



Emergency Telephone System Board Of DuPage County Interoperable Radio Project

Fire Paging Solution

Introduction – submitted by John Lozar and the Radio Steering Committee Fire Subcommittee

The DuPage ESTB has developed a grant program to address the paging and toning needs of the Fire Service and to assist fire agencies in compliance with the FCC January 1, 2013 mandate to narrow band. The DuPage ETSB offers this one-time reimbursement grant contingent upon the Fire Service agencies participating in the Interoperable Radio Project as stated in the intergovernmental agreement.

This document examines an DuPage ETSB proposed solution that addresses the Fire Service concern regarding VHF paging and toning as stated in question 2 of the DuPage Fire Chief's Association White Paper released March 31, 2010.

Fire members of the ETSB Radio Steering Committee have reviewed several options including an engineering proposal from Motorola, the vendor for the 700 MHz STARCOM 21 trunking system. Their conclusion indicates Motorola's proposed engineering solution was not as cost effective and did not use existing resources in the design.

The ETSB proposed solution is a cost effective method to deliver paging and toning services to fire agencies that require such services. The design incorporates seven paging zones based on geographic relationships in use today. The equipment model configuration is based the DU-COMM Fire North initiative and the equipment is available on the Western States Contracting Alliance Cooperative Purchasing Agreement (WSCA) to achieve cost-effective and efficient acquisition of quality products and services.

The benefit to the fire agencies that participate is consistent with the goal of interoperability as stated in the DuPage County Fire Chief's Association White Paper released March 31, 2010. The proposed VHF paging and toning solution also serves as backup to the trunking system and addresses the FCC mandate to narrowband by January 1, 2013.

This proposal meets the Fire Service goal and is consistent with the DuPage ETSB objective not to own the infrastructure. Ownership of the equipment for the zones will remain with the fire agency users.

The DuPage ESTB will not provide grant funds to maintain the VHF paging and toning solution. The agencies that participate will also be responsible for any ongoing cost such as phone line interconnectivity required.



Fire Paging Equipment and Installation Cost Projection Summary

<u>Zone</u>	<u>Projected Cost</u>
North	\$220,532
East	\$230,192
South	\$230,192
West	\$273,038
PLVW/DWFD	\$83,966
South Central	N/A
Downers Grove	N/A
Spares	\$22,325
<u>Total Cost</u>	\$1,060,245.00

Supplemental Information on Fire Paging Equipment and Installation Cost Projection

- 1 Pricing structure is based on list price of Fire North Channel proposal to DU-COMM and adjusted to reflect the configuration of each zone.
- 2 Fire North projection is based on actual invoices to DU-COMM
- 3 Pricing does not include interface to 700MHz or console or monthly phone line cost between sites and to PSAP
- 4 Pricing does not include ongoing maintenance
- 5 South Central and Downers Grove do not need infrastructure replacement. Equipment is narrowband compliant and can be interfaced to consoles
- 6 PLVW/DWFD costs include antenna and coax replacement if needed. Also includes Tech installation cost [turnkey]
- 7 Fire West assumes IGA agreement between DU-COMM, Itasca, and Wood Dale to build one network. Includes Tech installation cost [turnkey]
- 8 If Itasca and Wood dale choose not to participate in DU-COMM's build out add \$60,000 to toil cost.
Recommend IGA between DU-COMM, ETSB, PLVW/DWFW, Wooddale, and Itasca for Du-COMM techs to install. Use of DU-COMM techs provides consistency of paging system build
- 9 outcross the 5 zones and is cost effective.
- 10 If the remote receivers are not paid for by the ETSB deduct \$80,000. Savings of 7%.
Recommendation: ETSB pay for receivers since the cost is minimal and provides fire service with a back up system as discussed in the fire white paper.



Fire Paging Equipment and Installation Cost Projection Worksheet

Zone

North	<u>\$220,532</u>	4 TX/RX 6 RX	Based on invoices to DU-COMM
--------------	-------------------------	--------------	------------------------------

East	<u>\$230,192</u>	3 TXRX 8 RX	Based on North budgetary proposal to DU-COMM
	\$252,935		
	-\$7,740	remove one TX/RX package	
	-\$22,325	remove spares	
	\$7,322	Add two RX	
	<u>\$230,192</u>	Total	

South	<u>\$230,192</u>	3 TXRX 8 RX	Same as East
--------------	-------------------------	-------------	--------------

West	<u>\$273,038</u>	Including Itasca/ Wood dale as part of DU-COMM build out	
	\$230,192		
	\$38,246	2 TX/RX sites Wood dale Itasca	
	\$3,000	Antenna replacement Wood Dale Itasca	
	\$1,600	DU-COMM tech labor 2 tech x 2 day x \$45/hr	
	<u>\$273,038</u>		

PLVW/DWFD	<u>\$83,966</u>	Estimate from DU-COMM North Budgetary proposal	
	\$23,084	BB20	
	\$38,244	BB21	
	\$3,780	BB22	
	\$0	BB23	
	\$0	BB24	
	\$1,658	BB38	
	\$12,000	BB39	
	\$0	BB40	
	<u>\$78,766</u>	Equipment Total	
	\$3,000	Antenna replacement DWFD and Pleasantview	
	\$2,160	DU-COMM tech labor 2 tech x 3 day x \$45/hr	
	\$40	Misc parts	
	<u>\$83,966</u>		

South Central	N/A	Existing equipment is narrow band capable and recently replaced	
----------------------	-----	---	--

Downers Grove	N/A	Existing equipment is narrow band capable and recently replaced	
----------------------	-----	---	--

Spares	<u>\$22,325</u>		
---------------	------------------------	--	--

Total Cost **\$1,060,245.00**

Note: If Itasca and Wood dale choose not to participate in DU-COMM's build out add \$60,000 to total cost



Emergency Telephone System Board

Enhanced 9-1-1 Emergency Service For DuPage County
421 N. County Farm Road, Wheaton, IL 60187
Tel: 630-550-7743 Fax: 630-955-1130

March 31, 2010

DuPage County Fire Chiefs Association
P.O Box 460
Glen Ellyn, Illinois 60137
Chief Michael Kopp, President

Dear Chief Kopp,

The following document contains responses to the "Official DuPage County Fire Chief's Association White Paper", Version 3.1, dated March 26, 2010. The answers reflect the current information available to the ETSB Steering Committee. The ETSB Technical Sub-Committee is in process of reviewing options and information regarding a proposed paging solution. As that information becomes available, the ETSB Steering Committee will share that information with the DuPage Fire Chief's Association.

DuPage Fire Chief's Association Question 1

Any system design must meet applicable Federal Communications Commission (FCC) Rules, National Fire Protection Association (NFPA) standards, Insurance Service Office (ISO) requirements and standards set by the Mutual Aid Box Alarm System (MABAS). These standards will help assure redundancy, set operational standards, and ensure the widest range of interoperability locally, regionally, and nationally.

ETSB Response:

The STARCOM21 system meets FCC requirements. As a primary dispatch mode of operation, The Proposed DuPage County STARCOM 21 Subsystem Alternative meets NFPA 1221 and ISO standards as a monitored and supervised system with system administration reports available.

MABAS still requires box alarms to be toned on the VHF IFERN frequency. This will be achieved on The Proposed DuPage County STARCOM 21 Subsystem Alternative through the dual band APEX radios for fire users enabling them to switch between their dispatch frequency and IFERN.

DuPage Fire Chief's Association Question 2

System must be scalable and flexible to address the different communications needs of departments large and small. Several desirable features include:

- Tone and Voice Paging
- Alpha numeric paging [pager, PDA, cell phones, etc]
- Compatibility with existing VHF mutual-aid and tactical fire-ground channels
- Incorporate interoperability with existing low-band, VHF, UHF and/or future 700 MHz mutual-aid frequencies.

ETSB Response:

Tone and Voice Paging

Solutions similar to and including what is currently in place at St. Clair County should be investigated further to determine any technical and integration issues and identify costs. The ETSB will have to determine as a matter of policy whether additional costs associated with the retention of two-toned sequential paging will be born by the agency, PSAP, or the ETSB.

Alpha numeric paging [pager, PDA, cell phones, etc]

The ETSB is currently exploring a replacement for the Emergen Paging Software. If the ability to improve the reliability of alpha numeric paging exists it could reduce some agency's requirement for two-toned sequential paging at a lesser cost than maintaining two radio systems.

Compatibility with existing VHF mutual-aid and tactical fire-ground channels

APEX dual-band [VHF] radio will provide access to VHF mutual aid and tactical fire-ground channels.

Incorporate interoperability with existing low-band, VHF, UHF and/or future 700MHz mutual-aid frequencies.

APEX dual-band [VHF] radio will provide access to VHF mutual aid and tactical fire-ground channels, 700 MHz dispatch talk groups, and allow access to 700 MHz analog low power simplex channels that could be used for fire-ground operation.

DuPage Fire Chief's Association Question 3

Any new system must not delete current necessary capabilities or features. Improvements should not be made at the sacrifice of current necessary functionality. This includes retention of real-time tone and voice paging and the ability to easily and inexpensively monitor dispatch operations.

ETSB Response:

The Proposed DuPage County STARCOM 21 Subsystem Alternative is a 700-800 MHz digitally trunked radio system that on its own is incapable of performing two-toned sequential paging. The ability to develop a solution that would allow a fire department to utilize a digital talk group as a primary dispatch channel while retaining the ability to concurrently dispatch on an existing or new VHF channel exists.

Solutions should be investigated further to determine any technical and integration issues and identify costs. The ETSB will have to determine as a matter of policy whether additional costs associated with the retention of two-toned sequential paging will be born by the agency, PSAP, or the ETSB.

DuPage Fire Chief's Association Question 4

System design should not be reliant on third-party service providers for critical communications infrastructure operations.

ETSB Response:

To some extent, all radio systems rely on third party vendors for maintenance and service. The Original DuPage County TDMA Private System and The Proposed DuPage County STARCOM 21 Subsystem Alternative are no different.

Both STARCOM 21 and The Proposed DuPage County STARCOM 21 Subsystem Alternative are examples of public/private partnerships that are attempting to provide the most cost effective and reliable public safety communications. Users of the STARCOM 21 system have a voice on the STARCOM 21 Technical Oversight Committee.

Another example of a public/private partnership would be the State of Minnesota ARMER Network.

According to the State Communications Interoperability Plan [“SCIP”], “The rollout of Illinois’ STARCOM 21 [State Radio Communications for the 21st Century] radio network promises to raise the state interoperability in Illinois to an unprecedented level. This state-of-the-art 700/800 MHz radio network is bringing interoperability to the mainstream of police, fire, and emergency medical response agencies throughout Illinois.” [SCIP, Version 1.1; Pg 1:1, April 2009]

DuPage Fire Chief’s Association Question 5

There is a critical need to construct and maintain sufficient system redundancy, back-up systems and alternate dispatch facilities to support the operations of Association members in the event of man-made and natural disasters.

ETSB Response:

Yes, all dispatch centers connected to The Proposed DuPage County STARCOM 21 Subsystem Alternative will have the ability to talk to DuPage Dispatch Centers.

This is a dramatic enhancement for all 911 dispatch centers in DuPage County. Today, if any of them have to evacuate or move to an alternative backup location, they lose a majority of their communications functions. With the highest level of participation on The Proposed DuPage County STARCOM 21 Subsystem Alternative all users will be able to dispatch from any DuPage ETSB PSAP location.

DuPage Fire Chief’s Association Question 6

There is a strong desire to provide uniform, advanced telecommunicators training to increase the professionalism of public safety communications within DuPage County.

ETSB Response:

This is a PSAP issue that is not specific to the RF Project.

DuPage Fire Chief’s Association Question 7

Countywide electronic data capabilities to deliver critical information to first responders such as dispatch notification, vehicle routing (GPS capabilities), location information (preplan and site specific hazard information), electronic messaging, access to outside resources such as hazardous materials databases, and future field reporting needs.

ETSB Response:

While this question is not directly related to the radio project, the following options currently exist:

- a. DU-COMM users have the Data-Tac system.*
- b. The SONET network for PMDC and ATM. It should be noted that the contract for the SONET is up in 2011 and ETSB will be researching cost effective, efficient replacement systems for this type of data*

DuPage Fire Chief's Association Question 8

Data sharing between agencies would enhance regional arson investigators, establish and identify regional trends, help support decision-makers with facts, and allow better understanding of the fire and EMS issues in the county. There should be an equivalent, county-supported fire service data system that would be similar to the county-supported police data networks.

ETSB Response:

While this question is not directly related to the radio project, the following options currently exist:

- a. DU-COMM users have the Data-Tac system.*
- b. The SONET network for PMDC and ATM. It should be noted that the contract for the SONET is up in 2011 and ETSB will be researching cost effective, efficient replacement systems for this type of data*

DuPage Fire Chief's Association Question 9

The DuPage fire service should participate in, and fully exploit, connectivity opportunities such as the SONET ring data network that would allow connectivity between fire stations and dispatch centers. This would include real-time electronic/visual monitoring of vehicle status and backup computer-aided dispatch terminal capabilities.

ETSB Response:

While this issue is not directly related to the RF Project, ETSB has supported multiple fire districts in achieving connectivity with the SONET. In the past year Bartlett Fire Protection District requested and received connectivity. ETSB will work with all requests from fire agencies. Keep in mind the SONET contract is up for renewal in 2011 and ETSB would ask that agencies define their desired level of connection for that the RFP can be bid appropriately at that time. This issue can be discussed further with the Fire Service and the ETSB executive director.

DuPage Fire Chief's Association Question 10

There is a strong desire by the DuPage County Fire Chiefs Association members to explore alternative purchasing mechanisms such as centralized purchasing or system wide pricing for quantity discounts.

ETSB Response:

The ETSB would welcome any cost sharing partnerships with users in order to maximize funding for all parties involved.

DuPage Fire Chief's Association Question 11

There is a strong desire by the DuPage County Fire Chiefs Association members to seek alternative funding mechanisms such as state and federal grants to minimize the financial impact on Association members.

ETSB Response:

The ETSB would welcome any cost sharing partnerships with users in order to maximize funding for all parties involved including grants.

DuPage Fire Chief's Association Question 12

Would the ARS meet the needs of the Fire Service, specifically in regard to paging? If so, who will be responsible for the expense to integrate paging with the Starcomm21 system? What is the projected cost?

ETSB Response:

The fire members of the Technical Sub-Committee are in the process of reviewing configurations for a paging system proposal. Costs are not yet available until the Technical Sub-Committee completes its review and provides a paging system proposal. The proposal will be detailed in a binder presented to users for review and financial information will be provided as part of that solution.

DuPage Fire Chief's Association Question 13

Can DuPage County have its own independence and governance of their portion of the ARS?

ETSB Response:

Yes. Under The Proposed DuPage County STARCOM 21 Subsystem Alternative the users will still need governance. Additionally, it is the recommendation of staff to pursue a seat on the STARCOM 21 Technical Advisory Committee.

DuPage Fire Chief's Association Question 14

Where in DuPage County are the ARS towers proposed to be located and how will they be linked?

ETSB Response:

Specific location of towers and backhaul can not be released in a public document due to Public Safety confidentiality reasons. STARCOM21 will provide that information to members of the steering committee and the ETSB Board.

DuPage Fire Chief's Association Question 15

Who will have specific ownership of the ARS components?

ETSB Response:

Motorola will retain ownership of all system infrastructures. DuPage will retain ownership of all subscriber radios, consoles and associated recording equipment and frequencies.

DuPage Fire Chief's Association Question 16

If the Fire Service does not initially migrate to the ARS will there be enough funding for upgrading and maintenance of the Fire Service initiatives?

ETSB Response:

The answer to this question is two-fold: The final decision is up to the ETS board.

Second, the goal of The Proposed DuPage County STARCOM 21 Subsystem Alternative is to provide communications to all first responders. Paging and toning, if these are the fire service initiatives indicated in this question, have been addressed earlier in this document. Financially, a decision would have to be made as to equitable support of this aspect of fire service versus users overall.

In addition, keep in mind the cost to users is determined by the number of users on the system. Delay in joining impacts those costs. ETSB would have to seriously consider charging users who did not commit to The Proposed DuPage County STARCOM 21 Subsystem Alternative at the outset the difference in any costs associated with increased capacity.

DuPage Fire Chief's Association Question 17

How will the ARS impact monies already spent or committed to the original Motorola contract?

ETSB Response:

The \$2.7 million invested will be dependent upon contract negotiations.

DuPage Fire Chief's Association Question 18

What is the calculated grade of service and the db signal strength for the proposed ARS and compare this information to the original submittal?

ETSB Response:

The STARCOM 21 System contract as a system guarantees a <5% GoS. The Proposed DuPage County STARCOM 21 Subsystem Alternative has the potential to be engineered at <5%, this is dependent upon the number of frequencies.

The Motorola benchmark for RF design is 12db DAQ 3.0 as a standard for public safety coverage using 95% DAQ 3.0 coverage in medium buildings. The Proposed DuPage County STARCOM 21 Subsystem Alternative mirrors this model.

The Original DuPage County TDMA Private System design evolved from a 12db to a >12db trying to alleviate user concerns. While it was engineered to a >12db DAQ 3.4 and up to 18db in certain locations, this resulted in dramatic increases in costs.

The placement of sites in The Proposed DuPage County STARCOM 21 Subsystem Alternative configuration will allow greater than 12db DAQ 3.0 in certain areas. The cost effective recommendation for heavy dense buildings is a DBA (bi-directional amplifier) placed in these structures. Another option to consider is a DVRS (digital vehicle repeater)

The Proposed DuPage County STARCOM 21 Subsystem Alternative is proposed at 12db at 95% at DAQ 3.0 (Delivered Audio Quality) as the signal strength that Motorola will guarantee to go through a medium building. [Motorola considers a Medium Building as an example a two-story office building with windows].

DuPage Fire Chief's Association Question 19

Will the proposed ARS employ the FDMA or the TDMA technology?

ETSB Response:

The Proposed DuPage County STARCOM 21 Subsystem Alternative will employ APCO P25 Phase I FDMA Standard as currently deployed on STARCOM 21. The APCO P25 Phase II TDMA Standard has not yet been finalized in the TIA (Telecommunications Industry Association). We expect the APCO P25 Phase II Standard to be finalized in eighteen months and available for implementation by manufactures twenty four months after the standard is finalized.

Additional radio channels, APCO P25 Phase II TDMA, and ongoing software upgrades are included in the STARCOM 21 system upgrades and are part of The Proposed DuPage County STARCOM 21 Subsystem Alternative fees. The ETSB/users are financially responsible for subscriber unit upgrades, console upgrade and; if any, additional sites are needed.

All users of the STARCOM network in the Northern Illinois area would need to agree to any major upgrade of the network including an upgrade to APCO P25 Phase II TDMA Standard through the STARCOM Technical Oversight Committee.

There is no operational difference between APCO P25 Phase I FDMA Standard and the proposed APCO P25 Phase II TDMA Standard. The primary difference is in the efficiency of frequency utilization proposed in the APCO P25 Phase II TDMA Standard.

DuPage Fire Chief's Association Question 20

Will there be an independent consultant (Don Backys) evaluation of the ARS in terms of coverage and loading?

ETSB Response:

Yes, while Don Backys has retired, ETSB still has Hanson Professional Services under contract for this project. They can perform this work

DuPage Fire Chief's Association Question 21

How will the proposed ARS impact existing implementation dates?

ETSB Response:

The core system infrastructure is already in place so the implementation timeframe would be greatly expedited. The timeline for go live is approximately 9-12 months from execution of contract.