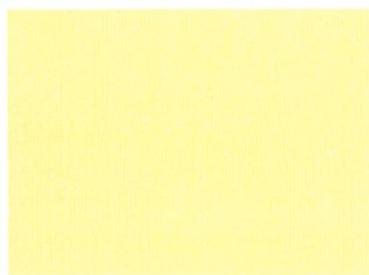




# Countywide Radio Communications Interoperability and Systems Engineering Services

**tusa** | Consulting Services  
*Raising the Bar in Radio Communications*

Orange County, North Carolina • March 1, 2016  
RFP No. 5217



February 29, 2016



**tusa** | Consulting Services  
*Raising the Bar in Radio Communications*

David Cannell  
Purchasing Agent  
Orange County, NC  
200 S. Cameron Street  
Hillsborough, NC 27278

Reference: Request for Proposal, Project #5217

Subject: Countywide Radio Communications Interoperability and Systems Engineering Services

Mr. Cannell,

It is my pleasure to submit Tusa Consulting Services' (TUSA) proposal to provide Orange County with consulting support services for the upgrade and modernization of its public safety radio system. TUSA understands your requirements and expectations for this proposal and we believe our capabilities and skillset are structured to best meet your needs.

We are grateful for the opportunity to support the County in defining its current and future capabilities, developing design specifications, and providing the information necessary to allow the County to determine the best approach in which to acquire a state of the art public safety radio system. With our extensive experience, Tusa Consulting can help Orange County meet the needs of its first responders with a robust, reliable public safety grade system at an appropriate and fair price.

For the past twenty-three years, TCS has assisted numerous modernization projects involving VHF/UHF conventional designs, 700/800MHz trunked radio, analog and digital systems, microwave, fiber optics, Phase 1 and 2 Project-25 systems, and recently, LTE technologies. Rest assured, no matter the technology, TUSA has the expertise to help guide you toward a successful conversion.

Tusa Consulting provides consulting, design, and project management services only. We have no affiliation with radio equipment vendors and have always believed that an open procurement is the best approach to maximize the use of funding, while achieving guaranteed performance. As a result, our solutions are structured solely to assist you in evaluating viable options, receiving what's agreed upon, and assuring the satisfaction of the radio user's needs, at the most reasonable cost possible.

Sincerely,

Dominic F. Tusa, Principal  
75757 Highway 1082  
Covington, LA 70433  
(985) 249-6467

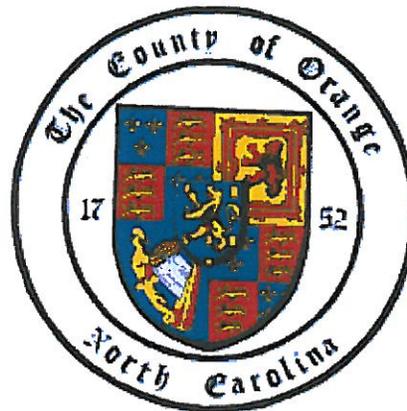


## *Qualifications*

# *Countywide Radio Communications Interoperability and Systems Engineering Services*

*for*

# **Orange County, North Carolina**



*Submitted by*

## ***TUSA CONSULTING SERVICES***





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*Raising the Bar in Radio Communications*

February 29, 2016

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Purchasing Agent  
Orange County, NC  
200 S. Cameron Street  
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Reference: Request for Proposal, Project #5217

Subject: Countywide Radio Communications Interoperability and Systems Engineering Services

Mr. Cannell,

I, Dominic F. Tusa, am the founder and owner of Tusa Consulting Services II, LLC. My firm (TUSA) provides unbiased technical consulting services for owners of public safety radio/microwave communications systems. TUSA has no affiliation with any manufacturer, agent or vendor of radio communications systems or equipment. To my knowledge, no TUSA personnel are engaged in any conflicting activity or interest involving such manufacturers, agents or vendors.

If during the term of our company's work with Orange County, some potential or previously unknown conflict arises, I will immediately notify County personnel of such and TUSA will agree to any remedy required to resolve the conflict.

Sincerely,

Dominic F. Tusa, Principal  
75757 Highway 1082  
Covington, LA 70433  
(985) 249-6467

## INTRODUCTION

### Organization

Tusa Consulting Services (TUSA) is headquartered in Covington, Louisiana (75757 Highway 1082) located approximately 40 miles north of New Orleans. This location is easily and efficiently served by three major airports: Armstrong (New Orleans) International; Baton Rouge Metropolitan Airport and the Gulfport-Biloxi Mississippi International Airport. The staff here is comprised of the firm's founder, one professional electrical engineer/spectrum planner, two radio consultants, three project managers, one administrative assistant and one sales manager. Individual consultants and field project managers are located in Topeka, Kansas; Kansas City, Missouri; Tallahassee, Florida; Tampa, Florida; New York; Lancaster, Pennsylvania; St. Louis, Missouri; Nashville, Tennessee and Decatur, Georgia.

The firm's current service area is broken down into the following regions: Midwest; Northeast; Gulf Coast and Southeast. Each of the three regions is staffed by a regional manager who reports directly to the firm's principal. The distributed nature of the firm, coupled with the simple fact that much of our consultants' work is in the field, requires the use of secured/hardened data management resources, ad-hoc video conferencing and cloud computing.

Owing to the scope and complexity of this project, the work would be contractually administered by the Covington office with overall oversight performed by the firm's principal. On-site field activities within Orange County would be guided by the assigned TUSA Project Manager, Bob Sutphen. Further information on proposed technical resources is included in Section 4.C "Staff Qualifications" and the project plan is contained in Section 4.F "Project Schedule and Work Plan" of this Proposal Submittal.

### Experience and Qualifications

Tusa Consulting Services is a recognized industry leader in public safety communications consulting<sup>1</sup>. The firm has designed, procured, and implemented public safety radio systems throughout the United States for more than 24 years. In addition, we have a strong history of performing needs assessment studies that evaluate, quantify, and provide prioritized recommendations for planning, operations, technology, and infrastructure. We have done this for a wide variety of clients at the state and local level.

TUSA has years of experience in designing and implementing trunked systems similar to the VIPER radio system and to the scope of work that Orange County is seeking in this RFP. For example, the State of Louisiana has the largest P25 radio system (LWIN) in the Country (i.e., 136 sites and over 70,000 radio users), and it is structured very similarly to VIPER's system. Some entities use the LWIN system as their primary mode of communications, while others use it as a backup communications tool. Other entities have chosen to come onto the LWIN system and add infrastructure to satisfy Parish (County) in-building

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<sup>1</sup> Mission Critical Magazine conducted an independent survey of the nation's public safety radio and 9-1-1 consulting firms in Year 2012 and ranked Tusa Consulting Services as a Top 21 Consultant.

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coverage needs and expectations. TUSA is currently assisting St. Tammany Parish's migration on to the LWIN system by adding 8 additional RF sites as a simulcast cluster and 18 channels onto the state's system. This \$16M project is a win-win for the State of Louisiana and St. Tammany Parish as this partnership improves coverage and interoperability throughout an area that is highly susceptible to hurricanes and flooding.

TUSA has extensive experience working with ALL public safety radio manufacturers, including EF Johnson, Harris, Icom, Kenwood, Motorola, and Tait. We know all of the pros and cons of each radio system vendor and how to mitigate each through in-depth specifications development, contract negotiations, and implementation oversight. Our vendor neutral approach to system design, procurement, and installation allow us to ensure that our customers receive a system that will best support the first responders on the street – and ultimately, Orange County's citizens.

### **Understanding RFP Tasks**

The Orange County, NC Purchasing Department is seeking a qualified public safety radio communications consultant to perform a study of voice and paging communications for a countywide interoperable radio system designed to meet short and long term needs for all County agencies. This needs assessment would initially explore and assess the current County radio system's coverage, capabilities, and infrastructure. It would encompass and present options for modernization and upgrade of the current radio system, as well as a transition plan supporting migration to the new system, and a comprehensive cost analysis.

The proposed study will, at a minimum, include the following:

1. Presentation of upgrade options, to include infrastructure design, propagation studies, procurement scope, and cost estimates, to the review committee for selection;
2. Develop a comprehensive cost analysis based on the approach selected by the review committee;
3. Develop a comprehensive transition plan to support conversion from the old system to the new system while minimizing impact to the user and with zero system downtime;
4. Develop a vendor-neutral Request for Proposal (RFP) based on in-depth system specifications designed to minimize vendor "wiggle room" and to facilitate smooth contract negotiations.
5. Provide a comprehensive evaluation of received RFP responses.

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As outlined in the RFP, TUSA acknowledges that the following work will be performed during this project:

1. Meet with management personnel and system users to develop needs assessment;
2. Gather operational, functional, and technical data regarding existing sites and all user agencies that provide emergency services within Orange County. This may include agencies outside of the County that provide support within County limits;
3. Analyze interoperability needs, including gateway and/or P25 ISSI needs, of all agencies providing emergency services to Orange County that would not be served by proposed new system;
4. Perform coverage analysis of new system with intention of providing countywide coverage including potential new sites;
5. Develop in-depth transition and cutover plan;
6. Submit recommendation for a procurement approach based on selection committee review and approval of upgrade option;
7. Development of vendor-neutral RFP;
8. Provide support to the County during the procurement process, to include evaluation of vendor proposals;
9. Provide CAD drawings as required to support the project;
10. Develop budgetary costs for each proposed alternative, and assist review committee with acquisition and implementation.

**Distinguishing Characteristics of Tusa Consulting Services**

Without question multiple radio consulting firms will respond to this RFP. It is a major project for Orange County and we certainly recognize the importance in gaining the best and most radio communications system, both short and long term. The following may be helpful to you in assessing our approach and the value we can bring to this assessment and design initiative:

1. TUSA has successfully completed dozens of P25 modernization projects for clients. These projects involved the same types of user assessment, infrastructure review, planning and design, budgetary analysis, and procurement support as required for Orange County. By leveraging the experience and lessons learned over the past 24 years, our team is positioned to hit the ground running and we are appropriately staffed to achieve RFP objectives and deliverable milestones.

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2. TUSA personnel are knowledgeable and are directly engaged in the FirstNet broadband initiative and its likely integration with traditional public safety radio technology. Our senior consultant, Jeya Selvaratnam, is currently assisting the State of Louisiana as it plans for the eventual implementation of this national broadband initiative throughout the State of Louisiana. In addition, TUSA assisted the City of New Orleans in conducting a 6-month field trial of LTE broadband technology that coincided with the NFL 2013 Super Bowl held in New Orleans. This future FirstNet initiative will likely influence the long term sustainment of WISCOM and TUSA personnel understand the risks and opportunities that initiative might bring to the State.
  
3. TUSA's Operations Expert, Dean Hart, has worked on multiple state systems, and is familiar with the challenges that Orange County faces. Dean has been involved in the public radio industry first as the manager of Kansas City, Missouri's expansive radio service department and later, as a former M/A-COM Field Service Manager, supported the installation and maintenance of the Florida SLERS 164-site initiative. Dean later moved to Motorola Solutions as a Project Group Manager who supervised the implementation of Virginia's STARS and Missouri's MOSWIN statewide P25 networks. Both the Virginia and Missouri statewide P25 radio networks are configured similarly to VIPER as each shares 800MHz coverage and capacity within urban areas. Dean fully understands the special management, operational and functional characteristics of multiband shared-resource networks and will provide that knowledge to this project in support of the project manager.
  
4. TUSA personnel have successfully identified and cured configuration and interference deficiencies within multiple VHF, UHF, and 800 MHz trunked/simulcast systems. If such problems exist here in Orange County, we can apply lessons learned to derive cost effective and technically comprehensive solutions.
  
5. Unlike for most other firms, Tusa is the owner's name. In this business, reputation and follow-through on commitments is Job-One. You have Dominic Tusa's personal commitment that TUSA will aggressively apply the resources and personnel necessary to successfully complete this project's scope of work, to the full satisfaction of County personnel.

## ORGANIZATION CAPABILITIES

Tusa Consulting Services II, LLC

Dominic (Nick) Tusa  
Principal Consultant/ Owner  
75757 Highway 1082  
Covington, LA 70435  
Phone: 985-249-6467  
Mobile: 504-400-8873  
[www.tusaconsulting.com](http://www.tusaconsulting.com)

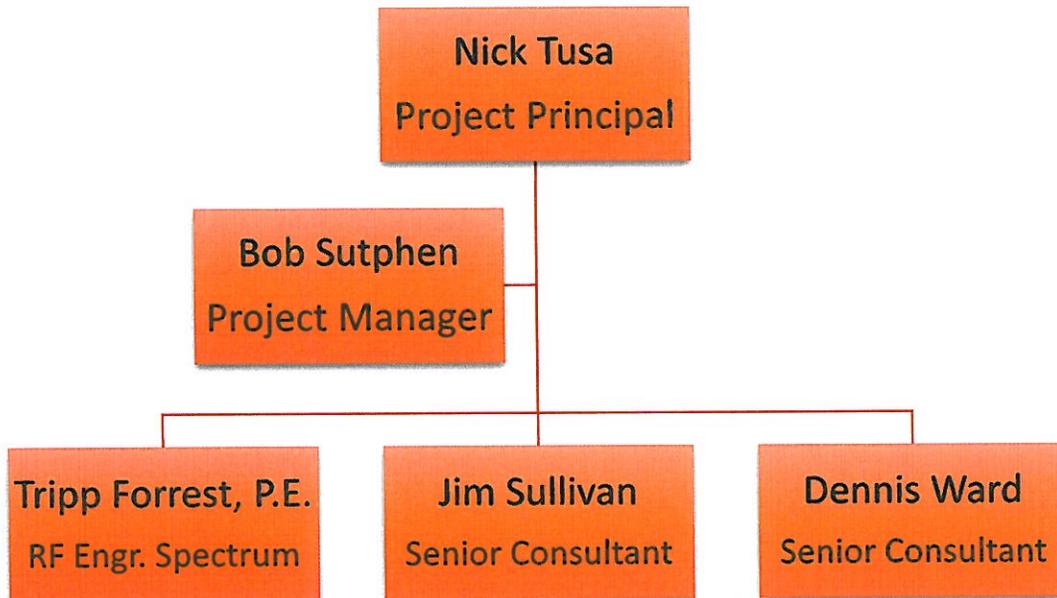


## STAFF QUALIFICATIONS AND FACILITIES

A public safety radio modernization project with the scope and importance that Orange County is planning demands the highest caliber of professional personnel and businessmen who thoroughly understand the technologies involved and have a solid record of successful system designs and deployments. Each of the people identified herein have successfully completed radio network designs and implementations, both large and small.

There are no novices here. Everyone included on this list is an accomplished public safety radio system expert and is capable of fully supporting your project's mission to a successful conclusion.

The following illustrates the TUSA Team assembled for Orange County, North Carolina:



## Background Overview

### **Dominic (Nick) Tusa – Project Principal Advisor**

Principal-founder of the firm, Dominic (Nick) Tusa would serve as the team's Project Principal for this radio modernization project. Nick Tusa will provide oversight and assistance to the engineering team's frequency planning activity, infrastructure/user equipment audits, statement of work development, coverage modelling, interference mitigation, reliability and conceptual solution development.

A resident of Covington, Louisiana, Nick Tusa is a 1975 graduate of Tulane University and has a Bachelor of Science degree in Electrical Engineering. He also holds an FCC commercial General Class radio license and is a licensed Extra Class amateur radio enthusiast (K5EF).

Drawing from a professional career span of 37 years involving virtually every aspect of public and private radio communications (HF-SSB, analog and digital radio systems, public safety and commercial analog/digital paging, private microwave, voice and data, multiplex and telephony signaling systems), Mr. Tusa has a documented record of successful, high performance public safety radio solutions.

### **Robert (Bob) Sutphen – Project Manager**

**Area of Expertise:** Radio/Microwave System Design, Fire Alerting Systems, RFP Development, Proposal Evaluations, Vendor Selection, Contract Negotiations, Implementation Management, Acceptance Test Verification, Dispatch Center Design.

**Years with TUSA:** 4 Years

**Experience in Wide Area Radio Systems:** 35+ Years

Bob Sutphen has extensive experience working with public safety agencies across the United States and in Columbia, South America. State side clients were located in the States of California, Ohio, Missouri, Illinois, Indiana, Georgia, Florida, Virginia, Louisiana, Maryland and Nebraska.

Bob began his consulting career with the State of Florida assisting the Law Enforcement agencies in statewide system upgrades via LEAA grants to reduce interference in the VHF Low and High bands and UHF conventional repeater systems. As systems evolved over time, analog, simulcast, trunking came along in the 80's followed with digital, simulcast, trunking in the 90's and finally today a uniform system design can be achieved using P25 Phase I and II systems. The key vendors in this evolution were G.E. (that sold its radio business that in turn was sold from vendor to vendor to what is now owned by Harris) and Motorola-Solutions while other vendors such as Tait, Airbus and EF Johnson/Kenwood have likewise entered and have achieved market growth within the P25 open standards environment. Mr. Sutphen has evaluated these various types of systems throughout his career, gaining a wealth of practical experience and best-practices knowledge along the way.

### **Jack (Tripp) Forrest, PE – Project Engineer/Spectrum Manager**

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**Area of Expertise:** Project engineering, propagation analysis, spectrum management and acquisition, FCC licensing, large scale system management, interference mitigation, intermodulation.

**Years with TUSA:** 6 Years

**Experience in Spectrum Acquisition and Licensing:** 10+ Years

Responsible for propagation analysis and FCC licensing, upon joining TUSA in 2011 Tripp has created *EZ-Spectrum™* which is a proprietary software tool that can be used to “find” licensable radio channels from within the FCC’s extensive licensing database. *EZ-Spectrum™* analyzes frequencies to determine if they have any potential for interference to, or from, neighboring FCC-licensed systems and can determine the suitability of channel sets for simulcast designs, combiner schemes, etc. For more information please visit [www.ez-spectrum.com](http://www.ez-spectrum.com).

Tripp served as a lead engineer on the State of Florida’s Statewide Law Enforcement Radio System (SLERS) from 2007 through 2011. This system encompasses 211 radio towers and 22,000 users operable on the statewide system. Since 2011, Tripp has served as a Tusa project engineer on numerous radio communications projects ranging in value from \$10,000 to \$80M.

Jack Forrest is a registered professional electrical engineer licensed to practice in numerous states including the State of North Carolina (P.E. Registration #040642).

**Jim Sullivan – Project Consultant**

**Area of Expertise:** Radio and Microwave System Design, RFP Development, Implementation Management.

**Years with TUSA:** 1.5 Years

**Experience in Wide Area Radio Systems:** 30 Years

Jim specializes in the design of large radio systems, radio propagation analysis, and has in-depth experience with the installation of complex radio systems. Prior to TUSA, Jim worked as a subcontractor for Naval Air Systems Command (NAVAIR), involved in the design and implementation of a \$100M VHF Simulcast trunked radio system, inclusive of distributed antenna systems (DAS) in each of the Capitol’s massive buildings. Jim’s prior activities include drafting of the Capitol Police’s radio system Operational and Maintenance manuals; the Prince William County 800 MHz system; the Overlay Regional Interoperability Network (ORION) in Virginia; Fairfax County, Virginia’s 800 MHz radio system; and an independent analysis on the State of New York’s failed 800 MHz OpenSky radio system.

While overseas, Jim worked with Anadarko Oil of Algeria, Occidental Oil of Colombia, South America, Cities Services Oil and Gas and the Missouri Pacific Railroad installing and maintaining radio communications systems in some of the most dangerous parts of the world. Jim has also developed an MS Access program for inventory management of all radios deployed in systems. This program

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includes tracking of serial numbers, assignments to individuals, radio-programming configurations, talk groups, total system talk groups and other features.

In addition to the inventory management program, Jim has also developed software used to ensure the health of a radio system's loading capacity.

As the proposed Project Consultant, Jim will assist in the analysis of technical compliance/viability of vendor proposed solutions and the subsequent findings report development. If this contract carries into system implementation, the Project Consultant role would expand and include participating as a technical advisor during the selected radio vendor's customer design review meetings and would provide oversight of critical equipment factory staging, functional test processes and radio coverage assessment of the vendor's fielded/installed radio system.

**Dennis Ward, PMP – Project Consultant**

**Area of Expertise:** Project Management, Risk Management, Quality Management, RFP Development, Proposal Evaluations, Vendor Selection, Contract Negotiations, Implementation Management, and Acceptance Test Verification.

**Years with TUSA:** 4 years

**Experience in Wide Area Radio Systems:** 20+ Years

Dennis Ward is a seasoned project manager with over 20 years of public safety experience. Mr. Ward began his career with M/A-COM (now Harris Corporation) and was responsible for overseeing numerous projects in the Commonwealth of Pennsylvania, including projects with the Governor's Office, Department of Transportation, State Police, Department of Health, Department of Military and Veterans Affairs, Office of Attorney General, Office of Inspector General, Probation and Parole, and the Pennsylvania Emergency Management Agency. These projects dealt directly with deploying radio equipment for the Commonwealth of Pennsylvania's Statewide 800 MHz Public Safety Radio System.

Mr. Ward also recently completed a challenging, multiyear P25 modernization project for Lancaster County, Pennsylvania that included four simulcast clusters, 24 tower sites, and a complex transition that brought 80 Fire Departments, 35 Police Departments, and 20 EMS Agencies on to a new Countywide radio system. Mr. Ward brings PMI's best practices to Orange County, and specializes in risk management and quality management.

# Proposed Project Staff

## Dominic F. Tusa

### Profession

Principal for Tusa Consulting Services (TCS), specializing in the design and implementation of public safety communication systems. Drawing from a professional career span of 35 years involving virtually every aspect of public and private radio communications (HF-SSB, analog and digital voice FM radio systems, private microwave, multiplex and telephone signaling systems), Tusa has a documented record of successful, high performance radio solutions. Recently, this expertise was put to the ultimate test when three radio networks designed by Tusa were subjected to the force and destructive power of Hurricane Katrina. Katrina proved to be one of the worst natural disasters to impact the United States, and all three TCS designed radio networks operated during and after the storm's passage.

### Experience

#### 1992 - Present: Tusa Consulting Services – Covington, Louisiana

##### Principal Consultant

- Provided private microwave design services to Exxon Company, USA
- Completed 25 public safety radio systems valued at over \$310M
- 800MHz rebanding support to 44 TCS clients
- Development of TCS process standards
- Provide radio consultant services to private and municipal agencies
- Trial expert—ComNet (CNE) v. Tyco. Provided key technical services and trial testimony instrumental in \$126MM judgment award to ComNet
- Expert in design and implementation of VHF, UHF, 700/800 MHz P25 simulcast solutions

#### 1985 - 1992: Crescent Radio Electronics, Inc. – Metairie, Louisiana

##### Co-Owner

- Start-up radio service and product development firm
- Provided contract radio engineering services for Exxon Company, USA
- Designed and implemented voice radio systems for Chevron
- Developed digital modulators for private carrier for Chevron
- Developed base/repeater station controllers for oil industry use

#### 1980 - 1985: CSM/EB Communications, Inc. – Lafayette, Louisiana

##### Contract Radio Engineer

- Designed/implemented HF-SSB Shore Station
- Developed signaling system for Gulf Oil M/W Network
- Implemented M/W modernization project for Gulf Oil
- Developed UHF point-to-point radio telephone systems
- Designed/implemented helicopter flight-following radio systems

### Articles Authored

- Options for Funding Your Radio Network – Digital Radio in the Americas” (Mission Critical Magazine Educational Series, December 2014)



### Key Clients

- New Bern, NC
- West Palm Beach, FL
- New Orleans, LA
- Kansas City, MO Region
- Mobile, AL
- Harrison County, MS
- St. Tammany Parish, LA
- ComNet Communications

### Key Qualifications

- Simulcast Network Design
- P-25/EDACS/ASTRO
- VHF/UHF Conventional
- Project Management, RF
- Coverage Designer
- Antenna System Specialization
- Network Evaluation Studies
- Trial Expert – RF Comm/Propagation

### Education

BSEE Tulane University

### Interests

- Amateur radio operator and experimenter (K5EF)
- Fabrication of HF no-tune amplifiers using proprietary power coupling devices
- Restoration and collecting of antique radio devices

### Awards

- Energy Telecommunications and Electrical Association (ENTELEC) Silver Scribe Award
- Co-Recipient of Gulf Oil's Outstanding Achievement Award for 1983

### Presentations

- Propose to Win– How to Structure Winning Radio System Proposals, presented in 2014 to Motorola Solutions, Inc., EF Johnson, Inc., Tait Communications, Inc., Williams Communications, Inc., Communications Int., Inc.

# Proposed Project Staff

- "Tips to Avoid Sole Source Procurements" (*Mission Critical Magazine*, October 2011)
  - "Tips to Mitigate P25 Security Concerns" (*Mission Critical Magazine*, August 2011)
  - "Trunked Radio Communications" (*Radio Resource Magazine*, July 2005)
  - "In Building Coverage" (*Radio Resource*, March 2003)
  - "How Kansas City Achieved In-Building Radio Coverage" (*Radio Resource*, March 2003)
  - "Reliable Radio Interoperability in the Big Easy" (*Public Safety Communications*, December 2002)
  - "A Structured Approach for the Procurement of Radio Communication Systems" (*APCO Bulletin*, Oct/Nov/Dec 1996)
  - "Choosing a Consultant" (*APCO Bulletin*, September 1995)
  - "Safe Operation of Electro-Explosive Devices in RF Environment" (*ENTELEC News*, February 1991)
- *High Frequency Radio Systems: Their Role in Disaster Communications*—APCO 2011 National Conference, Pittsburgh, PA
  - *Radio Survivability: Lessons Learned from Hurricane Katrina*—APCO 2006 National Conference, Orlando, FL

# Proposed Project Staff

## Jack "Tripp" Forrest

### Profession

RF Engineer/Consultant for Tusa Consulting Services. Drawing from the experience gained as the lead engineer for State of Florida 800MHz Public Safety Radio Systems, Forrest is responsible for frequency coordination and interference mitigation.

### Experience

#### 2011 - Present: Tusa Consulting Services

##### Consultant

- Subject matter expert for Thorp Reed and Armstrong
- Radio system design and simulcast system optimization
- System implementation overview and Supervision
- Custom software development
- Assistance with interference resolution
- Subject matter expert for 700/800 MHz frequency coordination
- Awarded Professional Engineer (P.E.) designation, 2011
- Created Google Earth based frequency planning software tools
- Created Google Earth based site acquisition software tools
- FCC licensing for experimental technologies
- Spectrum planning and FCC licensing expertise

#### 2007 - 2011: State of Florida – 800MHz Frequency Coordinator

##### Software Tool Designer for 800MHz Communications

- Spectrum Manager – Statewide Law Enforcement Radio System (SLERS)
- Co-Author and Manager of the Florida Region-9 Interference Program (FRIP)

#### 2006 - 2007: Hines Hartman

- Commercial power and lighting system design
- AutoCAD drafting

#### Professional Engineer Registration States and IDs

- |                       |                           |
|-----------------------|---------------------------|
| • Alabama - 32979     | • Mississippi - 20912     |
| • California - 20326  | • Missouri - 2012025236   |
| • Colorado - 0046760  | • New York - 090642       |
| • Florida - 73039     | • North Carolina - 040642 |
| • Georgia - 037311    | • South Carolina - 30087  |
| • Kansas - 22544      | • Tennessee - 116020      |
| • Louisiana - 0037345 | • Texas - 112096          |

### Education

BSEE – Florida State University

- Specialization in RF
- Specialization in Digital Communications
- National Merit Scholar, 2001

### Awards

- E.I.T. Designation, 2007
- P.E. Designation, 2011



### Key Clients

- Sumter County, FL
- City of Kansas City, MO
- City of New Bern, NC
- Harrison County, MS
- Hancock County, MS
- Wagoner County, OK
- City of Broken Arrow, OK
- City of New Orleans, LA
- St. Tammany Parish, LA
- Lee County, GA
- Gordon County, GA
- Floyd County, GA
- Mobile County, AL
- West Palm Beach, FL
- Washington County, WI
- Hot Springs, AR
- EF Johnson
- Janus Spectrum
- Harris Corporation
- Communications International
- Thorp, Reed and Armstrong

### Key Qualifications

- 700/800MHz Radio Systems
- P-25/EDACS/ASTRO
- Florida Interoperability Network
- 800MHz Spectrum Manager
- FRIP Co-Author and Manager
- VBA Excel
- Visual Basic 5
- Visual Basic.Net
- Visual Studio 2010
- SQL

### Interests

- Amateur Radio – AJ4GE
- Member of MENSA
- Real Estate Investing

# Proposed Project Staff

## James E. Sullivan

### Profession

Drawing from a professional career span of over 40 years of management and technical leadership provided to private energy / transportation industries, federal, state, and local government clients in developing system's needs assessments, design, acquisition, contract negotiations, and implementation management of Land Mobile Radio (LMR). Core competencies include project management, systems engineering design, contract enforcement, systems implementation management, and mentoring in the private, DoD and public safety sectors.

### Experience

#### 2009-2014: ManTech International

*Senior RF Engineer*

- Major contributor to a VHF trunking system design
- Major contributor to an in building VHF DAS system design
- Provided hands on support for system implementation, coordination and testing

#### 2008-2009: Federal Engineering

*Senior Consultant*

- Provided support for evaluation of the State of New York 800 MHz OpenSky trunked radio system
- Provided support for the enhancement and expansion of the ORION trunked radio system in the Hampton Roads area of Virginia

#### 2008-2009: Fairfax County Government

*Radio System Manager*

Provided technical hands on and engineering support of the Fairfax County 800 MHz trunked radio system

#### 2004-2007: Prince William County Government

*County Telecommunications Engineer*

Provided technical hands on and engineering support of the Prince William County 800 MHz trunked radio system

### Prior Experience

- Designed and implemented HF radio systems for oil exploration and production
- Designed and implemented microwave systems for oil exploration and production
- Designed and implemented voice and data transmission systems with several different physical media and protocols



### Key Clients

- Naval Air Systems Command / Special Communications Requirements Division, MD
- U.S. Capitol Police, Washington
- Statewide Wireless Network, NY
- Overlay Regional Interoperability Network (ORION), VA
- Fairfax County, VA
- Prince William County, VA
- Anadarko Oil of Algeria
- Occidental Oil of Colombia SA
- Cities Service Oil and Gas, OK
- Missouri Pacific Railroad, AR

### Key Qualifications

- HF Radio system Design
- VHF LMR Conventional / Trunking Design
- 800 MHz LMR Conventional / Trunking Design
- UHF Conventional Design
- Public Safety Radio System Design
- Oil Exploration and Production Radio System Design
- P-25/ASTRO/ OpenSky
- RF Coverage Design
- Project Management
- RF DAS Coverage Design
- Antenna System Design
- Point to Point Microwave Design

### Education

- BS Aviation Northeast Louisiana University
- Specialized Vendor Equipment Schools
- Marine Corps Technical Schools

### Interests

Electronics, Fishing, Astronomy, Shooting

# Proposed Project Staff

## Dennis Ward, PMP

### Profession

Seasoned Project Manager for Tusa Consulting Services (TCS), specializing in the design and implementation of public safety communication systems. Drawing upon the experience gained from M/A-COM (now Harris), and as a principle consultant for MWF Enterprises, Inc., Mr. Ward has worked directly with public safety for over 20 years in overseeing the implementation of complex, hardened radio networks. He brings with him a wealth of knowledge infused with public safety experience that relies heavily on PMI's best practices, ensuring project success!

### Experience

#### 2013 - Present: Tusa Consulting Services – Covington, Louisiana

##### *Project Manager Consultant*

- Project Manager for Lancaster County, PA – Currently overseeing the deployment of the County's 26 million dollar, 24 site P25 radio network.
- Project Manager for Emergency Health Services Federation – Currently overseeing several communication projects for the Federation, including the licensing of the interleave frequencies of the med radio system for eight counties.
- Project Supervisor for Auburn, ME – Currently overseeing Phase I of a three phase project that includes system assessment and user interviews.

#### 2005 - 2013: MWF Enterprises, Inc. – Lancaster, Pennsylvania

##### *Principle Consultant*

- Project Manager for numerous public safety projects, including work with the Commonwealth of Pennsylvania.
- Performed narrowbanding work for numerous MWF clients, including a project for the South Central Task Force that required coordinating with 16 counties, 4 task forces, and 2 states.
- Performed rebanding work for several MWF clients, including Lancaster County, Pennsylvania.
- Oversaw the development of over a hundred training videos for numerous clients, including Hartford, CT and Waterbury, CT.

#### 1999 - 2005: M/A-Com & Com-net Ericsson – Harrisburg, Pennsylvania

##### *Site Manager*

- Managed the statewide deployment of 5,000+ radios with a value of approximately \$12M over two years.
- Managed the day-to-day activities of 5 Field Technicians and 3 Subscriber Staging Technicians that reported directly to me.
- Managed the deployment of control station radios in 198 hospitals statewide within a 3-month time period for the Department of Health.
- Managed the deployment of 80 control stations in every 911 facility across 67 counties for the Pennsylvania Emergency Management Agency.
- Managed the deployment of 1,100 mobile radios in every PennDOT vehicle in 14 southeastern counties within a 4-month period for the Pennsylvania Department of Transportation.



### Key Clients

- Lancaster County, PA
- Auburn, ME
- Lewiston, ME
- South Central Task Force, PA
- Emergency Health Services Federation, PA

### Key Qualifications

- Project Management
- Needs Assessment
- Risk Management
- Specification Development and Scoring
- Implementation Oversight
- Acceptance Testing
- Coverage Testing
- P-25/EDACS/ASTRO

### National Speaker

- 2015 APCO International
- 2016 IWCE

### Video Production

- Training Videos
- Educational Videos
- Promotional Videos
- Recruitment Videos
- Live Event Videos

### Education

- University of Kansas - BGS in Communication Studies
- Liberty University - Masters Degree in Christian Leadership Studies

# Proposed Project Staff

## Robert W. Sutphen

### Profession

Drawing from a professional career span of over 50 years of management and technical leadership provided to acquisition, contract negotiations, and implementation management of Land Mobile Radio (LMR) systems. Core competencies include program management, FCC Licensing, business development, systems engineering design, contract negotiations, systems implementation management, and mentoring in the private, DoD and public safety sectors.

### Experience

#### 2013 – Present: Tusa Consulting Services – St. Louis, MO

##### Consultant

- Implementation management of 700/800 MHz P25 Phase II Simulcast Radio System
- Following execution of the contract between the client and vendor, equipment reviews resulted in no cost vendor upgrades of towers, shelters, generators and radio & microwave antennas that were found to be non-compliant

#### 2011-2012 – RCC Consultants, Inc. – St. Louis, MO

##### Managing Director

- Managed the RCC team supporting the St. Louis UASI Clients' \$130M, 800 MHz P25 3-County Simulcast Radio System providing tri-county seamless roaming
- Revised the vendor's project schedules into a set that met realistic timelines
- Team provided narrowband support for 200 licensees in St. Louis UASI, MO

#### 2009-2010: ManTech

##### Principal RF Engineer

- Provided simulcast theory and design technology to prime contractor team
- Provided inputs to prime contractor that a competitive COTS VHF 14-Channel DAS RFP was not possible
- Recommended client become member of Region 20 then use 700 MHz that was operational in many of the Capitol complex buildings

#### 2006-2009: BearingPoint

- Account Manager - 800 MHz Transition Administrator
- IT Project Manager - New Police Department in South Florida

#### 1992-2006 – RCC Consultants/OMNICOM Consultants Vice President

Needs assessments, comprehensive plan, vendor RFP, pre-bid conf., proposal evaluations, negotiations, vendor-client contract, system implementation management for VHF/UHF/700/800 MHz Land Mobile Radio (LMR); CAD and MDC; E-911 and Communications Centers

### Education

- BSEE University of Alabama
- Air Force Air Command and Staff College



### Key Clients

- 800 MHz Transition Authority Rebanding Licensees, nationwide
- Clayton Co., GA
- Independence, MO
- U.S. Capitol Police, Wash., D.C.
- UASI St. Louis Area, MO & IL
- Gainesville Regional Utilities, FL
- Tallahassee, FL
- Genesee Co., MI
- Cincinnati, OH
- State of Ohio
- State of Nebraska
- Orange Co., FL
- Miami-Dade Co., FL
- Lowndes Co., GA

### Key Qualifications

- FCC Licensing
- Contract Negotiations
- Implementation Management
- Comprehensive Communications Plans
- Communications System Vendors' Bid Evaluations
- VHF/UHF Narrowbanding
- 800 MHz Rebanding
- Conventional/Simulcast Multi-Network Designs
- P-25/ASTRO/ EDACS
- VHF/UHF Conventional
- Project Management, RF & IT
- RF Coverage Design
- Antenna System Specialization
- City/County/State Radio Design

### Interests

- Amateur Radio Lic. KDOMQD

## QUALIFICATIONS AND FACILITIES

### **TUSA = System Reliability 24/7/365**

TUSA's heritage derives from the hostile offshore Gulf of Mexico environment where hardened communications networks are essential in the petrochemical industry. TUSA adopted those proven techniques and successfully applied them to public-safety radio networks. No other consulting firm has the experience and tested record in designing highly resilient radio networks built to survive and remain operational during the worst environmental conditions. For example, TUSA designs have withstood ice storms in Kansas City, Missouri; Hurricane Katrina in locations throughout coastal Louisiana/Mississippi and tornadoes in Floyd County, Georgia.

TUSA personnel hold engineering degrees from some of nation's best colleges of engineering and business management. Others have decades of frontline field implementation and system maintenance experience, thereby knowing how to field your new system right the first time.

### **TUSA Core Competencies**

TUSA's expertise spans land-mobile radio design, infrastructure deployment, microwave transport and network integration, wireless broadband, interoperable solutions and navigating regulatory challenges.

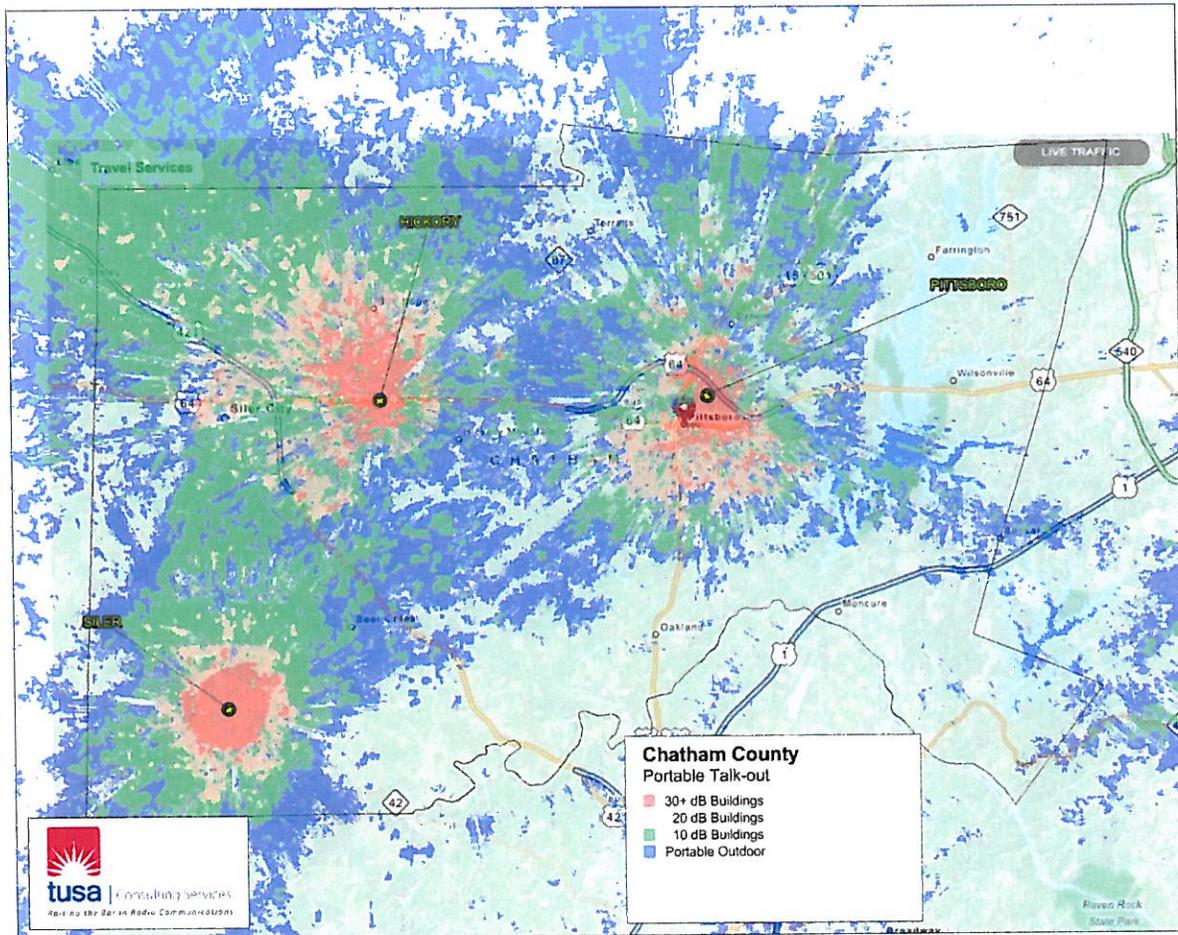
Communications networks for public safety have evolved into highly complex, multi-faceted networks offering public safety more choices, enhancements in safety and operational efficiencies and better management tools. However, all the same challenges such as reliable coverage, protection from harmful interference, interoperability and implementing resilient networks remain and still represent the core requirements of any public safety/local government radio system. TUSA has developed proprietary tools and processes that assure a successful outcome, which equate to mission-critical reliability and satisfied system users.

Key to radio system planning is development of solutions that meet Industry-recognized coverage and audio quality requirements and, most importantly, user expectations. TUSA utilizes two propagation modelling tools to assess radio coverage: Com-Site Design and RAPTR. Both employ an interactive graphical user interface that allows our designers to map the gains/losses associated with sites, antenna types, base station configurations, tower-top preamplifiers, antenna heights/orientations, and transmission lines in a manner that can visually depict portable and mobile radio coverage.

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The following example is a visual representation of a TUSA coverage modeling prediction for one of Orange County's 800 MHz VIPER radio channels as used by County agencies. This three-site coverage map was developed using information contained on the FCC's Universal Licensing System's database. The dark blue colored area depicts on-street portable radio coverage for an audio quality level of DAQ 3.4, as recommended by EIA/TIA TSB-88C. The other colors depict losses for residential, medium commercial and heavy/dense commercial structures (19db, 20db and 30db loss factors, respectively).

Figure 1: Outdoor Portable Radio Talk-Out (Base-to-Portable) Coverage (800MHz)



The next map depicts portable radio talk-in coverage. In this case, a portable radio user's ability to communicate back to the three distant tower sites is depicted for each of three building loss factors. Note that the covered area depicted between these Talk-In versus Talk-Out maps is very different. The difference is due to the low transmitter power of the UHF portable radio as compared to the of the base station site (5 watts versus 100 watts). In order to better Talk-In versus Talk-Out coverage balance for VHF and UHF radio systems, a technique termed *receiver voting* is often used. While

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receiver voting is also used on 700/800MHz simulcast systems, it is for an altogether different purpose (receive-path diversity) as Talk-in/Talk-Out balance is typically achieved in that spectrum via tower-top receiver preamplifiers and appropriate signal filtration.

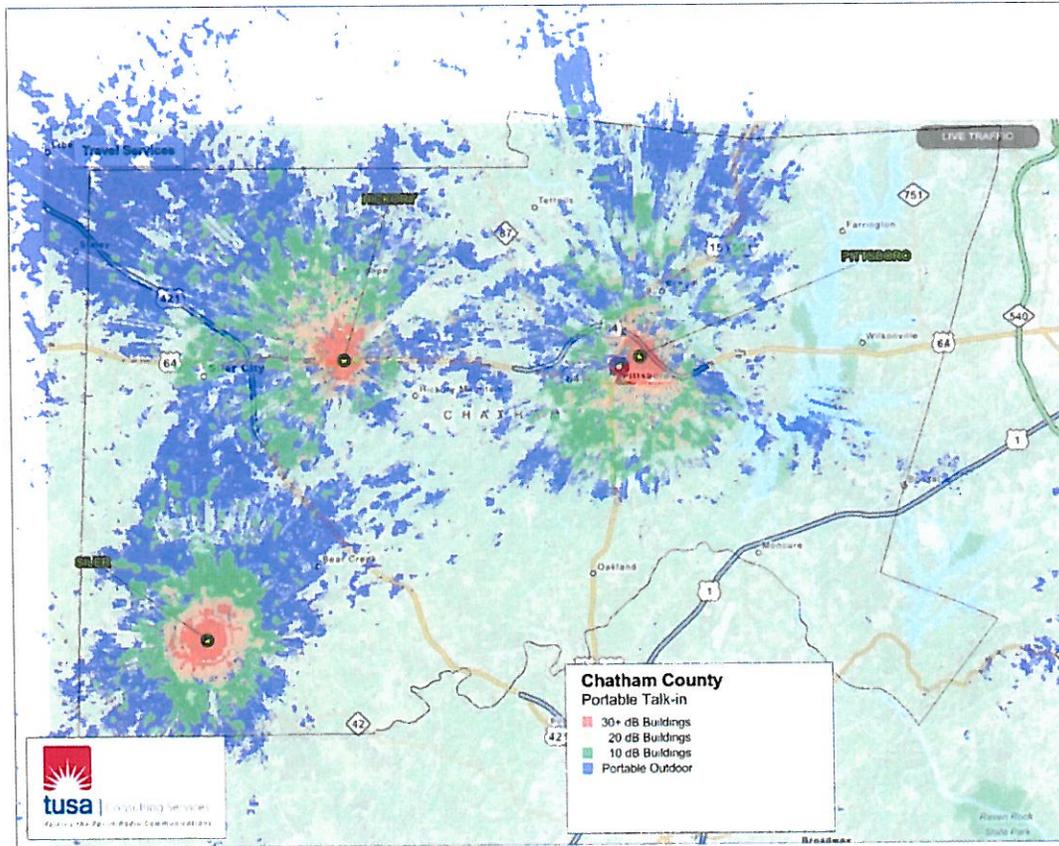


Figure 2: Outdoor Portable Radio Talk-In (Portable-to-Base) Coverage (800MHz)

It is one thing to predict radio coverage. It is another to confirm coverage and to possess the ability to calibrate propagation modelling software to a client's local environment. Using specialized test equipment, TUSA can measure signal level performance from specimen systems within a jurisdiction's area and, using that information, calibrate the model's environmental loss characteristics to actual local conditions. By so doing, TUSA coverage predictions would very closely parallel those of a constructed system, which translates into less implementation risk and ultimately the construction of radio systems that reliably meet user expectations.

### Project 25 System Experience

The public safety community is quickly moving away from proprietary radio technologies and is adopting open standard solutions, principally involving Project 25 voice and data services. Orange County is likewise considering such a technology migration as mentioned in its Request for Proposals. However, the standards for P25 networks, inclusive of network connectivity and infrastructure sharing continue to

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evolve, thereby making the issue of demonstrated experience and adherence to best practices even more acute.

Tusa Consulting Services (TUSA) was one of the first consulting firms to embrace the Project 25 (P25) standards as a mechanism to create truly competitive radio procurements and deliver more value for government and public safety entities. Figure 1 below shows our firm’s full P25 system implementation experience. Several of these projects, such as Kansas City, Missouri, St. Tammany Parish, Louisiana and Mobile County, Alabama involved technology migrations from either conventional VHF/UHF repeater or Project-16 analog trunking to Project 25 operation.

Understanding P25 standards, the P25 Compliance Assessment Program (P25 CAP) and the roadmap for new features in P25’s evolution must not be taken lightly. TUSA personnel regularly attend training on the new developments in the P25 standards and continually research each primary vendor’s capabilities in reference to compliance to these evolving standards.

*Figure 3: TUSA Project 25 System Experience*

Agency	Assessment	Design	Spec Dev	Implementation	Notes
Ada, ID	x	x	x		Concepts Implemented Successfully
Bay County, FL	x	x	x	Pending	Procurement Underway
Bonneville County, ID	x	x	x		Completed
Boston, MA	x				P25 Study, Initiated 2015
Cass County, MO	x	x	x	In Progress	
Clayton County, GA				Completed	800 MHz P25 Phase II
Crawford County, KS	x				Completed
Dubois County, IN	x	x	x		Procurement Underway
Floyd County, GA	x	x	x	Completed	Completed
Franklin, TN				Completed	Prior Consultant Released by Owner
Genesee County, MI	x	x	x	Completed	800 MHz ASTRO Digital
Gladstone, MO	x	x	x	Completed	800 to P25 Completed
Grandview, MO	x	x	x	Completed	800 to P25 Completed
Independence, MO	x	x	x	Completed	First 700 MHz P25 system in Nation
Hialeah, FL	x	x	x	Pending	800 to P25. Awaiting Funding
Jackson County, MO		x	x	In Progress	System Enhancement
KCMO, MO	x	x	x	Completed	800 to P25 Completed
Lancaster, PA	x	x	x	Completed	T-Band UHF; 24 sites/ 4 Simulcast Cells

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Liberty, MO		x	x	Completed	Completed
Miami Beach, FL	x	x	x	Pending	800 to P25 Completion est. 1 <sup>st</sup> Qtr. 2017
Mobile County, AL	x	x	x	In Progress	700MHz Phase 2 - 11 Site Simulcast
MSU, MS	x	x	x	Completed	800 to P25
New Bern, NC			x	Completed	Replaced Previous Consultant - 800 to P25
North Kansas City, MO	x	x	x	Completed	800 to P25
Pittsburg, KS	x				Modernization Study
Platte County, MO	x	x	x	Completed	P25 Completed
Rice County, KS	x	x		Pending	
Riverside, MO	x	x	x	Completed	P25 Completed
St. Tammany, LA	x	x	x	In Progress	700MHz Phase 1; jointly with State LWIN
Sumter County, FL	x	x	x	Completed	P25 Simulcast
Tallahassee, FL	x	x	x	Completed	800 to P25
West Palm Beach, FL	x	x	x	In Progress	800 to P25; Interoperable with OpenSky
Will County, IL	x	x	x	Pending	800 to P25 Phase 2 simulcast
Wyandotte County, KS	x	x	x	In Progress	800 to P25

### Experience in Scoping Needs, Building Stakeholder Consensus & Developing RFPs

Every project is unique. Some projects require in-depth legacy system assessments, conceptual design, procurement support, and deployment supervision, while other projects might have a more limited initial scope whose task set grows as agency needs become better defined. As an example, one of our clients engaged us on a simple project converting three analog dispatch positions to P25 consoles. As the project unfolded and user needs became more focused, the project evolved into a long-term dispatch center renovation with TUSA providing assistance that involved facility layouts, WAN/LAN, standby power systems, tower construction, and so on. In other cases, TUSA has been brought in to resolve prior-consultant design issues and/or assume Project Management of system's field implementation.

### Experience in Managing New Radio System Implementation & Supervising Work Done by Contractors

The TUSA Project Manager is the client's advocate, focused on the planning, cost containment and deployment of new radio systems. TUSA Project Managers have successfully managed the deployment of small, medium and large radio systems over the last two decades, with some projects spanning multiple states with budgets of over \$100 Million.

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A qualified public safety radio system Project Manager has the breadth of **field experience** to understand each and every facet of a project, from radio system design, site acquisition and construction, through subscriber equipment programming, equipment installation, and system acceptance testing. Along with this knowledge comes the professionalism of providing update reports on a regular basis, revising schedules, measuring vendor performance to milestones, and safeguarding the project's budget.

**TUSA Contract Negotiation Skills That Protect Client Interests**

TUSA's most experienced contract negotiator is the firm's founder, Nick Tusa. While employed by Exxon Company USA in the late 1970s and later as an Exxon contractor in the 1980s, Tusa quickly established a set of processes that helped that company secure best, most advantageous services from national radio and microwave equipment vendors. Later, as founder of Tusa Consulting Services, in the 1990s he gained skills in negotiating contracts for public safety agencies whereby vendors were held accountable (via penalties) for both installation completion and maintenance service response time performance.

In 2006, Nick Tusa negotiated the first ever bundled maintenance and software services contract for the City of Tallahassee (Florida) and Motorola whereby software updates and necessary hardware upgraded were embodied in a single maintenance contract.

In 2015, Nick Tusa completed an after-the-fact set of negotiations for the Mobile County (Alabama) 911 Communications District that resulted in \$5,000,000 in savings **from an existing contract**. County employees had negotiated a contract with a major radio manufacture in September 2013 that was flawed in many respects. That contract contained equipment that was not needed, allowed for user equipment to be shipped years before installation completion and failed to close "loopholes" to circumvent what was supposed to be a turnkey project. TUSA was retained by the District to resolve system implementation issues, but our work soon encompassed a negotiated re-write of the radio vendor's contract and a reduction in contract value from \$40M down to a final \$35M cost. It is one thing to negotiate a contract when none exists....it is an altogether different matter to renegotiate a contract that **already exists** and to maneuver a vendor to accept more risk and project responsibility. Yet, that is exactly what TUSA did for the Mobile County 911 Communications District.

Please contact 911 District Board Member Mr. Trey Oliver (toliver@mobileso.com) to gain a first-hand assessment of how TUSA has brought important value, security and implementation oversight to the District's 11-site 700MHz P25 radio project.

**TUSA Ancillary Services**

Design and development of radio communication systems often involve the identification and resolution of radio interference condition. Such conditions, particularly when such conditions are sporadic and affect infrastructure tower site receivers, often go unnoticed. The interference may occur only at different times of the day or season of the year. And, worse, the effect is not immediately obvious as the ability for a distant portable or mobile radio user to contact a remote tower site may be excellent on one transmission

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and bad on the next. The randomness of interference and the short term outages as a result are often difficult to appreciate during an event, but over a period of time patterns often emerge and gain the more experienced user's attention.

In addition, radio systems often are comprised of other technologies that must be considered in new or modernized conceptual solutions. In urban and suburban settings, fire stations are often manned 24/7/365 and a highly secure and redundant form of fire station alerting must be integrated within the radio system's configuration. Some fire departments, particularly volunteer agencies serving large counties, require one-way paging systems that are integrated with traditional two-way conventional and trunked radio systems. And, it is not unusual for a county's jail/correction center to require a separate stand-alone jail campus communication system that is interoperable with the wide-area voice communications system(s). TUSA has a broad range of experience in each of these important categories, as described next:

### **Interference Identification**

The County's RFP also required an ability to identify site interference issues. TUSA has extensive experience in identifying and resolving radio system interference. For Lancaster County (Pennsylvania) TUSA developed an innovative split-band UHF scheme involving UHF T-Band and non-Part 90 spectrum to resolve TV interference plaguing that County's 24-site UHF P25 simulcast network.

Closer to Orange County, Nick Tusa was retained by nearby Franklin County, NC to resolve project implementation issues with their Harris VHF P25 simulcast radio system. Here, Tusa successfully identified VHF interference with as a result of a flawed channel plan and, using its proprietary *EZ-Spectrum* software found a new radio channel. Franklin County has engaged TUSA to assist in negotiations with its equipment vendor to have this replacement VHF channel (and related site filtration equipment) installed. (For specific information on how TUSA identified interference issues within Franklin County's radio system, please contact Ms. Christy Shearin at 919-291-9420 or [cshearin@franklincountync.us](mailto:cshearin@franklincountync.us)).

As a final example of TUSA's interference identification capabilities, we were retained by Washington County, Wisconsin to identify operational and coverage issues with their newly-fielded VHF P25 simulcast radio system. The issues our personnel identified involved a flawed frequency plan devised by a previous consultant that resulted in self-generated IM products and noise floor degradation at all simulcast sites. We have included a copy of the report TUSA developed for Washington County to further illustrate our approach to identifying radio interference/noise floor issues and the development of potential mitigation solutions.

In any case, the identification of radio interference is a process of in-field investigation using specialized test equipment. HICAPS will be assisting our consultants in providing both technical support and equipment, as needed, to identify sources of radio and electrical noise interference during the Phase 1 audit.

### **One-Way Paging/Fire Alerting**

An important component of any new or modernized radio communication system involves the efficient and timely dispatch of fire department resources in response to calls for service. TUSA has an extensive level of experience in one-way radio paging and integrating these systems into trunked radio configurations. Prior to forming Tusa Consulting Services in 1992, Mr. Tusa founded and managed a company, Crescent Radio Electronics, whose business was the design and implementation of analog and digital radio paging systems. The technology developed by Crescent was used by numerous private carrier paging companies throughout the 1980s. In addition, Mr. Tusa has personally designed, fielded and performance-tested numerous hospital and fire department radio paging systems throughout his career. That work involved paging systems for the Cities of San Antonio, Texas; New Orleans, Louisiana; Gulfport, Mississippi; and Tallahassee, Florida as well as countywide systems for St. Charles, St. Tammany, Avoyelles, Calcasieu and other parishes throughout Louisiana and elsewhere along the Gulf Coast.

Recent paging system/fire alerting integrations have included the patching of trunked dispatch talkgroups to standalone VHF/UHF paging channels; development of IP-based station house alerting; use of cellular-based notification and other like services. TUSA is knowledgeable of NFPA-1221 station alerting requirements and designs new communication systems to meet or exceed those objectives, to the extent desired by its clients.

### **Jail Radio Systems**

Correction center needs for reliable communications are highly acute and specialized. Wide-area radio systems are designed to meet a coverage and audio quality objective that, while stringent, is not all encompassing due to the terrain features often encountered throughout service areas that encompass many hundreds of square miles. In contrast, a corrections center may have an encompassed compound area of just a few square miles of hardened building structures, but the communications reliability within that small region is expected to be 100%.

Due to the reliability required, coupled with the need for communications to be localized, most wide-area radio system designs also include a separate but interconnected radio system solution whose coverage is expressly optimized for correction center needs. Such a design allows for the safe, efficient transport of prisoners off-site; highly reliable communications within jail facilities; and the exclusion of localized jail communications from being broadcast throughout the full encompassed region of the wide-area radio system.

In some instances, depending upon the construction and layout of the correction center's facilities, reliable radio coverage within some interior locations - even with an on-site local radio tower - may be insufficient. In those instances, a customized building radio amplification system must be deployed. Here

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too, TUSA has experience in developing such solutions whereby efficient and reliable communications can be established and maintained within correction center facilities, thereby meeting the most demanding radio user's reliability and coverage expectations.

**Headquarters Location and Point of Contact**

Tusa Consulting is a seventeen-person consulting firm based in Covington, Louisiana and is capable of supporting Orange County's radio project to any degree desired. Our firm's size is by design, allowing us to maintain the highest level of quality, service and support. As previous and current customers have learned, our level of service is unmatched. This is why TUSA has been ranked a Top Consultant by an independent poll conducted by Mission Critical Communications Magazine.

TUSA personnel proposed for this project are located here (Covington); St. Louis, Missouri; Nashville, Tennessee; and Lancaster, PA. Our personnel can quickly respond to on-site meeting requests due to the numerous daily airline connection services between our various offices and the Raleigh-Durham International Airport.

## PROPOSER REFERENCES

In this section, TUSA is providing for your consideration reference descriptions of system implementations where TUSA's specification development, contract negotiation, and project implementation stewardship skills were successfully applied.

### **Reference #1: Barrow County, Georgia (2013 - 2015)**

TUSA was retained by Barrow County to replace another consulting firm and to steward the successful completion of a three-site/seven-channel Motorola P25 VHF trunked radio system. TUSA immediately discovered several system configuration problems including a failed receiver multi-coupler at one site and transmission lines damaged by bullet holes at another site. Both of these issues were causing extreme degradation in coverage and neither the service provider nor the vendor implementation team knew these problems existed. TUSA also identified numerous issues with ongoing VHF interference and subsequently negotiated a vendor replacement of the previous consultant's interference-plagued three-site VHF P25 system with a new 700 MHz P25 system and all new radios. TUSA has completed the implementation of the new system and assisting the customer in preparing for the upcoming cutover from VHF P25 to 700 MHz P25.

*This example alone underscores the importance of selecting a consulting firm whose members understand radio technology - coupled with a sound business-centric focus. Few have it, but TUSA does.*

The primary customer contact for the Barrow County, Georgia project is:

John W. Skinner, Chief  
Barrow County Emergency Services  
222 Pleasant Hill Church Rd. NE  
Winder, GA 30680  
Phone (770) 307-2987  
[jskinner@barrowga.org](mailto:jskinner@barrowga.org)

### **Reference #2: City of Franklin, Tennessee (2010 - 2012; 2015 - 2016)**

The City of Franklin retained TUSA after the City's previous consultant was released. TUSA brought value to the project by re-evaluating the radio vendor's proposed coverage and tower implementation plan. The vendor had originally proposed (and the previous consultant accepted) a two-tower solution, with one of the towers to be erected in a residential area with high-end houses. This proposed solution would have proven very difficult to gain approval and implement. TUSA worked with the vendor and the City to reconfigure the contracted solution into a three-site system with less obtrusive antenna placement near the residential area. TUSA also provided project management services through project completion that

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included monitoring vendor compliance to contract, equipment staging, radio programming template development, functional acceptance testing and coverage acceptance testing.

Recently TUSA was selected by the neighboring City of Brentwood to expand the Franklin system, built out a new Brentwood radio system and configure both for an eventual Countywide/Regional radio system involving Williamson County and the City of Nashville.

The primary customer contact for the Franklin, Tennessee system project is:

Fred Banner, MIT Director  
City of Franklin  
109 3<sup>rd</sup> Avenue South  
Franklin, TN 37064  
Phone (615) 550-6613  
[fredb@franklintn.gov](mailto:fredb@franklintn.gov)

**Reference #3: Cass County, Missouri (2011 - 2014)**

Cass County, Missouri was challenged with having five (5) PSAP's serving multiple police, fire and EMS organizations with each operable on individual VHF and UHF radio systems. Most of those systems were going to need extensive equipment upgrades to comply with the FCC's narrow-banding order. TUSA was retained to provide a conceptual 800 MHz P25 system design that would integrate into the regional network. TUSA next developed an RFP specification, assisted with proposal response evaluations, and provided contract negotiation assistance. TUSA also was tasked to provide site acquisition services to acquire the needed six (6) tower site locations and provided project management oversight for the duration of the system's implementation. A key task was the development of radio programming templates for 45 agencies within the County.

The primary customer contact for the Cass County system project is:

Kris Turnbow, Chairman  
Cass County Emergency Services Board  
801 S. Commercial Street  
Harrisonville, MO 64701  
Phone (816) 887-1952  
[turnbowkp@att.net](mailto:turnbowkp@att.net)

**Reference #4: City of West Palm Beach, Florida (2012 - now)**

TUSA was hired to assist the City of West Palm Beach to migrate from a proprietary Motorola SMARTNET system to standards-based Harris Project 25 network. The work involved integrating the West Palm Beach's P25 configuration into an existing OpenSky system operated by a several nearby municipalities. TUSA conducted a comprehensive assessment that included stakeholder discussions and an evaluation of

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the customer's existing infrastructure. TUSA used this information to develop and recommend conceptual solutions that would address a detailed migration plan and need for additional coverage. The selected configuration required the construction of three new communication towers rated for Category 5 hurricane force winds. One of the towers required AM broadcast station protection devices necessary to make the tower electrically "invisible" in order to preserve a nearby AM station's coverage footprint. TUSA developed separate specifications for tower/shelters and P25 infrastructure and has successfully managed the installation of both. We are now entering the acceptance test phase of the City's new three site simulcast radio system, whose sites and dispatch center are interconnected using an IP/MPLS protected 6GHz microwave subsystem.

The primary customer contact for this project is:

Dorritt Miller  
Deputy City Administrator  
City of West Palm Beach  
401 Clematis Street  
West Palm Beach, FL 33402  
Phone (561) 822-1400  
[dmiller@wpb.org](mailto:dmiller@wpb.org)

**Reference #5: Will County, Illinois (2014 - now)**

In early 2014, TUSA was awarded a competitively bid contract to assist Will County with their transition from a Harris EDACS system to a new P25 network. TUSA inspected and assessed all existing tower/infrastructure sites and met with the user community to better understand existing system challenges so that a new design would be all-encompassing. TUSA completed a series of conceptual designs and procurement specifications that involved P25 Phase 2 infrastructure and user equipment. This project is ongoing and is in the contract negotiation phase with the recommended best and most advantageous vendor, EF Johnson.

The primary customer contact for the Will County, Illinois system project is:

Ed Bean  
Communications Manager  
Will County Radio System  
14537 Edison Drive  
New Lenox, IL 60451  
Phone (815) 463-9210  
[ebean@willcountyillinois.com](mailto:ebean@willcountyillinois.com)

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**Reference #6: Coral Gables, Florida (2014 - now)**

The TUSA team was retained by the City of Coral Gables to transition its aged EDACS radio system to P25 technology. TUSA developed a conceptual solutions plan that leveraged existing City assets and has initiated a program to install a new Harris P25 overlay onto the existing EDACS. TUSA has been assisting, with Coral Gables' concurrence, nearby cities of Miami Beach, Hialeah and Miami in the development of a regional, shared communications infrastructure. This network-of-systems approach is geared to providing enhanced reliability through shared P25 switches and m/w connectivity.

The primary contact for Coral Gables, Florida is:

Jason Swift  
Radio System Manager  
City of Coral Gables  
2800 SW 72<sup>nd</sup> Avenue  
Miami, FL 33155  
Phone (305) 460-5404  
[jswift@coralgables.com](mailto:jswift@coralgables.com)

**Reference #7: Rome/Floyd County, Georgia (2010 - 2012)**

The City of Rome, Cave Springs and Floyd County, Georgia reside in the mountainous southern end of Appalachian Mountains where radio system designs and implementations can be very challenging. Here, TUSA conducted a full system design and implementation of a nine-site/10 channel P-25 Harris simulcast radio network valued at \$23M. Initially, TUSA performed a comprehensive user needs assessment with all radio-user stakeholder agencies. TUSA also completed an extensive infrastructure assessment of all tower sites, equipment shelters and dispatch centers in the County and each municipality. TUSA then created a conceptual design report for the client to review, followed by the development and issuing of technical specifications for a new 800 MHz Project 25 radio system. TUSA evaluated RFP responses from both Motorola and Harris. TUSA also participated in witnessing and evaluating vendor oral presentations during the RFP process.

The primary contact for the Rome/Floyd County system project is:

Blaine Williams (formally with Floyd County)  
Assistant Manager for Transportation and Community Development  
Athens-Clarke County  
301 College Avenue  
Athens, GA 30601  
Phone (706) 613-3020  
[blaine.williams@athensclarkecounty.com](mailto:blaine.williams@athensclarkecounty.com)

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**Reference #8: Tallahassee/Leon County, Florida (2007 - 2009)**

TUSA was hired to assist the City of Tallahassee and Leon County to migrate from a proprietary Motorola SMARTNET simulcast system to standards-based Project 25 network. TUSA conducted a comprehensive needs assessment that included stakeholder interviews and an evaluation of the customer's existing infrastructure. TUSA used the information collected from the needs assessment to develop and recommend conceptual solutions that would address a detailed migration plan and a lingering need for additional coverage. After approval from the radio system committee, TUSA developed a set of specifications and evaluation criteria for the RFP. TUSA evaluated RFP proposal responses from both Harris and Motorola, followed by assisting in contract negotiations which resulted in a Motorola ASTRO simulcast radio solution. TUSA was also contracted to provide project management and acceptance test verification services during the implementation phase of this project.

The primary customer contact for the Tallahassee/Leon County system project is:

Mr. Ron Wostel  
800 MHz Administrator  
City of Tallahassee  
642-C Mabry Street  
Tallahassee, FL 32304  
Phone (850) 544-4868  
[ron.wostel@talgov.com](mailto:ron.wostel@talgov.com)

**Reference #9: Kansas City, Missouri and MARRS (2009 - 2014)**

The proposed TUSA Project Team and alternate personnel for Orange County includes members who were instrumental in the evolutionary design and deployment of the Metropolitan Area Regional Radio System (MARRS) throughout the Kansas City metropolitan area. This network-of-systems currently covers five counties across two states (Missouri and Kansas). The population count within the primary coverage footprint of this regional radio network is approximately 1.2 million, and the geography covered is over 2,000 square miles. MARRS serves 24 Public Safety Answering Points (PSAP's), with 47 radio tower sites, and approximately 25,000 users. The network is seamless in operation, designed for portable-on-hip service within residential structures and dense high-rise buildings in defined urban cores.

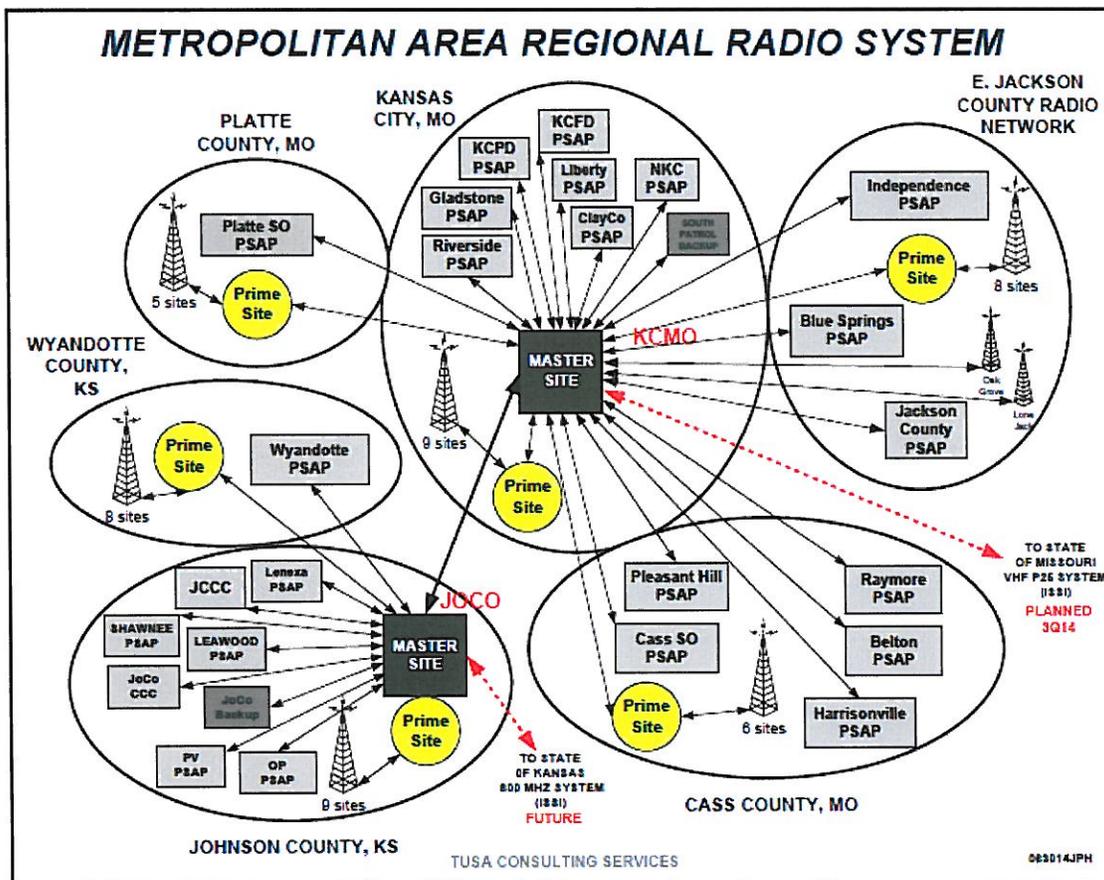
MARRS is a network-of-systems with each of the five counties operating their own multi-site "simulcast cells" with all sites interconnected via multiple microwave "loop" systems. In addition, a separate VHF/UHF/800 MHz 9-site conventional analog simulcast system provides an open mutual aid overlay that covers the five MARRS counties and four additional peripheral counties. This mutual aid system is known as RAMBIS (Regional Area Multi-Band Interoperability System). All 800 MHz P25 users, mutual aid itinerant users, and MARRS PSAP's have access to the RAMBIS system.

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TUSA began the developmental work that evolved into the MARRS network in 2009, when an RFP crafted by TUSA was released for the upgrade of the Kansas City, MO (KCMO), 8-site EDACS system. Around the same time period, Johnson County, Kansas was pursuing a county-wide P25 design that would replace multiple conventional VHF and UHF systems (in anticipation of the FCC's 12/31/2013 Narrowband mandate). TUSA was awarded Project Management responsibility for the deployment of both the Johnson County and KCMO P25 upgrades. Shortly after those two systems were made operational, TUSA then assisted Platte County, Missouri, with transitioning to the combined KCMO/Johnson County systems. This work was further expanded and followed by the additions of Cass County, the cities of Independence and Blue Springs, and Wyandotte County, Kansas.

The following diagram illustrates the structure of the MARRS network. Not shown is the expansive TUSA-designed microwave network that supports newly-deployed 911 telephony systems. Each PSAP has redundant, alternate-route microwave paths within the system's backbone which support both radio and NG9-1-1 connectivity.

Figure 1 - MARRS System Diagram



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It is important to note that the same TUSA personnel that were driving the core MARRS deployment were also simultaneously managing related projects that brought larger towns and cities into the network (primarily involving PSAP radio dispatch console upgrades, and subscriber equipment change-outs).

The primary customer contact MARRS is:

Keith Faddis, Director  
Mid America Regional Council  
600 Broadway, Suite 200  
Kansas City, MO 64015  
Phone (816) 701-8211  
[kfaddis@marc.org](mailto:kfaddis@marc.org)

## RESPONSE TO TECHNICAL REQUIREMENTS

### PROJECT SCHEDULE AND WORK PLAN

TUSA has thoroughly reviewed and understands the Scope of Work as outlined in Section 5.0 of the RFP and recognizes that this scope does not limit additional services that the consultant believes to be necessary. The requested tasks are normal and customary for radio modernization/replacement projects of this type and TUSA has successfully conducted such studies and performed modernized system implementations for many clients over the past twenty-four years. This Needs Assessment and Study would serve as a foundation designed to allow TUSA, in conjunction with County personnel, to determine the best approach for system upgrade. From this point, a transition plan and procurement specifications, capable of meeting user agency needs and expectations, would be crafted into a vendor-neutral RFP and prepared for release.

#### **TUSA Process**

The process we use is self-created for the study of existing radio systems that ultimately leads to the modernization and /or procurement of replacement radio systems. This TUSA process has been openly shared and published by both APCO (in its *APCO Bulletin*) and Mission Critical Magazine<sup>1</sup>. It is a task-based, structured approach having defined outcomes memorialized by deliverable reports or work product submittals. Our is one that is scalable in-step with projects as small as a single-tower site to those having well over one hundred sites comprised of multicast/multisite, as well as simulcast clusters.

#### **Understanding of the Scope of Work**

TUSA has a complete and full understanding of the Scope of Work outlined by Orange County, and has taken no exception to the County's scope and work requirements delineated by this RFP. We will provide the necessary manpower, materials, and work products as required, to support the County through the modernization of its public safety radio system. The work is broken down into 17 tasks, and there is an expectation that as much of the needs assessment, analysis, and budgetary estimation is completed as possible in support of the County's CIP process in May – June 2016. A general description of each element of the proposed TUSA approach follows:

#### **Task 1 - Project Initiation**

During this task, TUSA will meet with the designated project management team and key personnel to confirm the project's organization and the roles and responsibilities of the project participants. Areas we intend to cover include:

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<sup>1</sup> The first 1995 publication of this process, titled *A Structured Approach for the Procurement of Radio Communications Systems*, was authored by Dominic F. Tusa. A 2008 follow-up article, titled *The Procurement Expedition*, was authored by Peter J. Allan. These are each included as attachments.

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- Introduction of TUSA team members;
- Review of project Scope of Work;
- Review of contracted work plan, task elements, deliverables and schedule;
- Confirmation of communications and progress reporting procedures.

As part of this task, we will also work closely with Orange County's Project Manager(s) to define project management standards, processes, report formats, and project status metrics that will be used throughout the course of the project. We will seek to adapt these processes to mirror those already in use. TUSA will also identify Orange County's resources that we will need to contact and update throughout the course of the project.

The TUSA Project Director, Dominic Tusa, will coordinate the various TUSA resources attached to the project, with respect to investigative survey and assessment needs. TUSA Project Manager and Senior Consultant, Bob Sutphen, will be responsible for all on-site activities, the development and presentation of project deliverables, technical support and will provide project status reports during the course of the project. These reports will identify key accomplishments during the reporting period, expected accomplishments during the upcoming reporting period and identification of risk issues requiring management attention.

In the development of a TUSA Team to support this project, we have assembled a group of senior staff members whose career histories have included a large number of Project 16 and Project 25 trunked radio deployments. This prior work has been at municipal, county, regional and state levels, involving radio systems having user and agency bases equivalent to that in Orange County's system. We have paired these senior staff members with younger engineers whose software tool development and trunked radio experiences complement the project scope and licensing complexity envisioned here. Resumes for all TUSA personnel earmarked for this project are contained in Section 4.C of this Proposal Submittal.

#### **Task 2 - Develop Assessment Questionnaire**

Working in conjunction with County personnel, TUSA shall develop a Needs Assessment/ Survey Questionnaire. This questionnaire would be designed to affirm the contact information for the region's various participant agencies and allied maintenance providers. Additionally, the questionnaire would be used to establish present-day system operational status and performance limitations within the existing configurations. In total, the information gleaned through the Survey Questionnaire would provide guidance to the various user agencies on the type and scope of information needed in the course of actual field interview and survey sessions.

Orange County would have the opportunity to review and comment on the suitability of the questionnaire, prior to release. TUSA would incorporate all desired changes, as needed.

### **Task 3 - Management and User Interviews**

With respect to actual user interviews, TUSA would conduct agency-specific user interviews with public safety departments that would operate on the new County radio system. Additionally, TUSA would meet with a representative group of local agencies outside of Orange County, responsible for interoperable communications, to identify needed outside-network linkages. Non-public governmental agencies would be interviewed as well to make sure their needs are met as well.

These various interview sessions would be conducted in meeting facilities provided and scheduled by Orange County. The County and TUSA would jointly coordinate the scheduling of field interviews in a manner that assures the highest percentage of attendance possible while attempting to maximize convenience.

### **Task 4 - Evaluation of Existing Facilities**

An important aspect of managing new-system deployment costs is the leveraging of existing site infrastructure resources, when such reuse is appropriate. Typically, reusable resources could include towers, tower sites, building facilities, dispatch centers, HVAC systems, microwave connectivity and emergency power systems. TUSA personnel would evaluate existing infrastructure assets including land mobile radio network and dispatch sites, the County's microwave network, Fire Station Alerting System and paging stations. We will evaluate these assets for each of the specific criteria:

- Type/ models of installed infrastructure equipment;
- Assessment of existing configuration rack/ cabinet placements;
- Assessment of space to install new system equipment in parallel with existing equipment;
- Assessment of lightning protection systems;
- General assessment of existing tower structure feasibility.

Should it become necessary and subsequently requested by Orange County for TUSA to complete tower wind load studies by a State registered professional structural engineer, which is work that is outside the scope of this base-level assessment, such work would be proposed as an additional service.

At the conclusion of Task 4, TUSA will release a Needs Assessment Report. This document would include completed interview questionnaires and an infrastructure survey summary of existing conditions. The report would include observed infrastructure resources that could potentially be reused in the conceptual development of the new radio system.

Likewise, the successful and reliable operation of any multi-site conventional or trunked radio communications system is contingent upon the resiliency and availability of the many data, audio, and control linkages used to interconnect antenna sites. These linkages, whether accomplished by leased

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circuits, wired facilities or private microwave, are essential to the seamless integration of individual sites, having limited coverage, into a large network having the combined coverage of all sites.

The reliability of site backhaul infrastructures has direct impact on radio network functionality, audio clarity and coverage.

With respect to new-system conceptual solutions, we would consider traditional licensed microwave loop-switched technology as well as star-configured alternatives, as long as rigid expectations for survivability in adverse conditions can be met. In this conceptual development phase, TUSA would provide a high-level design and cost estimate for backhaul elements necessary to support the various conceptual Project-25 radio and interoperability solutions.

**Task 5 - Develop Interoperability Requirements**

TUSA will work with Orange County, the municipalities within, and other interested parties to gather the information necessary to thoroughly discuss conceptual alternatives that address potential regional interoperability needs. Here, TUSA will assist in the review of what networks are already in place, replacement networks being planned, or future networks needed. TUSA will conduct appropriate outside interviews regional user agencies to be identified by Orange County. The ideal proposed interview team would consist of TUSA representatives and one or more Orange County project support personnel.

We will review the data collected and distill this information into matrix sets that pictorially depict immediate requirements, goals, minimally-acceptable functionalities and long term requirements. This level of assessment will be conducted in order to integrate all into a cohesive interoperable communication network approach.

**Task 6 - Coverage Analysis/ Propagation Modeling**

TUSA would initiate propagation modeling activities with the aim of addressing known coverage shortfalls and anticipated new-area growth profiles. Ultimately, this work will drive the configuration of potential modernized network solutions. The propagation software tools used by Tusa Consulting Services employ a Graphical User Interface to manipulate complex radio propagation information and display the results graphically as a user coverage map. System variables such as tower location, transmission line type and length, antenna type, height and orientation, radio type (portable and mobile), power output and acceptable signal level are entered into the program.

Terrain specific characteristics of the area under investigation such as roads, terrain type and topography are also integrated into the program by incorporating United States Geodetic Survey data into the model and overlaying this information onto the predicted coverage map. With all of this information carefully entered into the program, the computer model is then able to accurately predict radio performance for both portable and mobile users operating within a given service area.

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The propagation modeling software will also indicate those specific areas that may experience sub-optimal or distorted coverage, thereby alerting the system's designer to potential coverage shortfalls. If the predicted coverage area does not meet the service needs of users throughout the desired geographical service area, the designer can then further adjust system variables or add tower sites until the predicted coverage coincides with user expectations. This iterative design approach permits coverage model convergence toward an optimized solution for the frequency band considered.

As the intent of the Orange County assessment and network modernization is to employ economies of scale by reusing existing sites and facilities as much as possible, TUSA would prioritize use of the existing radio system sites first. From there, we would then investigate the use of new "greenfield" or other existing tower or building rooftop settings that could overcome known coverage deficiencies and support new/future coverage needs. A "greenfield" site is any location where construction of an antenna site may be viewed as technically beneficial, but where no tower structure currently exists.

After the initial consideration explained above, TUSA would develop 800MHz coverage prediction overlays utilizing desirable existing sites as well as new sites. This investigation will consider mobile, portable on-street, portable in-vehicle, and portable in building configurations.

At the conclusion of Task 6 we will have identified the total number of sites, and their approximate locations, necessary to support multiple conceptual radio network solutions. The TUSA team would then devise infrastructure configurations that parallel and support each coverage defined conceptual solution.

The interview responses would suggest the type of network topology needed. TUSA will next develop detailed conceptual design descriptions, block diagrams, pictorials, and other details necessary to convey an overall description of each supplied enhancement/modernization concept.

#### **Task 7 - Develop Transition and Cutover Plan**

During the data collection and conceptual design process, TUSA will be working in parallel to develop a comprehensive migration plan that will prevent disruption of communication on the radio network and provide a smooth transition to the new Project-25 digital voice radio system. This plan will include a sequence of events for the installation of the new network showing any effect the different stages of installation may have on existing systems.

Likewise, the plan will provide an estimated completion time period (in days) for the cutover, based on the County's execution of a Notice to Proceed. TUSA shall also provide a schematic representation of the implementation process as well as a hypothetical migration plan.

#### **Task 8 - Develop Conceptual Design**

TUSA will use all information gathered during the Needs Assessment for radio, microwave, fire station alerting, and paging requirements to develop alternative conceptual designs that accurately reflect the

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new network and associated services envisioned by the County. TUSA would provide several options to the County with a focus on achieving operational efficiencies, better overall systems performance, and enabling a sustainable, evergreen network, while remaining fiscally responsible in our approach.

TUSA would present and discuss these options in detail with the Review Committee to seek comment and approval of the desired direction the County would like to pursue. These options would be presented with advantages and disadvantages of each approach and the associated cost estimates for each.

**Task 9 - Develop Budgetary Estimates**

In conjunction with Task 8, in-depth cost budgetary estimates designed to provide the County with the cost information necessary to support fiscal planning cycles. Detailed estimates will include cost information to include infrastructure hardware, installation services, software, backhaul interconnectivity, user equipment, and dispatch facilities, as needed to fully configure and support each conceptual solution. The output of this task will be included within our Conceptual Design Report.

**Task 10 – Present Conceptual Report & Recommendations**

Each of the above described tasks will have impact and result in a deliverable report that fully depicts a future course for radio network enhancement. This Report will include final information disclosures in concert with the requirements delineated by the RFP.

The Final Report deliverable will include, minimally, the following information:

- Overview of the existing host radio network;
- Identification of existing infrastructure resources capable of reuse;
- Description of current coverage and reliability aspects;
- Identification of critical maintenance components of the existing configurations that affect long/short term viability;
- Description of Project-25 conceptual configuration solutions implementation plan and timelines. At a minimum, this work will likely include: A P-25 overlay of the existing system; a hosted P-25 network solution and a design that allows for the use of another agencies P-25 switch;
- High level overview of proprietary features offered by P-25 radio vendors to include functions such as over-the-air-reprogramming, status messaging, non- standard voice encryption, etc.;
- Conceptual system coverage maps (mobile and portable radio configurations);
- Detailed description of user equipment requirements;
- Conceptual description of backhaul connectivity solutions;
- Description of dispatch configurations redundancy and backup;
- Radio interoperability options;
- Delineation of phased migration plan alternatives;
- Potential shared resource governance structure descriptions;

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- Detailed cost definition for each proposed solution;
- Consultant recommendations (short and long term); and
- Budget estimates for conceptual designs as described herein.

Upon completion of the Final Report in Task 10, TUSA would return to Orange County to present the report and our findings to the County's Review Committee and other interested parties. At this time, we would answer any initial questions and explain the methodology behind our recommendations. Our intent would be to confirm that Orange County is comfortable with the suggested direction for procurement of a new P25 radio system, microwave backhaul and services/ subsystems to support fire station alerting and paging.

#### **Task 11 – Develop RFP Specifications**

Once the final network configuration desired by the County is firmly established and a suitable funding source has been secured, the Consultant would receive approval to develop procurement specifications.

TUSA will combine the required technical and purchasing language into a draft RFP specifications/ procurement document. The specifications would also contain safeguards to assure that the various new systems are constructed in accordance to recognized industry standards, achieve proposed coverage and service levels, and are completed in a timely, professional fashion.

A typical RFP Specification could encompass the following technical elements:

- Description of existing radio system configurations;
- Description of participant user needs and expectations;
- Identification of network functionality requirements;
- Description of service area and coverage needs;
- Identification of dispatch radio console locations and functionality;
- Description of department or functionally specific subsystems (e.g. Fire Station Alerting);
- Description of desired infrastructure reliability factors;
- Description of minimally acceptable radio interoperability requirements;
- Equipment shelter requirements, where necessary;
- Tower shelter requirements, where necessary;
- Standby power systems;
- Infrastructure connectivity;
- Electrical grounding system requirements;
- Description of radio network alarm systems;
- Development of minimum functional and coverage Acceptance-Testing criteria.

A Draft Specification would be released to the County's Review Committee for comments, additions or other recommendations. Desired changes would be incorporated into a final Specifications Document. Specifications would next be released, by the County Purchasing Department, as a request for Proposal (RFP) from qualified vendors.

**Task 12 – Provide Procurement Process Support**

Throughout the acquisition and procurement process, TUSA will be available to provide support to County personnel to help ensure that the progression of the project continues to move forward smoothly. We have a very extensive history with new radio system procurements and have worked closely with purchasing officials through numerous projects.

**Task 13 – Develop CAD Drawings**

As requested in the RFP, TUSA will provide necessary Computer Aided Drafting (CAD) services. CAD drawings and templates will be created using Microsoft Visio and will be provided to the County in a PDF format.

**Task 14 – Develop Proposal Evaluation Worksheet**

TUSA will develop worksheet templates, concurrent with Task 11, which would be used to evaluate vendor proposals in a consistent, fair and impartial manner. These worksheets will be custom designed to enable a comprehensive comparison and will allow many details of each proposal to be summarized in an objective, point-structured format to enable the evaluation and selection process.

TUSA will also present a recommended Proposer Evaluation Criteria template to the County’s Review Committee for review and comments. Once revised in accordance with Committee direction, this template would define the criteria used to throughout the proposal evaluation process. If a quantitative or weighted method is used, the criteria will define that process. The evaluation criteria should be included as part of the RFP Specifications (in accordance with County procurement practices) so prospective vendors clearly understand the County’s objectives and approach.

**Task 15 – Pre-Proposal Conference and RFP Addenda**

TUSA will attend and participate in a pre-proposal conference assisting the County, as needed, in answering or clarifying RFP specification related questions and in the preparation of subsequent written project addenda.

**Task 16 – Evaluation of Proposals and Recommendation**

Multiple resources within the TUSA team will review and evaluate each vendor proposal and independently complete and total evaluation worksheets as prepared for each proposal received. TUSA will then prepare a summary that identifies the strengths and weaknesses of each proposal as well as any items needing additional clarification.

Using our approach, any potential for bias toward a particular vendor solution set is eliminated and vendors, as well as the County, are assured that each set of evaluations has been conducted in an honest

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and fair-minded fashion. It is strongly recommended that members of the County's Review Committee likewise evaluate vendor submittals using our same evaluation process.

Use of evaluation worksheets as described would result in a numerical grade for each proposal, in a manner that directly and accurately correlates with the published evaluation criteria. The vendor having the highest numerical evaluation score and greatest overall benefit to the County would receive our recommendation for selection.

**Task 17 – Provide Contract Negotiation Support**

Following vendor selection, TUSA would assist the County in negotiating contracts with the various successful vendors. TUSA is not a law firm and does not provide legal advice; however, TUSA has considerable experience in developing fair and reasonable contracts for major communication networks. Our system approach focuses on key issues, which results in the achievement of successful, industry-recognized, implementations.

Examples of issues TUSA would address during contract negotiations include:

- County Implementation Responsibilities;
- Vendor Implementation Responsibilities;
- Performance Standard Identification (Coverage, Capacity & Reliability);
- Acceptance Testing Procedures;
- Issue Resolution Processes;
- Pricing Guarantees;
- Payment Schedules;
- Project Time Line Development;
- Performance and Penalty Requirements;
- Identification of Project Personnel; and
- Warranty/Maintenance Responsibilities.

From the County's perspective, success gained through contract negotiations is directly related to the strength of the original RFP specification coupled with the experience of its crafting consultant. If the specification is strong and leaves little room for ambiguity of requirements and functional/ technical expectations, contract negotiations are normally smooth and always favorable to the Owner.

**WHY TUSA IS THE BEST APPROACH**

Our approach and methodology has been highly successful with all of our customers, including the County of Florida and the County of Louisiana. Our approach has been refined over the years because TUSA is

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often brought in to fix problems created by other consulting firms. This has caused us to perfect the art of evaluating and optimizing systems.

We have structured our approach to this project so the County has full control over our work at each stage. Our travel budget allows us to attend virtually any reasonable set of meetings, with the flexibility to accommodate ad-hoc meetings. And our relationship with each vendor allow us to get results that other firms can only dream of. TUSA's approach has been proven the best, most advantageous one for the Orange County!

ID	Task Name	Duration	Start	Finish	April 2016				May 2016				June 2016				July 2016				August 2016											
					2	7	12	17	22	27	1	6	11	16	21	26	1	6	11	16	21	26	31	5	10	15						
1	<b>Orange County, NC RFP #5217</b>	100 days	Fri 4/1/16	Thu 8/18/16																												
2	Needs Assessment and Survey	45 days	Fri 4/1/16	Thu 6/2/16																												
3	Task 1 - Project Initiation	2 days	Fri 4/1/16	Mon 4/4/16																												
4	Task 2 - Develop Assessment Questionnaire	7 days	Tue 4/5/16	Wed 4/13/16																												
5	Task 3 - Management and User Interviews	2 days	Thu 4/14/16	Fri 4/15/16																												
6	Task 4 - Evaluation of Existing Facilities	3 days	Sat 4/16/16	Tue 4/19/16																												
7	Task 5 - Develop Interoperability Requirements	7 days	Wed 4/20/16	Thu 4/28/16																												
8	Task 6 - Coverage Analysis/ Propagation Modeling	6 days	Fri 4/29/16	Fri 5/6/16																												
9	Task 7 - Develop Transition and Cutover Plan	7 days	Sat 5/7/16	Mon 5/16/16																												
10	Task 8 - Develop Conceptual Design	8 days	Tue 5/17/16	Thu 5/26/16																												
11	Task 9 - Develop Budgetary Estimates	3 days	Fri 5/27/16	Tue 5/31/16																												
12	Task 10 - Present Conceptual Report and Recommendations	2 days	Wed 6/1/16	Thu 6/2/16																												
13	Procurement	55 days	Fri 6/3/16	Thu 8/18/16																												
14	Task 11 - Develop RFP Specifications	30 days	Fri 6/3/16	Thu 7/14/16																												
15	Task 12 - Provide Procurement Process Support	55 days	Fri 6/3/16	Thu 8/18/16																												
16	Task 13 - Develop CAD Drawings	7 days	Thu 6/9/16	Fri 6/17/16																												
17	Task 14 - Develop Proposal Evaluation Worksheet	7 days	Sat 6/18/16	Mon 6/27/16																												
18	Task 15 - Pre-Proposal Conference and RFP Addenda	2 days	Tue 6/28/16	Wed 6/29/16																												
19	Task 16 - Evaluation of Proposals and Recommendation	21 days	Thu 6/30/16	Thu 7/28/16																												
20	Task 17 - Provide Contract Negotiation Support	15 days	Fri 7/29/16	Thu 8/18/16																												

Firm: Tusa Consulting Services  
 Project: Countywide Radio Communications Interoperability and Systems Engineering Services

	Task		Start-only
	Split		Finish-only
	Milestone		Deadline
	Summary		Progress
	Project Summary		Manual Progress
	External Tasks		Manual Summary Rollup
	External Milestone		Manual Summary

## COST PROPOSAL

### Consultant Rate Schedule

The following describes the firm's normal fee structure for technical and support services that are performed on a time and expenses basis. For projects of a large scope, the cost for services varies depending upon the project's duration, breadth of services required and economy of scale.

<b>Technical Resource</b>	<b>Hourly Rate</b>
Project Director/Advisor	\$185
Project Manager	\$165
Senior Consultant	\$155
NG9-1-1 Specialist	\$150
Drafting	\$ 65
Administrator	\$ 60

### Orange County's Consultant Fee Proposal

The calculated costs for each task described by our Project Schedule and Work Plan are indicated by the included table. The Orange County RFP requires a fixed fee inclusive of travel expenses. The travel expense cost budget for this project's work is based on a fixed percentage of the total project manpower cost (i.e., 13%). This percentage has been derived from actual project expense costs captured over the past 24 years. Any portion of the travel expense budget that is not consumed during the project will be refunded to the County. The above indicated time rates for drafting and administrative services apply.

In the event that the County wishes to retain Tusa Consulting to provide Implementation support during installation of the new radio system, a fully negotiable scope of work, agreeable to both parties, would be provided.

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The total cost for services, *inclusive of all travel-related costs*, is as follows:

**Project Time/Fee Detail Spreadsheets**

Description of Service/Task	Hours	Rate	Admin.	Rate	Drafting	Rate	Task Total
Task 1 - Project Initiation	20	\$ 165.00					\$ 3,300.00
Task 2 - Develop Assessment Questionnaire	8	\$ 155.00					\$ 1,240.00
Task 3 - Management and User Interviews	36	\$ 155.00					\$ 5,580.00
Task 4 - Evaluation of Existing Facilities	24	\$ 155.00					\$ 3,720.00
Task 5 - Develop Interoperability Requirements	8	\$ 155.00					\$ 1,240.00
Task 6 - Coverage Analysis/ Propagation Modeling	18	\$ 155.00					\$ 2,790.00
Task 7 - Develop Transition and Cutover Plan	16	\$ 155.00	4	\$ 60.00			\$ 2,720.00
Task 8 - Develop Conceptual Design	24	\$ 155.00					\$ 3,720.00
Task 9 - Develop Budgetary Estimates	18	\$ 155.00	8	\$ 60.00			\$ 3,270.00
Task 10 - Present Conceptual Report and Recommendations	20	\$ 165.00	4	\$ 60.00	4	\$ 65.00	\$ 3,800.00
Task 11 - Develop RFP Specifications	60	\$ 155.00	8	\$ 60.00			\$ 9,780.00
Task 12 - Provide Procurement Process Support	20	\$ 165.00					\$ 3,300.00
Task 13 - Develop CAD Drawings	18	\$ 155.00			4	\$ 65.00	\$ 3,050.00
Task 14 - Develop Proposal Evaluation Worksheet	20	\$ 155.00	4	\$ 60.00			\$ 3,340.00
Task 15 - Pre-Proposal Conference and RFP Addenda	24	\$ 155.00					\$ 3,720.00
Task 16 - Evaluation of Proposals and Recommendation	60	\$ 155.00					\$ 9,300.00
Task 17 - Provide Contract Negotiation Support	24	\$ 165.00					\$ 3,960.00
Consultant Hours	418						
Services Sub-Total							\$ 67,830.00
Other Direct Costs (ODC) (13% of services)							\$ 8,817.90
TCS Project Director Oversight	18	\$ 185.00					\$ 3,330.00
<b>PROJECT SERVICES TOTAL</b>							<b>\$ 79,977.90</b>

\*ODC not consumed during the project will be refunded to the County.



**Attachment B**

**VENDOR DATA SHEET**

**1. Proposing Company Name** Tusa Consulting Services II, LLC

Telephone (985) 249-6467 Toll Free Telephone \_\_\_\_\_ Fax (985) 249-6468

Address: 75757 Hwy. 1082

City: Covington State: LA Zip + Four: 70435

**2. Contact Person in the event there are questions about your proposal**

Name: Dominic F. Tusa Title: Founder/ President

Telephone: (985) 249-6467 Toll Free Telephone: \_\_\_\_\_

Address: 75757 Hwy. 1082

City: Covington State: LA Zip + Four: 70435

**3. Mailing address where County purchase orders/contracts are to be mailed and person the Department can contact concerning orders and billing.**

Name: Dominic F. Tusa Title: Founder/ President

Telephone: \_\_\_\_\_ Toll Free Telephone: \_\_\_\_\_

Address: Same as above

City: \_\_\_\_\_ State: \_\_\_\_\_ Zip + Four: \_\_\_\_\_

## Attachment C

### REFERENCES

Provide company name, address, contact person, telephone number, and appropriate information on the product(s) and/or service(s) used for three (3) or more installations/services with requirements similar to those included in this solicitation document. If vendor is proposing any arrangement involving a third party, the named references should also be involved in a similar arrangement.

Company Name: Kansas City, Missouri and MARRS

Company Address: 600 Broadway Ste. 200, Kansas City, MO 64015

Telephone/email: (816) 701-8211 kfaddis@marc.org

Contact Person: Keith Faddis

Services provided by proposer/vendor: P25 network of systems; microwave; Dispatch center development See page 33

Company Name: City of West Palm Beach, Florida

Company Address: 401 Clematis Street, West Palm Beach, FL 33402

Telephone/email: (561) 822-1400 DMiller@wpb.org

Contact Person: Dorritt Miller

Services provided by proposer/vendor: TUSA was hired to assist the City of West Palm Beach to migrate from a proprieta  
Hired to migrate from Motorola SMARTNET simulcast system to standards based system to standards-based  
Harris Project 25 network. See page 30

Company Name: Barrow County, Georgia

Company Address: 222 Pleasant Hill Church Road NE, Winder, GA 30680

Telephone/email: (770) 307-2987

Contact Person: Chief John W. Skinner

Services provided by proposer/vendor: Hired to replace another consulting firm; discovered several system configuration  
problems; updated interference plagued three site VHF P25 system with a new 700 MHz P25 system and all new radios. Preparing to  
cutover from VHF P25 to 700 MHz P25. See page 29

Company Name: City of Tallahassee, Florida

Company Address: 642-C Mabry Street

Telephone/email: (850) 544-4868

Contact Person: Ron Wostel

Services provided by proposer/vendor: Hired to migrate from Motorola SMARTNET simulcast system to standards based  
P25 network. See page 33

Company Name:

Company Address:

Telephone/email:

Contact Person:

Services provided by proposer/vendor:

**Attachment D**

**COST SUMMARY SHEET (Submit only one copy, in separate envelope with Original copy of submittal)**

Personnel Costs	\$ 71,160.00
ODC Costs	\$ 8,817.90
TOTAL COSTS	\$ 79,977.90

ORANGE COUNTY  
NORTH CAROLINA

Orange County  
Financial Services Department  
**ADDENDUM #1**  
February 8, 2016

RFQ 5217
Countywide Radio Communications Interoperability And Systems Engineering Services

To all Vendors:

Modifications to bid documents for the above-named Request for Proposal are made as follows and shall be included in the proposed amount.

Questions received with County's responses are on page 2 of this document

All other terms and conditions shall remain the same

By: David E. Cannell, Purchasing Agent; [dcannell@co.orange.nc.us](mailto:dcannell@co.orange.nc.us) / (919) 245-2651

**Acknowledgement of receipt of this addendum shall be included with your submittal**

Company Name: TUSA CONSULTING SERVICES  
By: DOMINIC TUSA [Signature]  
Date Received: 2-9-16

P.O. Box 8181 200 South Cameron Street Hillsborough, North Carolina 27278  
Telephones: Area Code 919-245-2651 Fax: 919-636-4913

1. Is the County expecting to replace the EMS/Fire Station Alerting System or only to provide audio and interface to this system?

The only system in place are consolettes at each station. The county is currently looking at station alerting systems independent of this study – we would not be opposed to the consultant assessing this.

2. Will the previous radio system studies be made available to the successful proposer for this work and if yes, do these studies contain detailed information describing the present system?

Yes, Orange County will provide previous study from CTA consultants in 2004. The studies do contain detailed information regarding VIPER and Legacy VHF/UHF – however, the study was done in 2004.

3. Does the County operate its own 911 dispatch center and if yes, how many radio console positions exist today?

Yes with 11 positions.

4. Is the project as described funded? What is the expected date for completion of the assessment and RFP development?

The work defined by the rfp is budgeted in this fiscal year's budget. As stated in the RFP we want respondents to propose a timeline based on the County's budget (CIP) process. A description of that timeline can be found here [http://www.orangecountync.gov/departments/orange\\_county\\_budget\\_documents.php#](http://www.orangecountync.gov/departments/orange_county_budget_documents.php#)

5. Currently, how many County public safety radios operate on the VIPER system?

Currently 1300 Radio IDs

6. We acknowledge your request of 2 copies of all cost information to be provided in a separate sealed envelope. Does the County desire to have any cost information, as described in Section 4.C & 4.D of the RFP, included in the technical proposal? Yes

7. Section 4.C Staff Qualifications and 4.D Experience requests the same information. May we use the Experience section to share with you our Firms' industry and project experience? Yes

8. In the RFP, Section 3.0; Subsection 3.C. states the terms of the contract are negotiable with the selected vendor. However on Attachment A: Signature of Affidavit it states that by submitting a proposal response the submitter agrees to the Terms & Conditions, and Specifications. Is it possible to acquire a copy of the Terms & Conditions for review prior to response? Or would the County make an addendum to the RFP to revise the language in Attachment A to reflect the Terms & Conditions as negotiable?

Yes, terms and conditions are negotiable. Attached is a copy of the County's template contract.

[Departmental Use Only]  
Title  
FY

NORTH CAROLINA

**CONSULTING SERVICES AGREEMENT -RFQ-**

ORANGE COUNTY

This Agreement, made and entered into this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_, (“Effective Date”) by and between Orange County, North Carolina a body politic and corporate of the State of North Carolina (hereinafter, the "County") and \_\_\_\_\_, (hereinafter, the "Consultant").

**WITNESSETH:**

That the County and Consultant, for the consideration herein named, do hereby agree as follows:

**ARTICLE 1           SCOPE OF WORK**

1.1       Scope of Work

1.1.1     This Services Agreement (“Agreement”) is for professional consulting services to be rendered by Consultant to County with respect to (insert type of project)

1.1.2     By executing this Agreement, the Consultant represents and agrees that Consultant is qualified to perform and fully capable of performing and providing the services required or necessary under this Agreement in a fully competent, professional and timely manner.

1.1.3     Time is of the essence with respect to this Agreement.

1.1.4     The services to be performed under this Agreement consist of Basic Services, as described and designated in Article 3 hereof. Compensation to the Consultant for Basic Services under this Agreement shall be as set forth herein.

**ARTICLE 2           RESPONSIBILITIES OF THE CONSULTANT**

2.1       Services to be Provided. The Consultant shall provide the County with all services required in Article 3 to satisfactorily complete the Project within the time limitations set forth herein and in accordance with the highest professional standards.

2.2.      Standard of Care

2.2.1     The Consultant shall exercise reasonable care and diligence in performing services under this Agreement in accordance with the highest generally accepted standards of this type of Consultant practice throughout the United States and in accordance with applicable federal, state and local laws and regulations applicable to the performance of these services. Consultant is solely responsible for the professional quality, accuracy and timely completion and submission

of all reports, drawings, specifications, plans, documents and services (hereinafter "Deliverables") related to the Basic Services.

2.2.2 The Consultant shall be responsible for all errors or omissions in the deliverables prepared by the Consultant.

2.2.3 The Consultant shall correct at no additional cost to the County any and all errors, omissions, discrepancies, ambiguities, mistakes or conflicts in any Deliverables prepared by the Consultant.

2.2.4 The Consultant shall assure that all Deliverables prepared by it hereunder are in accordance with applicable laws, statutes, and that any necessary or appropriate applications for approvals are submitted to federal, state and local governments or agencies in a timely manner so as not to delay the Project.

2.2.5 The Consultant shall not, except as otherwise provided for in this Agreement, subcontract the performance of any work under this Agreement without prior written permission of the County. No permission for subcontracting shall create, between the County and the subcontractor, any contract or any other relationship.

2.2.6 Any and all employees of the Consultant engaged by the Consultant in the performance of any work or services required of the Consultant under this Agreement, shall be considered employees or agents of the Consultant only and not of the County, and any and all claims that may or might arise under any workers compensation or other law or contract on behalf of said employees while so engaged shall be the sole obligation and responsibility of the Consultant.

2.2.7 Consultant agrees that Consultant and its subcontractors, if any, shall be required to comply with all federal, state and local anti-discrimination laws, regulations and policies that relate to the performance of Consultant's services under this Agreement.

2.2.8 If activities related to the performance of this agreement require specific licenses, certifications, or related credentials Consultant represents that it and/or its employees, agents and subcontractors engaged in such activities possess such licenses, certifications, or credentials and that such licenses certifications, or credentials are current, active, and not in a state of suspension or revocation.

### **ARTICLE 3            BASIC SERVICES**

#### **3.1        Basic Services**

3.1.1 The Consultant shall perform as Basic Services the work and services described herein and as specified in the County's Request for Qualifications RFQ Number        for (the "RFQ") issued        , 20        , which is fully incorporated and integrated herein by reference together with Attachments        (designate all attachments).

3.1.2 The Basic Services will be performed by the Consultant in accordance with the following schedule: (Insert task list and milestone dates)

<u>Task</u>	<u>Milestone Date</u>
1.	
2.	
3.	
4.	
5.	
6.	
7.	
8.	
9.	
10.	

3.1.3 Should County reasonably determine that Consultant has not met the Milestone Dates established in Section 3.1.2 of this Article, County shall notify Consultant of the failure to meet the Milestone Date. The County, at its discretion may provide the Consultant seven (7) days to cure the breach. County may withhold the accompanying payment without penalty until such time as Consultant cures the Breach. In the alternative, upon Consultant's failure to meet any Milestone Date the County may modify the Milestone Date schedule. Should Consultant or its representatives fail to cure the breach within seven (7) days, or fail to reasonably agree to such modified schedule County may immediately terminate this Agreement in writing without penalty or incurring further obligation to Consultant. This section shall not be interpreted to limit the definition of breach to the failure to meet Milestone Dates.

**ARTICLE 4      DURATION OF SERVICES**

4.1      Scheduling of Services

4.1.1      The Consultant shall schedule and perform his activities in a timely manner so as to meet the Milestone Dates listed in Article 3.

4.1.2      Should the County determine that the Consultant is behind schedule, it may require the Consultant to expedite and accelerate his efforts, including providing additional resources and working overtime, as necessary, to perform his services in accordance with the approved project schedule at no additional cost to the County.

4.1.3      The Commencement Date for the Consultant's Basic Services shall be \_\_\_\_\_.

**ARTICLE 5      COMPENSATION**

5.1      Compensation for Basic Services

5.1.1      Compensation for Basic Services shall include all compensation due the Consultant from the County for all services under this Agreement except for any authorized Reimbursable Expenses which are defined herein. The maximum amount payable for Basic Services is \_\_\_\_\_ Dollars (\$ \_\_\_\_\_). Payment for Basic Services shall become due and payable in direct proportion to satisfactory services performed and work accomplished. Payments will be made as percentages of the whole as Project milestones as set out in Section 3.1.2 are achieved. *(For example, if there are 10 Project Tasks with Milestone Dates then Consultant may invoice for the first 10% of the whole upon County's acknowledgement of the satisfactory completion of*

*Task one. Upon the County's acknowledgement that the second Task has been satisfactorily completed Consultant may invoice for the next 10% of the whole.)*

## **ARTICLE 6 RESPONSIBILITIES OF THE COUNTY**

### **6.1 Cooperation and Coordination**

6.1.1 The County has designated \_\_\_\_\_ to act as the County's representative with respect to the Project and shall have the authority to render decisions within guidelines established by the County Manager and the County Board of Commissioners and shall be available during working hours as often as may be reasonably required to render decisions and to furnish information.

6.1.2 The County shall be solely responsible for determining whether Consultant as satisfactorily completed Tasks associated with Milestone Dates. Upon County's written determination to Consultant that a Task has been satisfactorily completed by its accompanying Milestone Date Consultant may submit an invoice for payment. It is agreed that County shall not unreasonably withhold its determination of satisfactory completion of any Task. In the event the amount of an invoice is disputed County may withhold payment until the dispute is resolved by the parties. County may also withhold payment on an invoice until the satisfactory completion of a Task by Consultant.

## **ARTICLE 7 INSURANCE AND INDEMNITY**

### **7.1 General Requirements**

7.1.1 Consultant shall obtain, at its sole expense, Commercial General Liability Insurance, Automobile Insurance, Workers' Compensation Insurance, Professional Liability Insurance, and any additional insurance as may be required by Owner's Risk Manager as such insurance requirements are described in the Orange County Risk Transfer Policy and Orange County Minimum Insurance Coverage Requirements (each document is incorporated herein by reference \_\_\_\_\_ and \_\_\_\_\_ may \_\_\_\_\_ be \_\_\_\_\_ viewed \_\_\_\_\_ at [http://www.orangecountync.gov/departments/purchasing\\_division/contracts.php](http://www.orangecountync.gov/departments/purchasing_division/contracts.php)). If Owner's Risk Manager determines additional insurance coverage is required such additional insurance shall be designated here \_\_\_\_\_ (if no additional insurance required mark N/A as being not applicable). Consultant shall not commence work until such insurance is in effect and certification thereof has been received by the Owner's Risk Manager.

### **7.2 Indemnity**

7.2.1 The Consultant agrees to indemnify and hold harmless the County from all loss, liability, claims or expense, including attorney's fees, arising out of or related to the Project and arising from bodily injury including death or property damage to any person or persons caused in whole or in part by the negligence or misconduct of the Consultant except to the extent same are caused by the negligence or willful misconduct of the County. It is the intent of this provision to require the Consultant to indemnify the County to the fullest extent permitted under North Carolina law.

## **ARTICLE 8 AMENDMENTS TO THE AGREEMENT**

8.1 Changes in Basic Services

8.1.1 Changes in the Basic Services and entitlement to additional compensation or a change in duration of this Agreement shall be made by a written Amendment to this Agreement executed by the County and the Consultant. The Consultant shall proceed to perform the Services required by the Amendment only after receiving a fully executed Amendment from the County.

**ARTICLE 9 TERMINATION**

9.1 Termination for Convenience of the County

9.1.1 This Agreement may be terminated without cause by the County and for its convenience upon seven (7) days prior written notice to the Consultant.

9.2 Other Termination

9.2.1 The Consultant may terminate this Agreement based upon the County's material breach of this Agreement; provided, the County has not taken all reasonable actions to remedy the breach. The Consultant shall give the County seven (7) days' prior written notice of its intent to terminate this Agreement for cause.

9.3 Compensation After Termination

9.3.1 In the event of termination, the Consultant shall be paid that portion of the fees and expenses that it has earned to the date of termination, less any costs or expenses incurred or anticipated to be incurred by the County due to errors or omissions of the Consultant.

9.3.2 Should this Agreement be terminated, the Consultant shall deliver to the County within seven (7) days, at no additional cost, all Deliverables including any electronic data or files relating to the Project.

9.4 Waiver

9.4.1 The payment of any sums by the County under this Agreement or the failure of the County to require compliance by the Consultant with any provisions of this Agreement or the waiver by the County of any breach of this Agreement shall not constitute a waiver of any claim for damages by the County for any breach of this Agreement or a waiver of any other required compliance with this Agreement.

9.5 Suspension

9.5.1 County may suspend suspend the work at any time for County's convenience and without penalty to County upon three (3) days' notice to Consultant. Upon any suspension by County, Consultant shall discontinue the work and shall not resume the work until notified to proceed by County.

**ARTICLE 10 ADDITIONAL PROVISIONS**

## 10.1 Relationship of Parties

10.1.1 Consultant is an independent contractor of the County. Neither Consultant nor any employee of the Consultant shall be deemed an officer, employee or agent of the County. Consultant's personnel shall not be employees of, or have any contractual relationship with the County.

## 10.2 Limitation and Assignment

10.2.1 The County and the Consultant each bind themselves, their successors, assigns and legal representatives to the terms of this Agreement. Neither the County nor the Consultant shall assign or transfer its interest in this Agreement without the written consent of the other.

## 10.3 Governing Law

10.3.1 This Agreement and the duties, responsibilities, obligations and rights of respective parties hereunder shall be governed by the laws of the State of North Carolina. Consultant shall at all times remain in compliance with all applicable local, state, and federal laws, rules, and regulations including but not limited to all anti-discrimination laws. By executing this Agreement Provider affirms that Provider and any subcontractors of Provider are and shall remain in compliance with Article 2 of Chapter 64 of the North Carolina General Statutes. Where applicable, failure to maintain compliance with the requirements of Article 2 of Chapter 64 of the General Statutes constitutes Consultant's breach of this Agreement. By executing this Agreement Consultant affirms Consultant is in compliance with Article 2 of Chapter 64 of the North Carolina General Statutes.

## 10.4 Dispute Resolution

10.4.1 Any and all suits or actions to enforce, interpret or seek damages with respect to any provision of, or the performance or non-performance of, this Agreement shall be brought in the General Court of Justice of North Carolina sitting in Orange County, North Carolina and it is agreed by the parties that no other court shall have jurisdiction or venue with respect to such suits or actions. The Parties may agree to nonbinding mediation of any dispute prior to the bringing of such suit or action.

## 10.5 Extent of Agreement

10.5.1 This Agreement, together with the RFQ and attachments distributed by the County and the Consultant's submitted response to the RFQ, all of which constitute the Contract Documents, represents the entire and integrated agreement between the County and the Consultant and supersedes all prior negotiations, representations or agreements, either written or oral. In the event of a conflict among the terms of the Contract Documents, the priority of documents shall be this Agreement, the County's RFQ, attachments to the County's RFQ, and the Consultant's response to the RFQ. This Agreement may be amended only by written instrument signed by both parties. Modifications may be evidenced by facsimile signatures.

## 10.6 Severability

10.6.1 If any provision of this Agreement is held as a matter of law to be unenforceable, the remainder of this Agreement shall be valid and binding upon the Parties.

10.7 Ownership of Deliverables

10.7.1 All Deliverables, together with all supporting materials, source documentation, data collected, field notes, and working drafts, developed in the performance of this Agreement shall become the property of the County and may be used on any other project without additional compensation to the Consultant. The use of the Deliverables by the County or by any person or entity for any purpose other than the Project as set forth in this Agreement shall be at the full risk of the County.

10.8 Non-Appropriation

10.8.1 Consultant acknowledges that County is a governmental entity, and the validity of this Agreement is based upon the availability of public funding under the authority of its statutory mandate.

In the event that public funds are unavailable and not appropriated for the performance of County's obligations under this Agreement, then this Agreement shall automatically expire without penalty to County immediately upon written notice to Consultant of the unavailability and non-appropriation of public funds. It is expressly agreed that County shall not activate this non-appropriation provision for its convenience or to circumvent the requirements of this Agreement, but only as an emergency fiscal measure during a substantial fiscal crisis.

In the event of a change in the County's statutory authority, mandate and/or mandated functions, by state and/or federal legislative or regulatory action, which adversely affects County's authority to continue its obligations under this Agreement, then this Agreement shall automatically terminate without penalty to County upon written notice to Consultant of such limitation or change in County's legal authority.

10.9 Notices and Signatures

10.9.1 This Agreement together with any amendments or modifications may be executed electronically. All electronic signatures affixed hereto evidence the intent of the Parties to comply with Article 11A and Article 40 of North Carolina General Statute Chapter 66.

10.9.2 Any notice required by this Agreement shall be in writing and delivered by certified or registered mail, return receipt requested to the following:

Orange County  
Attention:  
P.O. Box 8181  
Hillsborough, NC 27278

Consultant's Name & Address

[SIGNATURE PAGE TO FOLLOW]

IN WITNESS WHEREOF, the Parties, by and through their authorized agents, have hereunder set their hands and seal, all as of the day and year first above written.

**ORANGE COUNTY:**

**PROVIDER:**

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

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

Orange County

*Printed Name and Title*

ORANGE COUNTY  
NORTH CAROLINA

Orange County  
Financial Services Department  
**ADDENDUM #2**  
**February 12, 2016**

RFQ 5217
Countywide Radio Communications Interoperability And Systems Engineering Services

To all Vendors:

Modifications to bid documents for the above-named Request for Proposal are made as follows and shall be included in the proposed amount.

The due date has been extended to March 1, 2016 at 5:00 pm. We anticipate issuing at least one additional addendum to address questions received

All other terms and conditions shall remain the same

By: David E. Cannell, Purchasing Agent; [dcannell@co.orange.nc.us](mailto:dcannell@co.orange.nc.us) / (919) 245-2651

**Acknowledgement of receipt of this addendum shall be included with your submittal**

Company Name: TUSA CONSULTING SERVICES

By: DOMINIC TUSA

Date Received: 2-12-16

P.O. Box 8181 200 South Cameron Street Hillsborough, North Carolina 27278  
Telephones: Area Code 919-245-2651 Fax: 919-636-4913

ORANGE COUNTY  
NORTH CAROLINA

Orange County  
Financial Services Department  
**ADDENDUM #3**  
**February 23, 2016**

Orange Co.	RFQ 5217
Countywide Radio Communications Interoperability And Systems Engineering Services	

To all Vendors:

Modifications to bid documents for the above-named Request for Proposal are made as follows and shall be included in the proposed amount.

Questions received with County's responses are on pages 2-4 of this document

By: David E. Cannell  
All other terms and conditions shall remain the same

By: David E. Cannell, Purchasing Agent; [dcannell@co.orange.nc.us](mailto:dcannell@co.orange.nc.us) / (919) 245-2651

By: **Acknowledgement of receipt of this addendum shall be included with your submittal**

By: TUSA CONSULTING SERVICES  
Company Name: \_\_\_\_\_  
By: D.F. TUSA [Signature]  
By: \_\_\_\_\_  
Date Received: 2-23-16  
Date Received: \_\_\_\_\_

P.O. Box 8181 200 South Cameron Street Hillsborough, North Carolina 27278  
Telephones: Area Code 919-245-2651 Fax: 919-636-4913

## 1.0 General Information

### 1.1 B Scope of the Project

#### 1.1.3 Background

**RFP Statement:** The Orange County Emergency Communications Center currently dispatches law enforcement, fire, EMS and all County and local municipality users.

**Question:** Will you provide a list of all county and local municipality users dispatched by the Emergency Communications Center?

Current VIPER System users:

Law Enforcement – Orange County Sheriffs Dept, Chapel Hill Police, Carrboro Police, Hillsborough Police

EMS – Orange County EMS, South Orange Rescue Squad

Fire Departments – Municipal – Chapel Hill Fire, Carrboro Fire, Hillsborough Fire

Orange County Volunteer/Mixed – Efland Fire, Eno Fire, New Hope Fire, Orange Grove Fire, Cedar Grove Fire, Caldwell Fire, White Cross Fire, Mebane Fire, North Chatham Fire

Additions with this system:

Orange County Animal Control, Orange County Solid Waste, Orange County Transit, Orange County Asset Management

all Town of Chapel Hill, Town of Carrboro, Town of Hillsborough departments and OWASA (a private water system within the county.)

**Question:** Are there other dispatch centers including back-up dispatch centers to be included in the Scope of Work for this project? If there are other dispatch centers, will they be included in this project and will the County considering a detailed dispatch center consolidation assessment plan as part of this project?

UNC Public Safety dispatch is within our jurisdiction that handles law enforcement, security, parking for UNC Chapel Hill. We are currently working out back up plan with Alamance County.

**RFP Statement:** In addition to the VIPER and County VHF Paging systems, there are numerous other radio systems in operation within the County that are in various stages of decay. Solid Waste, Orange County Transportation and local governments to include Towns of Carrboro, Chapel Hill, and Hillsborough operating their own, distinct radio systems for various systems such as Public Work, Transit, Schools, etc. The Orange Water and Sewer Authority (OWASA) also operates a distinct radio system.

**Question:** Are there any other radio or other systems not included in this list that will be included in the project to include SCADA, mobile data, automatic vehicle location, records management, CAD, etc. that exists today that will be required in the systems assessment and recommendations for upgrade or inclusion in assessment report? All mobile data at this time is handled by consumer LTE. The county has started a broadband initiative, so LTE integration may be welcomed.

**Question:** How many agencies or entities will the consultant be interviewing during the needs assessment phase? There is a radio system workgroup that would be the majority of the interviews, but interviews with all partner agencies may be warranted.

**RFP Statement:** While the County has conducted numerous studies of radio communications, none of these studies has been definitive. None of these studies have provided enough information to provide a clear direction for the policy makers and decision makers in the County to identify a solution to the problem.

**Question:** Will all of studies be provided to the firm chosen for this project and will these studies be in electronic or paper format for internal distribution to the project team? Is there an Orange County Tactical Interoperable Communications Plan and/or a Regional Tactical Interoperable Communications Plan available for review by the firm chosen?

## 5.0 Scope of Work

### 5.1 A Introduction and Definitions

#### Bullet 2:

**RFP Statement:** 2. Communications infrastructure backbone (microwave, fiber, or other)

**Question:** Does the County own any infrastructure backbone (microwave, fiber, or other) or are all systems operating on the VIPER microwave infrastructure? The County does own legacy vhf/uhf system, but as part of this needs assessment that needs to be built out. Most of current infrastructure does belong to VIPER.

**Bullet 3:**

**RFP Statement:** 3. New and/or upgrades to existing towers, supporting buildings, and backup power.

**Question:** It is understood that the Authority (OWASA) also operates a distinct radio system. Does this system operate on VIPER towers, on Authority owned towers, County owned towers, or do they have equipment co-located on towers owned and operated by other entities?

**Question:** Are there any Authority SCADA requirements that need to be addressed during this effort? This would be based on the needs of services, such as OWASA, in using radio to control valve openings, etc. and would need to be incorporated in the interview process.

**Question:** How many towers are included in this project that are not owned and maintained by the County other than the VIPER towers? The 5 current VIPER towers are not owned by the County, plus based on needs assessment there is funding per year for up to three more towers based on previous coverage maps.

**Bullet 5:**

**RFP Statement:** Voice paging infrastructure

**Question:** Does the current voice paging system have antenna sites independent of the VIPER towers and if so are they located on towers owned by the County? No, they are on the same towers.

**Question:** How many sites are used to transmit the voice paging system? 2 which are not providing proper coverage.

**Bullet 6:**

**RFP Statement:** Fire and EMS station alerting infrastructure

**Question:** Do all entities and Fire/EMS departments utilize the same station alerting infrastructure and if not, how many are included in this project? The only current station alerting in place station radios with tones. We would like to look at what "basic" infrastructure would be needed to get all EMS/Fire departments on the same station alerting infrastructure.

**Question:** Is the Fire and EMS alerting infrastructure defined at the station location as the receiver only or will the County require the report to include the building functions (bells, lights, door operations, gas shut-offs, etc.) as part of the infrastructure? The County, Fire depts., and EMS are currently looking at Station Alerting solutions, but can be included.

**5.0 Scope of Work**

**5. B Study Expectations**

**Question:** In several instances, the RFP mentions agencies and user entities whose input will be required during the needs assessment phase. To assist our understanding of the level of effort, can a quantity of agencies /entities, or a list, be supplied? See Above.

**Section 3.a**

**RFP Statement:** Frequency range (low band, high band, UHF, 700, 800) and analysis of spectrum availability within each frequency range.

**Question:** Are frequency searches expected or required for the analysis of spectrum availability within each of the listed frequency bands? Yes – but more interested in your providing what frequencies are available for licensing within the recommended frequency range.

**Section 3.h.ii**

**RFP Statement:** Interoperability with adjoining County Emergency Service entities (for adjoining County units responding into Orange County, and for Orange County units responding into adjacent Counties).

**Question:** Which adjoining counties are included in the requirement of interoperability? Durham, Alamance, Person, Chatham, Caswell, and State VIPER system

**5.0 Scope of Work**

**5. C Work to be Performed**

**Bullet 9**

**RFP Statement:** Create and submit computer aided design (CAD) drawings as required.

**Question:** If computer aided drawing are necessary, may drawings be supplied via the Visio software drawing application? Yes and should be exported as a PDF document.

**5.0 Scope of Work**

**5. D Deliverables**

**Bullet 6:** A vendor-neutral RFP, including recommended tower requirements suitable to be released to the vendor community for the purposes of procuring the approved alternative.

**Question:** Does the County desire tower structural analysis reports, tower modification drawings, and greenfield tower requirements to be included in this effort? Yes to all except need clarification of greenfield tower sites.

1. **Question 4, Addendum 1** asks the County to identify their expected dates for the completion of the assessment and RFP. The answer to question 4 in Addendum 1 states:

*"The work defined by the RFP is budgeted in this fiscal year's budget. As stated in the RFP we want respondents to propose a timeline based on the County's budget (CIP) process."*

The link provided in the addendum states *"the first year of the CIP's budget is adopted in June, in conjunction with the operating budget"*

a. Does Orange County require that the consultant complete all needs assessment, alternatives analysis and budgetary estimation tasks for inclusion in the CIP process in May-June 2016? No, however the cip is for long range budgeting, so any information within those time constraints would be helpful

2. **RFP B.1.3—Background** states the following:

*"In addition to the VIPER and County VHF Paging systems, there are numerous other radio systems in operation within the County that are in various stages of decay. Solid Waste and Orange County Transportation and local governments, including the Towns of Carrboro, Chapel Hill, and Hillsborough operate their own, distinct radio systems for various services such as Public Works, Transit, Schools, etc. The Orange Water and Sewer Authority (OWASA) also operate a distinct radio system."*

a. Will the County provide a list of the agencies that will need to be interviewed as part of the Needs Analysis phase of the project? See above

b. Will the County identify which if any of the other "numerous radio systems" will also need to be assessed as part of this project? See above, question asked prior.

Question 1

Response 1

Section 3

Section 3

RFP Section

Section 3

Question 1

Response 1

Section 3

RFP Section

Section 3

Bullet 3

RFP Section

Question 1

Response 1

Section 3

Question 1

Response 1

Question 1

Response 1

Bullet 5

RFP Section

RFP Section

Question 1

Bullet 6

RFP Section

ORANGE COUNTY  
NORTH CAROLINA

Orange County  
Financial Services Department  
**ADDENDUM #4**  
**February 24, 2016**

RFQ 5217

Countywide Radio Communications Interoperability And Systems Engineering Services

To all Vendors:

Modifications to bid documents for the above-named Request for Proposal are made as follows and shall be included in the proposed amount.

Questions received with County's responses are on page 2 of this document

All other terms and conditions shall remain the same

Contact: David E. Cannell, Purchasing Agent; [dcannell@co.orange.nc.us](mailto:dcannell@co.orange.nc.us) / (919) 245-2651

**Acknowledgement of receipt of this addendum shall be included with your submittal**

Company Name: TUSA CONSULTING SERVICES  
By: D. F. T...  
Date Received: 2-24-16

P.O. Box 8181 200 South Cameron Street Hillsborough, North Carolina 27278  
Telephones: Area Code 919-245-2651 Fax: 919-636-4913

"Bullet 6: A vendor-neutral RFP, including recommended tower requirements suitable to be released to the vendor community for the purposes of procuring the approved alternative.

Question: Does the County desire tower structural analysis reports, tower modification drawings, and greenfield tower requirements to be included in this effort? Yes to all except need clarification of greenfield tower sites."

To be clear the County will expect the selected Consultant to complete structural analysis of existing towers that may be used in the proposed design? Any new tower construction would not require a structural analysis as it would be built know the loads and future load requirements. Structural analysis of existing tower data is available through the Federal Engineering Study from 2013; however, that study is based on the existing VIPER and Legacy systems. Additional tower sites were recommended, again, based on the existing radio system.

"RFP Statement: Interoperability with adjoining County Emergency Service entities (for adjoining County units responding into Orange County, and for Orange County units responding into adjacent Counties).

Question: Which adjoining counties are included in the requirement of interoperability? Durham, Alamance, Person, Chatham, Caswell, and State VIPER system."

Is it anticipated that the selected Consultant will conduct interviews with each of the listed agencies? There is a radio committee with members representing each discipline (including county and municipalities). We would be more than willing to set up interviews with any agency you request.

Or will the selected Consultant be able to gather the required information from Orange County personnel with respect to the requirements of interoperability with these agencies? See above.

Section 6 Cost Proposal requires that pricing be submitted in a separate sealed envelope. Section 2.E. Proposal Organization and Format calls for the Cost Summary page to be included in the technical response. Should we include it there or just in the separate sealed Cost Proposal? Please clarify where we should include our cost proposal. Per the RRP

Two (2) copies of the cost proposal should be submitted in a separate envelope with the written proposal. The proposal will be scored using a standard quantitative calculation where the most cost criteria points will be awarded to the proposal with the lowest cost.

We want any cost information to be included in a separate envelope, and included with the submittal that is turned in. We want to distribute technical responses for evaluation with cost information