

IN THE COUNTY LEGISLATURE OF JACKSON COUNTY, MISSOURI

A RESOLUTION authorizing the County Executive to execute a Consulting Agreement with Tusa Consulting Services of Covington, LA, for a radio system study and conceptual design for use by the Sheriff's Office, at a cost to the County not to exceed \$38,250.00, as a sole source purchase.

RESOLUTION #17575, April 18, 2011

INTRODUCED BY James D. Tindall, County Legislator

WHEREAS, the Federal Communications Commission has mandated that by January 1, 2013, all public safety radio systems must "narrowband," which means the reduction of the occupied bandwidth from the current wideband analog system; and,

WHEREAS, because of the complex technology issue involved in this conversion, the County has the need for assistance in analyzing viable options for compliance; and,

WHEREAS, Tusa Consulting Services (TCS) of Covington, LA, previously assisted the Mid-America Regional Council on radio system planning in the Kansas City area and would provide the County with a needs assessment and conceptual design for a new system; and,

WHEREAS, section 1030.1, Jackson County Code, 1984, eliminates the requirement for competitive bidding when items or services to be purchased can be obtained from only one source and requires notification of and approval by the Legislature on such sole source purchases exceeding \$25,000.00; and,

WHEREAS, the Director of Finance and Purchasing recommends the award of a contract for consulting services with TCS as a sole source purchase because of its unique knowledge and experience in dealing with the FCC conversion issue, particularly the issues presented in the Kansas City area; now therefore,

BE IT RESOLVED by the County Legislature of Jackson County, Missouri, that the County Executive be and hereby is authorized to execute for the County a Consulting Agreement with Tusa Consulting Services, in a form to be approved by the County Counselor, at a cost to the County not to exceed \$38,250.00; and,

BE IT FURTHER RESOLVED that the Director of Finance and Purchasing be and hereby is authorized to make all payments, including final payment on the contract.

Effective Date: This Resolution shall be effective immediately upon its passage by a majority of the Legislature.

APPROVED AS TO FORM:

[Signature]
Chief Deputy County Counselor

[Signature]
County Counselor

Certificate of Passage

I hereby certify that the attached resolution, Resolution #17575 of April 18, 2011, was duly passed on April 25, 2011 by the Jackson County Legislature. The votes thereon were as follows:

Yeas 7

Nays 0

Abstaining 0

Absent 2

4.26.11
Date

[Signature]
Mary Jo Spino, Clerk of Legislature

There is a balance otherwise unencumbered to the credit of the appropriation to which the expenditure is chargeable and there is a cash balance otherwise unencumbered in the treasury to the credit of the fund from which payment is to be made each sufficient to provide for the obligation herein authorized.

ACCOUNT NUMBER: 004 5104 56080
ACCOUNT TITLE: Road and Bridge Fund
Non-Departmental
Other Professional Services
NOT TO EXCEED: \$38,250.00

April 14, 2011
Date

[Signature]
Director of Finance and Purchasing

REQUEST FOR LEGISLATIVE ACTION

Completed by County Counselor's Office:

Res/Ord. No.: 17575

Sponsor(s): James D. Tindall

Date: April 18, 2011

<p>SUBJECT</p>	<p>Action Requested <input type="checkbox"/> Resolution <input checked="" type="checkbox"/> Ordinance</p> <p>Project/Title: <u>An ordinance awarding a contract to Tusa Consulting Services to conduct a Radio System Study and Conceptual Design for the County's public safety radio system.</u></p>												
<p>BUDGET INFORMATION <i>To be completed By Requesting Department and Finance</i></p>	<table border="1" data-bbox="324 556 1201 903"> <tr> <td>Amount authorized by this legislation this fiscal year:</td> <td>\$38,250.00</td> </tr> <tr> <td>Amount previously authorized this fiscal year:</td> <td>\$0</td> </tr> <tr> <td>Total amount authorized after this legislative action:</td> <td>\$38,520.00</td> </tr> <tr> <td>Amount budgeted for this item * (including transfers):</td> <td>\$38,250.00</td> </tr> <tr> <td>Source of funding (name of fund) and account code number:</td> <td></td> </tr> <tr> <td>FROM: 004-5104-56080 – Other Professional Services</td> <td>\$38,250.00</td> </tr> </table> <p>* If account includes additional funds for other expenses, total budgeted in the account is: \$</p> <p>OTHER FINANCIAL INFORMATION:</p> <p><input type="checkbox"/> No budget impact (no fiscal note required) <input type="checkbox"/> Term and Supply Contract (funds approved in the annual budget); estimated value and use of contract: Department: Estimated Use: \$</p> <p>Prior Year Budget (if applicable): Prior Year Actual Amount Spent (if applicable):</p>	Amount authorized by this legislation this fiscal year:	\$38,250.00	Amount previously authorized this fiscal year:	\$0	Total amount authorized after this legislative action:	\$38,520.00	Amount budgeted for this item * (including transfers):	\$38,250.00	Source of funding (name of fund) and account code number:		FROM: 004-5104-56080 – Other Professional Services	\$38,250.00
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FROM: 004-5104-56080 – Other Professional Services	\$38,250.00												
<p>PRIOR LEGISLATION</p>	<p>Prior ordinances and (date): N/A</p> <p>Prior resolutions and (date): N/A</p>												
<p>CONTACT INFORMATION</p>	<p>RLA drafted by (name, title, & phone): Amiee Wenson, Senior Admin. Manager, 816-881-3073</p>												
<p>REQUEST SUMMARY</p>	<p>Jackson County, along with other radio system users across the United States, is under a mandate to “narrowband” our current public safety radio system by order of the Federal Communications Commission (FCC) no later than January 1, 2013. This will require a significant investment to upgrade our public safety equipment and support systems. Because of the complex*technologic nature of the issue, the County needs assistance in analyzing viable options for compliance with this mandate.</p> <p>The attached proposal from Tusa Consulting Services (TCS) includes a comprehensive approach to analyzing solutions for upgrading the County’s radio system. At this time, staff is requesting approval to enter a contract for Phase I and Phase II of the proposal, which would provide a needs assessment and conceptual design for a new system. After those items have been completed, the County will be able to analyze options and better understand what resources will be required to implement a new radio system.</p> <p>Staff is requesting approval of this sole source contract. Because of their previous work in the region with Mid-</p>												

	America Regional Council for radio system planning throughout the metro as well as their work developing specific plans for other jurisdictions including metro-area municipalities, Tusa Consulting Services is in a unique position to provide the best service to the County including representatives who are familiar with the efforts of surrounding agencies and how Jackson County might best work with these agencies in cooperation.	
CLEARANCE	<input type="checkbox"/> Tax Clearance Completed (Purchasing & Department) <input type="checkbox"/> Business License Verified (Purchasing & Department) <input type="checkbox"/> Chapter 6 Compliance - Affirmative Action/Prevailing Wage (County Auditor's Office)	
ATTACHMENTS	Proposal from Tusa Consulting Services for Radio System Study and Conceptual Design	
REVIEW	Department Director:	Date:
	Finance (Budget Approval): <i>If applicable</i> <i>Heberan Ball</i>	Date: <i>4-13-11</i>
	Division Manager: <i>[Signature]</i>	Date: <i>4/13/11</i>
	County Counselor's Office:	Date:

Fiscal Information (to be verified by Budget Office in Finance Department)

- This expenditure was included in the annual budget.
- Funds for this were encumbered from the _____ Fund in _____.
- There is a balance otherwise unencumbered to the credit of the appropriation to which the expenditure is chargeable and there is a cash balance otherwise unencumbered in the treasury to the credit of the fund from which payment is to be made each sufficient to provide for the obligation herein authorized.
- Funds sufficient for this expenditure will be/were appropriated by Ordinance # _____
- Funds sufficient for this appropriation are available from the source indicated below.

Account Number:	Account Title:	Amount Not to Exceed:

- This award is made on a need basis and does not obligate Jackson County to pay any specific amount. The availability of funds for specific purchases will, of necessity, be determined as each using agency places its order.
- This legislative action does not impact the County financially and does not require Finance/Budget approval.



tusa | consulting services
Our Radio Systems Speak for Themselves.

March 30, 2011

Ms Shelley Temple-Kneuvean - Deputy Chief Administrative Officer
Jackson County Courthouse
415 E. 12th Street, 2nd Floor
Kansas City, MO 64106

Reference: Radio System Consulting Proposal

Dear Ms Temple-Kneuvean,

Per our recent discussion, I am submitting the attached Radio Systems Consulting Proposal for your consideration.

Tusa Consulting Services is currently providing radio system consulting services to multiple municipalities and counties within the greater Kansas City area. We have developed an in-depth understanding of the radio systems environment in the area and will apply that knowledge to developing practical and timely solutions for Jackson County.

Our team is excited by this opportunity and the possibility of partnering with Jackson County on such a vital and necessary project. Please let me know if you have any questions about our proposal.

Sincerely,

TUSA CONSULTING SERVICES

Jack

Jack Hart – Senior Consultant

Radio System Study & Conceptual Design Proposal
Jackson County, Missouri
TUSA CONSULTING SERVICES

Phase I	Needs Assessment		Hours	Cost
<u>Task</u>	<u>Description</u>			
1.1	Project Initiation - Kickoff Meeting		16	\$2,160.00
1.2	Understanding of Users Needs		40	\$5,400.00
1.3	Evaluate Existing Communications Facilities		24	\$3,240.00
1.4	Existing System Coverage Analysis		24	\$3,240.00
	Radio System Assessment Report		40	\$5,400.00
	<i>Costs are Inclusive of Travel Expenses</i>			
		Phase I Total		\$19,440.00

Phase II	Conceptual Design		Hours	Cost
<u>Task</u>	<u>Description</u>			
2.1	Conceptual System Coverage Design		40	\$5,400.00
2.2	Voice Communications Network		16	\$2,160.00
2.3	Backhaul Infrastructure Solutions		8	\$1,080.00
2.4	Interoperability: County, Regional and State Level		8	\$1,080.00
2.5	Conceptual Report and Recommendations		40	\$5,400.00
2.6	Oral Presentation to Jackson County		16	\$2,160.00
	Administrative Support		40	\$1,800.00
	<i>Costs are Inclusive of Travel Expenses</i>			
		Phase II Total		\$19,080.00

TOTAL - PHASE I & PHASE II	\$38,520.00
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Phase III	RFP Specification		Hours	Cost
<u>Task</u>	<u>Description</u>			
	(OPTIONAL)			
3.1	RFP Specification Development		120	\$16,200.00
3.2	Develop Evaluation Worksheets		40	\$5,400.00

3.3	Pre-Proposal Conference	32	\$4,320.00
3.4	Evaluation of Vendor Proposals	120	\$16,200.00
3.5	Assistance with Contract Negotiations	40	\$5,400.00
	Project Oversight	24	\$3,240.00
	Administrative Support	80	<u>\$3,600.00</u>
	<i>Costs are Inclusive of Travel Expenses</i>	Phase III Total	\$54,360.00

Phase IV	Implementation	Hours	Cost
<u>Task</u>	<u>Description</u>	<u>TBD</u>	<u>TBD</u>
	(OPTIONAL)		

Rate of Services	Hourly
<u>Description</u>	
Senior Consultant	\$135.00
Administrative	\$45.00

**Proposal for Radio System Study & Conceptual Design
Jackson County, Missouri**

Radio System Study & Conceptual Design Options

Introduction

Jackson County, Missouri, wishes to investigate options related to the evolution of its current VHF analog conventional radio network. The County Sheriff's Department operates a conventional single-site radio system which provides VHF mobile coverage to most of central and eastern Jackson County. The north central and western portions of the County are also covered by the Metropolitan Area Regional Radio System (MARRS) which is a wide-area 700/800 MHz P25 digital network comprised of the City Independence, Kansas City, MO, and Johnson County, KS, radio networks.

The FCC has mandated that all users of Part 90 radio systems between 150 and 512 MHz must reduce the occupied bandwidth of their current wideband analog systems ("narrowbanding") by January 1, 2013; Jackson County's radio system is subject to this requirement. Options to be investigated include transition to a narrowband-compliant system with necessary improvements to serve portable radios users, or development of a new 700/800 MHz radio system based upon Project-25 digital technology, seamlessly interoperable with the MARRS network.

Tusa Consulting Services (TCS) has been asked to provide a proposal to Jackson County that would address the County's needs.

TCS Proposal

The primary goal of our team's proposed assistance is to provide qualified radio communications system advice, guidance, and support in a manner that addresses the County's need for a timely, cost-effective and successful radio network solution.

In our proposed set of services, TCS is focused and committed to *fully satisfy* Jackson County's radio system assessment and upgrade objectives. Additionally, we will commit TCS resources to complete this project's needs assessment and conceptual design phases in a timely, schedule-driven manner. In order to develop a clear definition of consultant requirements, and to explore the complex technology and cost-benefit issues involved with potential solutions, the TCS approach and methodology focuses on these key tasks:

- Understanding of user agency current and future needs;
- Analysis of present-system radio coverage, capacity, reliability and interoperability;
- Identification of existing infrastructure assets, in order to maximize the County's existing communication investment;
- Use of coverage modeling tools to evaluate new-system coverage potential and conceptual new tower site(s);
- Development of system enhancement options;
- Optional development of procurement specifications for release to vendors (RFP);
- Optional technical support during subsequent vendor contract negotiations;

**Proposal for Radio System Study & Conceptual Design
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- Optional Project Management services to oversee successful deployment of the new radio system.

TCS' proposed tasks are flexible and customizable, based on County needs and requirements.

TCS Phased Approach

Tusa Consulting Services offers the following approach to address the County's requirements. These proposed tasks can be modified based on feedback from the County's project team. The following four project phases, and their assigned tasks, will deliver a successfully deployed solution.

- Phase I - Needs Assessment/Current System Review
- Phase II - Analysis of Conceptual Solutions
- Phase III - Procurement (optional)
- Phase IV - Implementation (optional)

PHASE I: NEEDS ASSESSMENT

Task 1.1

Project Initiation – Kickoff Meeting

During this task, we will meet with the County's designated project management team and other key personnel to confirm the project organization and the roles and responsibilities of the project participants. We will also identify County resources that we will need to contact as part of the project.

Areas we intend to cover include:

- Introduction of TCS team members;
- Review of the Project's Scope of Work;
- Review of contracted work plan, and schedule;
- Confirmation of communications and progress reporting procedures

As part of this task, we will also work closely with the County's Project Manager to define project management standards, process, report formats and metrics that will be used throughout the course of the project.

Task 1.2

Understanding of User Needs

TCS will conduct on-site interviews with County-identified user groups, inclusive of public safety/local government agencies now utilizing the County's radio resources. These interviews will follow a set interview format designed to gather information that describes existing-system

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advantages and disadvantages, as well as desired network improvements and long-term communication needs. TCS shall provide an interview Questionnaire in advance of any on-site interviews, thus County-designated personnel would have time to collect that data necessary to successfully conclude each interview session.

We will review the data collected through these on-site interviews and distill this information into an Interview Summary Report that describes immediate requirements, goals, functional expectations, minimally-acceptable interoperability access, and long term requirements.

An understanding of user needs is absolutely the most important step in the development of the future total communication network concept.

Without a firm, solid and accurate understanding of agency needs and radio user expectations, a designer risks developing conceptual solutions that satisfy relatively few users and fall below agency expectations. In short, the project fails. There have been many cases, reported in print media or on the Internet, where costly and highly complex radio system deployments have failed to meet expectations. History suggests that this Needs Assessment task is critically important to the success of the County's modernization project.

Task 1.3

Evaluate Existing Communication Facilities

In this task, TCS personnel would evaluate the County's primary/backup radio infrastructure sites as well as the County-operated radio dispatch center. We will specifically evaluate all County radio system-related sites for each of the specific criteria:

- Type/Models of installed infrastructure equipment (including an assessment of narrowband capability of each item);
- Assessment of available space to install new system equipment;
- Assessment of HVAC and existing electrical power systems to support new equipment;
- Confirmation of FCC/FAA tower registration numbers and as-licensed site coordinates;
- Assessment of lightning protection/grounding systems;
- Assessment of fire suppression systems;
- General assessment of feasibility of existing tower structures to support additional antenna loads.

In the course of investigating existing conditions, our consultants would also evaluate existing maintenance practices and documentation procedures for both repair and preventative maintenance functions.

Should it become necessary, and subsequently requested by the County, for a Missouri-registered Professional Engineer to conduct tower loading analysis, which is work that is outside the scope of this base-level assessment, such work would be quoted as an additional service.

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TCS always attempts, to the maximum extent possible, to leverage existing resources in the deployment of its enhanced communications network. Typically, such resources include tower sites, building facilities, dispatch centers, HVAC systems, interconnectivity, and emergency power systems.

Radio Dispatch Center Analysis

It is important for the Consultant to evaluate the suitability of existing radio control equipment, control stations, and related radio console devices utilized in the County's dispatch center. TCS would identify those equipment groupings, if any, which would have an ongoing relevance in the context of a new, modernized radio network.

The on-site dispatch center equipment assessment is included in our infrastructure inspection activity. We will also spend time monitoring dispatch operations to better understand operational issues related to the use of the radio system.

Task 1.4

Perform Coverage Verification

The single-most important feature of any radio communications system is coverage. Today's modern public safety radio networks are designed to provide superior coverage to a hip-worn portable radio. The situations that police, fire and rescue personnel experience place heightened demands on hand-held radio performance. The portable radio supports an invisible lifeline between the user, the dispatcher, and others performing related tasks. No matter how difficult the situation, a radio-equipped user is never alone, provided that specific factors influencing radio coverage were fully investigated, understood and considered during the system's design. Many legacy VHF radio networks have not evolved to support the use of a portable radio, even though portable radios might be deployed to network users.

In order to develop an understanding of current system performance, TCS would develop coverage modeling of the existing-system configuration using information obtained earlier from the Infrastructure Survey (Task 1.3).

As part of our base coverage evaluation services, a series of coverage maps would be developed. These would include:

1. Talk-Out coverage – base to mobile/portable
2. Talk-In coverage – mobile/portable to base

Quite often, VHF systems are not balanced, meaning the base talks out a lot further than it can "hear". This coverage analysis will graphically illustrate this situation, if it exists.

Upon completion of Phase I tasks, a Radio System Assessment Report will be submitted to Jackson County.

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PHASE II: DEVELOP CONCEPTUAL SYSTEM SOLUTIONS

Task 2.1

Conceptual System Coverage Design

Utilizing the coverage verification information derived by Task 1.4, TCS would renew its propagation modeling with the aim of addressing known coverage shortfalls. Ultimately, this work will drive the configuration of potential modernized network solutions.

The advent of high-speed desktop computing has ushered in an era of unprecedented precision in the development of modern public safety communication systems. Fifteen years ago, it was customary to install test transmitters within a given locale to predict the degree of coverage attainable from individual antenna sites. However, today's abundance of actual signal strength test data from constructed cellular, commercial and public safety communication networks has permitted the development of highly accurate loss prediction models. These models, coupled with enhanced manufacturing data from antenna system producers and established standards for coverage verification (TIA/TSB-88), now allow engineers and consultants to rapidly design coverage-compliant radios systems to a level of reliability that was unheard of in the early 1990s.

The tool engaged by Tusa Consulting Services uses a Graphical User Interface to manipulate complex radio propagation equations (Okumura Adaptive Model) and displays the results graphically as a user coverage map. System variables such as tower location, coaxial cable 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.

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 a desired geographical service area, the designer can then further adjust system variables or add sites until the predicted coverage coincides with the desired service area. This iterative design approach permits coverage model convergence toward a best, optimized solution per frequency band considered.

As the intent of the County's assessment and network modernization is to leverage *existing facility resources*, TCS would consider use of existing radio tower sites within the County. This exercise allows for a timely assessment of potential (and available) radio tower sites that might contribute to providing the radio system coverage required. If a location that needs coverage does not have an existing tower site, a new site would be proposed.

After the initial consideration explained above, TCS will develop coverage predictions for both a narrowbanded VHF system and a 700/800 MHZ digital network utilizing available existing sites as well as new sites. This investigation will use the "portable-on-hip" as the targeted design standard.

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Additionally, TCS will investigate the benefits of the County joining the Missouri Statewide VHF P25 radio system. The same portable-on-hip coverage requirement would be used as the criteria.

Task 2.2

Voice Communications Network

At the conclusion of Task 1.5 we will have identified the total number of sites, and their approximate locations, necessary to support conceptual radio network options. The TCS team would then devise infrastructure configurations that parallel and support each coverage-defined conceptual solution.

TCS will create detailed conceptual design descriptions, block diagrams, pictorials and other details necessary to convey an overall description of each proposed enhancement/modernization concept. TCS will additionally develop detailed cost budget information, inclusive of infrastructure hardware, installation services, software, backhaul interconnectivity, facilities, 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 Final Report.

Task 2.3

Backhaul Infrastructure Solutions

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 telephone circuits, fiber optic cables, hard-wired facilities, or private microwave, are essential to the seamless integration of individual sites into a large network supporting the combined coverage of all sites.

The reliability of site backhaul infrastructures has an immediate impact on radio network functionality and coverage.

For example, loss of a telephone line or microwave link serving a radio site could impact system operations. Users would suddenly discover a major loss of coverage, possibly affecting a portion of the network's service area. From the user's perspective, "the radio system failed" whereas the true problem was far removed from the radio system, itself. Therefore, a system designer must consider and evaluate the possibility of multiple levels of backhaul redundancy to prevent single points of failure.

Through field experience we have seen where integration of an FCC-licensed microwave subsystem is a key component to public safety radio network survivability. But, microwave connectivity also has strong implications for E-911/radio dispatch functions, as well.

For example, if regional/municipal dispatch facilities were likewise interconnected via the radio network's microwave subsystem, it would be possible for the centers to easily share 911 telephone connections, CAD, Records Management, Audio Recording and other data-related technologies. Using live video conferencing, meetings between separate dispatch centers, EOC's, and involving Department of Homeland Security, FEMA and others, could be instantly configured in response to local emergency conditions.

***Proposal for Radio System Study & Conceptual Design
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The expansive broadband digital bandwidth available through today's licensed microwave technology could become the pathway that allows separate dispatch centers to operate seamlessly and in concert ... a capability that is now lacking in many of the nation's public safety environments.

With respect to new-system conceptual solutions envisioned for Phase II, we would consider traditional licensed microwave loop-switched technology as well as star-configured alternatives so long as rigid expectations for survivability in adverse conditions can be met. In this conceptual development phase, TCS would provide a high-level design and cost estimate for backhaul elements necessary to support the County's voice and data conceptual solutions.

It should be noted that a high-bandwidth interconnection network will be the basis of the Next Generation 911 concept.

Task 2.4

Interoperability

TCS will work with the County to gather and/or provide the information necessary to thoroughly assess solutions geared toward development of potential regional interoperability. This task will review networks that are already in place, replacement networks being planned, and/or future networks that are needed.

TCS has a unique perspective when it comes to the evolving regional digital network that serves the greater Kansas City area. We are the consultants for Johnson County, KS, Kansas City, MO, and have recently completed a microwave system upgrade for the City of Independence. We have an in-depth understanding of the technical and operational makeup of the evolving MARRS network and can immediately apply the knowledge gained towards determining interoperability options for Jackson County.

Task 2.5

Conceptual Report and Recommendations

Upon completion of the above-described tasks, a Radio System Conceptual Design report will be published. This Report will present multiple conceptual solutions that meet identified needs, using differing technologies, frequency bands and costs. While working in concert with the County's project team, TCS will assist in the determination of a network solution that provides the best balance between requirements, present/future needs, coverage & capacity, features, network functionality, reliability, interoperability, and cost. This information becomes the basis for the development of a Request for Proposal (RFP).

The Phase II Conceptual Report will include the following information:

- Description of proposed radio system solutions;
- Listing of required radio system features, coverage and capacity;

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- Detailed user equipment requirements;
 - Conceptual description of backhaul connectivity solutions;
 - Description of dispatch configurations;
 - Radio interoperability schemes;
 - Estimated costs for each proposed solution;
- ☞ TCS will work with Jackson County to investigate viable short-term system enhancements that could provide needed features and operability while positioning the system for its ultimate configuration. For example, adding remote receivers to the existing single-site base station and converting the base station to a fully-functional repeater would contribute to improved operations with minimal economic impact.

Task 2.6

Oral Presentation

The submission of the Final Report signifies the end of the assessment and conceptual design activities. Next, TCS would conduct an on-site Oral Presentation of our conceptual design findings to designated Jackson County representatives.

While there might be opportunities for some short-term changes to the current VHF radio system, many key benefits would be achieved by adopting digital technology (using either the VHF or 700/800 MHz radio bands). Improved officer safety (Unit and Emergency ID), increased system capacity, call security, enhanced audio clarity, reduced backhaul/site connectivity costs and enhanced interoperability with legacy VHF, UHF and proprietary 800MHz radio networks are some of the advantages possible using digital technology. In fact, the entire public and private communications industry is adopting and rapidly transitioning toward fully-digital, packet-switched radio network solutions. A full-featured digital communications network will place Jackson County squarely within the mainstream of ongoing technology developments, in concert with the area's modernization of older radio networks (i.e., Johnson County and Leavenworth County, Kansas; Buchanan County, and the City of Kansas City, Missouri, as well as the Missouri State Patrol).

Most important of all, these new radio solutions provide a much greater capacity to deliver desired information systems and applications, peripherally, to the patrol car or fire apparatus. By so doing, public safety vehicles can become field extensions of the office environment, whereby information can be transacted, efficiently and securely, regardless of location.

A modernized Jackson County radio network will be a significant technical and financial undertaking, both in initial capital costs and ongoing maintenance expense costs. Therefore, best practices in procurement, contracting and project management are necessary to enable decision makers to make fact-based choices, thereby protecting the County's sizable financial exposure.

Finally, careful planning will be needed to ensure a smooth migration onto the newly modernized network and to prepare the necessary interoperability linkages to systems operating on differing frequency bands and technologies. And, due to the dependence of public safety personnel upon

**Proposal for Radio System Study & Conceptual Design
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reliable radio communications, it will be crucial that the design and implementation of the many technologies and supportive subsystems be successful and satisfy user expectations.

The County's ultimate radio system enhancement should consider, minimally, the following:

- Portable-based, County-wide coverage;
- Increased system call-handling capacity;
- Seamless interoperability and expanded coverage with MARC Region public safety agencies;
- IP-Based Site Interconnectivity;
- Compliance with Federally-mandated digital voice initiatives (i.e., APCO Project-25, SAFECOM, etc);
- Backward compatibility to adjacent-county VHF and UHF radio systems;
- Enhanced ability to handle voice, data, and imagery communications (combined LMR and Broadband technology platforms);
- Utilization of network migration scheme that does not interrupt current operations.

TCS has the demonstrated ability to deliver technology enhancements to live, operational public safety communication systems. We've done this in New Orleans; Kansas City, Missouri; Jackson County, Mississippi, Hillsborough County, Florida, and Harrison County, Mississippi . . . *and always successfully.*

PHASE III: PROCUREMENT (OPTIONAL)

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 to be used for a Request for Proposal (RFP). Next, as the County's procurement steps are concluded, the Consultant would conduct a formal evaluation of vendor proposals, rank all proposals using a weighted point system, and provide a vendor selection recommendation to the County.

The following describes our proposed approach to Phase III process tasks and the resultant deliverables.

Task 3.1

RFP Specification Development

TCS will work with the County to combine the required technical and purchasing language into a draft RFP Specifications/Procurement Document(s). 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.

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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 desired infrastructure reliability factors;
- Description of minimally acceptable radio interoperability requirements;
- Equipment shelter requirements, where necessary;
- Tower 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 Project Team for comments, additions or other recommendations. Desired changes would be incorporated into a final Specifications Document.

At the County's direction, Specifications would next be released as a Project Request for Proposal (RFP) from qualified vendors.

Task 3.2

Develop Evaluation Worksheets and Criteria

TCS will develop worksheet templates, concurrent with Task 2.1, 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.

TCS will also present a recommended Proposer Evaluation Criteria template to the County's Project Team for review and comments. Once revised in accordance with Team 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

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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 3.3

Pre-Proposal Conference Participation

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

Task 3.4

Evaluation of Vendor Proposals

Multiple resources within the TCS team will review and evaluate each vendor proposal and independently complete and total evaluation worksheets as prepared for each proposal received. TCS 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, each set of evaluations is conducted in an honest and fair-minded fashion. It is strongly recommended that members of the County's Project Team 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. That vendor having the highest numerical evaluation score would receive our recommendation for selection.

Task 3.5

Assistance with Contract Negotiations

Following vendor selection, TCS would assist the County in negotiating contracts with the various successful vendors. Our system approach focuses on key issues, which results in the achievement of successful, industry-recognized, implementations.

Examples of issues TCS 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;

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- Payment Schedules;
- Project Time Line Development;
- Performance and Penalty Requirements;
- Identification of Project Personnel; and
- Warranty/Maintenance Responsibilities.

From the issuing agency'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.

PHASE IV: IMPLEMENTATION (OPTIONAL)

Implementation Task Descriptions

The successful radio vendor would have provided, as part of their proposal, an implementation schedule and completion date based on a hypothetical Notice to Proceed grant date. From this information, TCS and the County would be able to negotiate a mutually-acceptable Consultant services supportive of the project's implementation.

Using the selected-vendor's Project Gantt chart, TCS would identify key events, times and work periods where either on-site or in-office technical consulting support may be necessary. Here, we would then allocate TCS resource time (allocated in man-days) for the categories of Project Principal, On-Site Project Manager and Technical Support.

During certain periods of Project Implementation it is probable that two or more members of the TCS team would be working on-site to take advantage of overlapping technical expertise. As an example, a highly critical part of this implementation process would involve the verification of coverage performance, network reliability and delivered audio quality.

In our review of the selected-vendor's project schedule and Gantt chart, we will have identified areas where further TCS involvement, on the County's behalf, may be desirable. As one reviews these areas, it will become clear that our proposed work plan and deployment of technical resources would have been structured to best match each given activity.

For example, in the initial project implementation kickoff/design review stage we would include team members having both on-site and in-field responsibilities. This we find is necessary so that all implementation team members would develop critical relationships with key County and Vendor decision makers and a gain a clear, undistorted view of project goals and objectives. Likewise, we will draw on and involve multiple personnel so that throughout the contracted implementation process TCS will always have knowledgeable consultant representatives available to attend "short fuse" meetings and to expeditiously resolve fast-breaking issues.

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The following is a list of tasks normally required of consultants during the implementation of public safety radio communication networks and would likely be included in our mutually-acceptable, negotiated scope of services:

- Attend client/vendor Project Kickoff Meeting;
- Establish on-site project management team;
- Provide continuous monitoring of vendor progress and report, bi-weekly, on completed activities and deviations from the project time line;
- Assure that tasks falling within the owner's responsibility are completed in accordance with schedule;
- Assist in the development of channels or talk group structures (i.e., code plugs) and interoperability procedures and structures, supportive of the new radio system's configuration;
- Participate in monthly progress review meetings with vendor/owner. Would provide resolution action to vendor-flagged technical or installation issues that require decisions by the owner;
- Review all vendor technical submittals and prepare action recommendation for owner approval/execution;
- Review vendor invoices and provide inspection services to verify that claimed materials and/or services had been received and/or completed;
- Conduct inspections of all worksites to monitor vendor progress. Punch lists would be developed throughout the implementation process and reconciled with vendor;
- Participate in acceptance testing of the microwave/fiber subsystem and radio infrastructure;
- Monitor and participate in radio system coverage testing and audio quality verification;
- Review and comment on vendor's proposed user migration plans;
- Monitor vendor progress in programming user radios;
- Monitor and assist, where needed in user/dispatcher training;
- Support owner during migration period;
- Develop a final project punch list and reconcile with vendor; and
- Review and comment on vendor-submitted as-built documentation.

TCS will provide whatever level of support is desired by Jackson County throughout the various phases of its enhanced-network implementation. The actual services to be provided can be identified once the County has reached this point.