SERVICES OR REPLACEMENT POWER, DOWNTIME COSTS OR CLAIMS OF CUSTOMER'S CLIENTS, IF ANY, FOR SUCH DAMAGES.**
- 4.2 **THE WARRANTY SET FORTH IN SECTION 4.1 ABOVE IS SELLER'S SOLE WARRANTY UNDER THIS AGREEMENT AND IS IN LIEU OF ANY AND ALL OTHER WARRANTIES WHETHER WRITTEN OR ORAL, EXPRESSED OR IMPLIED, STATUTORY OR OTHERWISE INCLUDING, BUT NOT LIMITED TO ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.**
- 4.3 **Patents, Trademarks, Information**
  - a. Nothing in this Agreement shall be construed as;
    - (i) A warranty or representation by Seller that any advice provided under this Agreement is or will be free from infringement of patents of third parties; or

- (ii) Conferring a right to Customer to use in advertising, publicity or otherwise any trademark or trade name of Seller; or
- (iii) Granting to Customer by implication, estoppel, or otherwise any licenses or rights under patents of Seller.

**b.** SELLER MAKES NO REPRESENTATIONS, EXTENDS NO WARRANTIES OF ANY KIND, EITHER EXPRESSED OR IMPLIED, AND ASSUMES NO RESPONSIBILITIES WHATSOEVER WITH RESPECT TO THE ADEQUACY, ACCURACY OR UTILITY OF ANY INFORMATION OBTAINED BY CUSTOMER UNDER THIS AGREEMENT. Seller assumes no responsibilities whatsoever with respect to the use by Customer or any third party of any information obtained by Customer or third party under this Agreement with respect to any use, sale or other disposition by Customer or its clients or other transferees of any products incorporating or made by use of the information obtained under this Agreement.

#### **4.4 General**

- a.** Radio systems are subject to degradation of service from natural phenomena such as so-called “skip” interference and other causes beyond the reasonable control of Seller such as motor ignition and other electrical noise as well as interference from other users assigned by the FCC to the same or adjacent frequencies. Seller cannot be responsible for interference or disruption of service caused by operation of other radio systems or by natural phenomena or by motor ignition or other interference over which there is no reasonable control. Such foregoing interference and noise can be minimized by the addition of corrective devices (at Customer’s expense) adapted for particular locations and installations. Seller will investigate interference complaints (at the rates specified in Addendum I to this Agreement) and make recommendations as to the use of such devices; however, total freedom from noise and interference cannot be guaranteed.
- b.** Seller does not assume responsibility for signal strength unless the deficiency is the result of substandard equipment maintenance.
- c.** If, due to the action of regulatory authorities, changes to the equipment become necessary, such changes will be performed by Seller upon request at the expense of Customer.

### **5. TERM AND TERMINATION**



**5.1** The services under this Agreement will be provided by Seller to Customer for an initial one year period and thereafter on an annual basis as provided herein with rates to be modified as set forth in Section 3.2.

The effective date of this Agreement is one (1) year following System Acceptance.

**5.2** The services shall be automatically extended at the end of the initial year for an additional year and on a succeeding yearly basis thereafter unless either party notifies the other, in writing, at least sixty (60) days prior to the end of the yearly period then in effect that the services shall not be extended.

**5.3** In the event that Customer fails to make any overdue payments due to Seller under this Agreement within fifteen (15) days after receipt of written notice from Seller, Seller may at its option immediately thereafter terminate this Agreement.

**5.4** In the event of any other default under this Agreement, either Customer or Seller shall give the other party written notice describing the default and a thirty (30) day period to correct the default. This Agreement may then be immediately canceled if the default is not corrected prior to the end of the thirty (30) day period.

## **6. LIMITATION OF LIABILITY**

**6.1** The total liability of seller, including its subcontractors or suppliers, on any and all claims, whether in contract, warranty, tort (including negligence or patent infringement) or otherwise, arising out of, connected with, or resulting from the performance or non-performance of any agreement resulting herefrom or from the manufacture, sale, delivery, resale, repair, replacement or use of any equipment or the furnishing of any service, shall not exceed an amount equal to three times (3x) the Maximum Contract Liability of the Agreement between the Parties. Except as to title any such liability shall terminate upon the expiration of the applicable warranty period specified in the article entitled "warranty".

**5.2** IN NO EVENT, WHETHER AS A RESULT OF BREACH OF CONTRACT, WARRANTY, TORT (INCLUDING NEGLIGENCE OR PATENT INFRINGEMENT) OR OTHERWISE, SHALL SELLER, OR ITS SUBCONTRACTORS OR SUPPLIERS, BE LIABLE FOR ANY SPECIAL, CONSEQUENTIAL, INCIDENTAL, INDIRECT OR EXEMPLARY DAMAGES, INCLUDING, BUT NOT LIMITED TO, LOSS OF PROFIT OR REVENUES, LOSS OF USE OF THE EQUIPMENT OR ANY ASSOCIATED EQUIPMENT, COST OF CAPITAL, COST OF SUBSTITUTE GOODS, FACILITIES, SERVICES OR REPLACEMENT POWER, DOWNTIME COSTS OR CLAIMS OF BUYERS CUSTOMERS FOR SUCH DAMAGES. IF BUYER TRANSFERS TITLE TO, OR LEASES THE EQUIPMENT SOLD HEREUNDER TO, OR OTHERWISE PERMITS OR SUFFERS USE BY, ANY

**5.3**

THIRD PARTY, BUYER SHALL OBTAIN FROM SUCH THIRD PARTY A PROVISION AFFORDING SELLER AND ITS SUBCONTRACTORS AND SUPPLIERS THE PROTECTION OF THE PRECEDING SENTENCE.

- 6.3** Any action for any claim of any kind for any loss or damages arising out of, connected with, or resulting from the performance, non-performance or breach of the Contract, or from the manufacture, sale, delivery, installation, technical direction or installation, resale, repair, replacement, licensing or use of any Hardware, Software or the furnishing of any Services, shall be commenced within one (1) year after the cause of action occurred or it shall be deemed waived or barred.
- 6.4** Seller shall not be liable for costs incurred for repair and/or replacement of equipment that fails or becomes inoperative due to negligence on the part of the user, liquid intrusion, lightning damage, user installations, user removals and/or acts of God, acts of terrorism or work performed by third parties not authorized by Seller to perform work on Seller equipment.
- Seller shall not be liable for costs incurred for correcting, replacing or repairing equipment damaged and/or data corruption induced and/or caused by 3<sup>rd</sup>. party personnel or other equipment / systems not provided by Seller.
- 6.5** The provisions of this Section, LIMITATION OF LIABILITY, shall apply notwithstanding any other provisions of this Contract and any other agreement.
- 6.6** The provisions if this Section, LIMITATION OF LIABILITY, shall survive the expiration or termination of this Contract.

## **7. GENERAL PROVISIONS**

- 7.1** All notices under this Agreement shall be in writing and shall be deemed to have been duly given upon being delivered personally or upon receipt if mailed by certified mail, return receipt requested. Notices shall be sent to the representatives named below or any subsequent representative for which notice was provided pursuant to this section.

**Seller:**

Director, Field Services  
Harris Corporation  
221 Jefferson Ridge Parkway  
Lynchburg, Virginia 24501  
With a copy to:  
Regional Manager

**Customer:**

City and County of Denver  
8500 Pena Blvd.  
Denver, CO 80249

- 7.2** This Agreement shall be interpreted and the legal relations between the parties determined in accordance with the laws of the State of Colorado. The invalidity, in whole or in part, of any provision of this Agreement shall not affect the validity of enforceability of any other provisions thereof.
- 7.3** Seller shall not be responsible for delays or failures in performance under this Agreement that are due to causes beyond its reasonable control including, but not limited to, acts of God, war, acts of terrorism, fires, severe weather, floods, strikes, blackouts, – embargoes or work performed on Seller equipment by third parties not authorized by Seller to perform such work. In the event such delays or failures interrupt Seller’s services to Customer, Seller shall promptly notify Customer of the circumstances and the anticipated delay.
- 7.4** This Agreement represents the entire understanding of the parties with respect to the subject matter hereof and this Agreement supersedes and replaces all prior Agreements and understandings, either oral or written, regarding the subject hereof.
- 7.5** This Agreement cannot be amended, modified or any provisions waived orally. All amendments and modifications must be in writing and signed by both parties. All waivers must be provided in writing by the party waiving their rights under this Agreement.
- 7.6** This Agreement may not be assigned without the prior written consent of the other party, which consent shall not be unreasonably withheld. However, Seller may: (i) assign all of its rights, obligations and liabilities under this Agreement to any subsidiary; or (ii) assign its rights to monies due or payable under this Agreement; Seller shall provide Customer with written notice of any such assignment. Seller’s assignment of monies due or payable under the Agreement will not relieve Seller of any obligations or responsibilities to Customer  
Hereunder  
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**ADDENDUM I  
to SYSTEM  
MAINTENANCE  
AGREEMENT**

**SYSTEM MAINTENANCE RATES**

Rates in sections B, C, D will be raised by 4.88% (based on a hybrid of CPI-W/CPI-U) per year starting one year after Final System Acceptance.

**A. ANNUAL FIXED EQUIPMENT MAINTENANCE RATES**

• Warranty Year 1	\$ 0
• Year 2	\$ 96,687.00
• Year 3	\$ 99,587.00
• Year 4	\$ 102,575.00
• Year 5	\$ 105,652.00
• Year 6	\$ 108,821.00

**B. ANNUAL TERMINAL EQUIPMENT MAINTENANCE RATES**

The items below will be multiplied by the final defined equipment list provided in Addendum II (B) – Terminal Equipment List

Portable	\$N/A
Individual desk-top charger \$	\$N/A
Multi-Unit rack charger	\$N/A
Vehicular Charger	\$N/A
Mobile -Front Mount	\$N/A
Mobile Radio -Remote Mount	\$N/A
Mobile Radio -Dual Control Head	\$N/A
Mobile Radio -Dual Radio -1 Control	\$N/A
Desktop Control Station (Enclosure + Radio)	\$N/A

Per Section 3.2, Seller may evaluate the Terminal Equipment pricing on an annual basis and request changes if necessary.

**C. DEMAND SERVICE RATES**

Hourly Rate (normal business hours):	<u>\$ 125.00 per hour</u>
Hourly Rate (Nights & Saturday):	<u>\$ 187.50 per hour</u>
Hourly Rate (Sunday & Holidays):	<u>\$ 187.50 per hour</u>
Mobile/Portable Radio Reprogramming:	<u>Price quoted on a per occurrence basis.</u>

**D. DATABASE CORRECTION RATES**

Hourly Rate (normal business hours):	<u>\$125.00 per hour</u>
Annual inventory rate	<u>\$125.00 per hour</u>

**E. OTHER SERVICES**

Service provided by third party vendors, at the request of the customer, will be provided at cost plus 35%.

**ADDENDUM II  
to SYSTEM  
MAINTENANCE  
AGREEMENT**

**EQUIPMENT LIST**

**A. FIXED EQUIPMENT:**

*Equipment List to be defined after final Customer Design Review Meeting and prior to start date of this Agreement.*

**B. TERMINAL EQUIPMENT:**

*Equipment List to be defined after final Customer Design Review Meeting and prior to start date of this Agreement.*

**ADDENDUM III to  
SYSTEM  
MAINTENANCE  
AGREEMENT**

**SPECIAL CONDITIONS**

**1.0 Maintenance Exclusions**

**1.1 Fixed Equipment**

**The items identified below are covered by Seller during the first year of Warranty if they have been provided and installed by Seller.** Following the end of the first year of Warranty, these items are specifically excluded from coverage by this Maintenance Agreement, **unless otherwise noted in Addendum II (A) Fixed Equipment List or as negotiated after Award.** Customer may request services on these items at the then current Demand Services Rates listed in Addendum I – System Maintenance Rates.

- Site Antenna Systems – Specifically Excluded are:
  - o Antennas Mounted external to the site equipment shelter – including antennas mounted on towers, building tops or other structures.
  - o Antenna Feedlines mounted external to the site equipment shelter – including Feedlines to antennas as noted above.
  - o Microwave System Antennas (dishes) and antenna waveguides are excluded
- Batteries of any type or equipment location. Batteries are considered a consumable item and are not covered by this agreement.
- Trunked Logging Recorder
- Any UPS or power conditioning equipment and associated batteries are excluded from this Agreement.
- Tower Mounted Portions of Tower Top Amplifiers (TTA or TMA) are covered by the Agreement, however, tower work required to access these devices is not covered by this Agreement.
- Site Civil Work Items are excluded from this Agreement to include:
  - o Towers and Tower Lighting Systems
  - o Shelters – including lighting fixtures or bulbs, HVAC systems & Fire Suppression Systems.
  - o Fences
  - o Roads and surface coverings
  - o Landscaping
  - o Generators
  - o Generator Fuel Tanks
  - o Site Electrical Feed (whether underground or overhead)
- Antennas and Antenna Feedlines as well as Cabling from Remote Controller to Desktop Control Stations associated with Desktop Stations / Control Stations / Remote Controllers

- Console Personal Audio Accessories (headset, ear piece)
- Microwave Radio System Equipment

## 1.2 Terminal (Non-Fixed) Equipment

- Portable Radios – Specifically Excluded are:
  - o Antennas
  - o Batteries
  - o Carrying Cases
  - o Audio Accessories (speaker microphone, headset, ear piece)
- Mobile Radios – Specifically Excluded are:
  - o Antennas
  - o Power Cables
  - o Control Head to T/R package cables for remote mount units
  - o Fuses & Fuse Holders
  - o Audio Accessories (microphone, headset, ear piece)
  - o Any issues related to vehicular power systems
    - Voltages out of radio specification range
    - Voltage spikes

## 2.0 Specialized Site Access

On-site response times are based on the assumption that the site is accessible by normal transportation methods and vehicles. On-site response time requirements exclude site locations that require extensive drive time due to traffic conditions or site locations where specialized vehicles (snowcat, helicopter, etc) are required. In addition, Customer is responsible to ensure that all necessary clearances, escorts, or other special requirements have been met in advance to allow technicians prompt access to any equipment requiring service that may be located in a secured or limited access area of the Customer's facilities.

## 3.0 EQUIPMENT LISTS

All services provided under this Agreement are only applicable to the land mobile radio products and systems sold and provided by Seller to Customer and referenced in Addendum II to this Agreement. Prior to signing this Agreement, Seller shall provide a complete listing of all equipment to be covered under this agreement.

Customer may add or delete equipment items to the list of maintained equipment by notifying the Seller in writing. As additional items are purchased from Seller they will be added to this Agreement on an annual basis. Any changes to this Agreement will be through an Amendment document completed by Seller and provided to Customer for review, approval and signature. The Amendment document will provide revised equipment lists, revised pricing structure changes and any necessary changes to fully incorporate the additional items into the Agreement.



**CITY AND COUNTY OF DENVER  
INSURANCE REQUIREMENTS FOR THE DEPARTMENT OF AVIATION**

Certificate Holder Information:

CITY AND COUNTY OF DENVER  
Attn: Risk Management, Suite 8810  
Manager of Aviation  
Denver International Airport  
8500 Peña Boulevard, Room 8810  
Denver CO 80249

**CONTRACT NAME & NUMBER TO WHICH THIS INSURANCE APPLIES: 201417087 – Public Safety Radio System Upgrade**

**I. MANDATORY COVERAGE**

**Colorado Workers' Compensation and Employer Liability Coverage**

**Coverage:** COLORADO Workers' Compensation

**Minimum Limits of Liability (In Thousands)**

WC Limits: \$100, \$500, \$100

And Employer's Liability Limits:

**Any Policy issued under this section must contain, include or provide for the following:**

1. All States Coverage or Colorado listed as a covered state for the Workers' Compensation
2. Waiver of Subrogation and Rights of Recovery against the City and County of Denver (the "City"), its officers, officials and employees.
3. State Of Colorado law states that if a contractor is a sole proprietor, they are not required to have Workers Compensation coverage.

**Commercial General Liability Coverage**

**Coverage:** Commercial General Liability (coverage at least as broad as that provided by ISO form CG0001 or equivalent)

**Minimum Limits of Liability (In Thousands):**

Each Occurrence:	\$1,000
General Aggregate Limit:	\$2,000
Products-Completed Operations Aggregate Limit:	\$2,000
Personal & Advertising Injury:	\$1,000
Fire Damage Legal - Any one fire:	\$1,000

**Any Policy issued under this section must contain, include or provide for the following:**

1. City, its officers, officials and employees as additional insureds, per ISO form CG2010 and CG 2037 or equivalents.
2. Coverage for defense costs of additional insureds outside the limits of insurance, per CG0001.
3. Liability assumed under an Insured Contract (Contractual Liability).
4. The full limits of coverage must be dedicated to apply to this project/location, per ISO form CG2503 or equivalent.
5. Waiver of Subrogation and Rights of Recovery, per ISO form CG2404 or equivalent.
6. Separation of Insureds Provision required
7. General Aggregate Limit Applies Per: Policy \_\_\_Project \_\_\_Location\_\_\_, if applicable

**Business Automobile Liability Coverage**

**Coverage:** Business Automobile Liability (coverage at least as broad as ISO form CA0001)

**Minimum Limits of Liability (In Thousands):** Combined Single Limit \$1,000

**Any Policy issued under this section must contain, include or provide for the following:**

1. Symbol 1, coverage for any auto. If no autos are owned, Symbols 8 & 9, (Hired and Non-owned) auto liability.
2. If this contract involves the transport of hazardous cargo such as fuel, solvents or other hazardous materials may occur, then Broadened Pollution Endorsement, per ISO form CA 9948 or equivalent and MCS 90 are required.

## **II. ADDITIONAL COVERAGE**

### **Umbrella Liability**

**Coverage:**

**Umbrella Liability, Non Restricted Area**

**Minimum Limits of Liability (In Thousands)**

Umbrella Liability Restricted Area

Each Occurrence and aggregate

\$9,000

**Any Policy issued under this section must contain, include or provide for the following:**

1. City, its officers, officials and employees as additional insureds.
2. Coverage in excess of, and at least as broad as, the primary policies in sections WC-1, CGL-1, and BAL-1.
3. **If operations include unescorted airside access at DIA, then a \$9 million Umbrella Limit is required.**

### **Professional Liability only as applicable Information Technology Contracts**

**Coverage: Professional Liability including Cyber Liability for Errors and Omissions**

(If contract involves software development, computer consulting, website design/programming, multi-media designers, integrated computer system design, data management, and other computer service providers.)

**Minimum Limits of Liability (In Thousands)**

Per Claim

\$1,000

**Any Policy issued under this section must contain, include or provide for the following:**

1. The insurance shall provide coverage for the following risks:
  - a. Liability arising from theft, dissemination and / or use of confidential information (a defined term including but not limited to bank account, credit card account, personal information such as name, address, social security numbers, etc. information) stored or transmitted in electronic form
  - b. Network Security Liability arising from the unauthorized access to, use of or tampering with computer systems including hacker attacks, inability of an authorized third party, to gain access to your services including denial of service, unless caused by a mechanical or electrical failure
  - c. Liability arising from the introduction of a computer virus into, or otherwise causing damage to, a customer's or third person's computer, computer system, network or similar computer related property and the data, software, and programs thereon.
2. Policies written on a claims-made basis must remain in full force and effect in accordance with CRS 13-80-104. The Insured warrants that any retroactive date under the policy shall precede the effective date of this Contract; and that either continuous coverage will be maintained or an extended discovery period will be exercised for a period of two (2) years beginning at the time work under the Contract is completed.
3. Any cancellation notice required herein may be provided by either certified or regular mail.
4. The policy shall be endorsed to include the City, its elected officials, officers and employees as additional insureds with respect to liability arising out of the activities performed by, or on behalf of the Insured
5. Coverage must include advertising injury, personal injury (including invasion of privacy) and intellectual property offenses related to internet.

## **Builders' Risk Insurance or Installation Floater**

### **Minimum Limits of Liability (In Thousands)**

### **Completed Value Basis**

Unless otherwise provided, the Insured shall purchase and maintain, in a company or companies lawfully authorized to do business in the jurisdiction in which the Project is located, Builders' Risk Insurance in the amount of the initial Contract Sum, plus value of subsequent modifications, change orders, and cost of material supplied or installed by others, comprising total value of the entire Project at the site on a replacement cost basis.

- a. Policy must provide coverage from the time any covered property becomes the responsibility of the Insured, and continue without interruption during construction, renovation, or installation, including any time during which the covered property is being transported to the construction installation site, or awaiting installation, whether on or off site.
- b. Such Builders' Risk Insurance shall be maintained, unless otherwise provided in the Contract Documents or otherwise agreed in writing by all persons and entities who are beneficiaries of such insurance, until formal acceptance of the project by the owner (DIA) or the placement of permanent property insurance coverage, whichever is later.
- c. The Builders' Risk insurance shall include interests of the Denver International Airport and if applicable, affiliated or associate entities, the General Contractor, subcontractors and sub-tier contractors in the Project.
- d. The Builders Risk insurance shall be written on a **Special Completed Value** Covered Cause of Loss form and shall include theft, vandalism, malicious mischief, collapse, false-work, temporary buildings, transit, debris removal, demolition, increased cost of construction, flood (including water damage), earthquake, and if applicable, all below and above ground structures, piping, foundations including underground water and sewer mains, pilings including the ground on which the structure rests and excavation, backfilling, filling and grading.
- e. The Builders' Risk shall include a Beneficial Occupancy Clause. The policy shall specifically permit occupancy of the building during construction. City and County of Denver Contractor shall take reasonable steps to obtain consent of the insurance company and delete any provisions with regard to restrictions within any Occupancy Clauses within the Builder's Risk Policy. The Builder's Risk Policy shall remain in force until acceptance of the project by the City.
- f. Equipment Breakdown Coverage (a.k.a. Boiler & Machinery) shall be included as required by the Contract Documents or by law, which shall specifically covers insured equipment during installation and testing (including cold and hot testing).

**The deductible shall not exceed \$25,000 and shall be the responsibility of the Contractor except for losses that involve all Acts of God such as flood, earthquake, windstorm, tsunami, or volcano.**

### **III. ADDITIONAL CONDITIONS**

It is understood and agreed, for the benefit of the City, that the following additional conditions shall apply to all coverage specified herein

- All coverage provided herein shall be primary and any insurance maintained by the City shall be considered excess.
- With the exception of professional liability and auto liability, a Waiver of Subrogation and Rights of Recovery against the City, its officers, officials and employees is required for each coverage period.
- The City shall have the right to verify or confirm, at any time, all coverage, information or representations contained herein, and the insured and its undersigned agent shall promptly and fully cooperate in any such audit the City may elect to undertake.
- Advice of renewal is required.
- All insurance companies issuing policies hereunder must carry at least an A -VI rating from A.M. Best Company or obtain a written waiver of this requirement from the City's Risk Administrator.
- Compliance with coverage requirement by equivalent herein must be approved in writing by the City's Risk Administrator prior to contract execution.
- No changes, modifications or interlineations on this document shall be allowed without the review and approval of the Risk Administrator prior to contract execution.

## **NOTICE OF CANCELLATION**

It is understood and agreed that should any Policy issued hereunder be cancelled or non-renewed before the expiration date thereof, or sustain a material change in coverage adverse to the City, the issuing company or its authorized Agent shall give notice to the Department of Aviation in accordance with policy provisions.