



Memorandum

TO: Al Auxier, Chief
FROM: Victor Voss, Captain
DATE: March 17, 2011
RE: Radio Communications Update

The current radio/data system that the fire departments in Winnebago County have for the most part always been funded through county funds in the Sheriff's operating budget. They have included everything from towers, repeaters, licenses, servers, consoles, etc. NMFR has only funded the radios we need to use the "county" system. We have also purchased the mobile data computers (MDC's) needed to use the "county" system.

Narrow-banding:

The FCC has mandated that all VHF frequencies be narrow-banded before January 1, 2013. These frequencies are the channels that we use for day-to-day operations. There are two different modulations that can be used; currently we use analog modulation radios, which are anticipated to be discontinued around the year 2017 by the FCC (phase two narrow-band). The other option is digital modulation, which is available now. When an analog radio is narrow-banded the range and quality of signal are diminished. Meaning that if we simply narrow-band our radios we would have less coverage and poorer signal and reliability. Our radios that NMFR own are analog radios and are capable of being narrow-banded at a cost of about \$40 each. A digital radio can be operated in a narrow-band and the quality of signal and reliability can be improved so that the losses associated with the narrow-band of an analog radio are made up for with digital modulation. We do not own any digital radios and would have to purchase them new at an estimated price of \$1500 - \$2000 each. *The actual cost of the radios will be \$3,000 to \$4,000. However, in the case of narrow banding or going to digital radios, the proposal by the Sheriff is for the County to purchase the radios at this time. This is a change, as of May 23, 2011, from the original proposal for the Cities to pay for their own radios.*

We need to also keep in mind that we are not alone on this; we cannot go "digital" if the county stays "analog" and visa versa. If the county simply narrow-bands and then goes "digital" we will have to do the same to use the "county" system.

Fox Comm Radio Project:

In anticipation of the changes in radio for the three counties associated with Fox Comm, we began researching options for Winnebago, Outagamie and Calumet counties as a Fox Comm Radio Project. Fox Comm has paid two separate consulting firms to research the options for an improved radio system. Both studies have reported back to Fox Comm that a 700 Megahertz, Digital, Trunked system was appropriate to meet the needs of the area for the next 20 plus years. I will explain the three parts of this system.

700 Megahertz - this is the frequency band that would be used. The FCC has earmarked this bandwidth for public safety radio. The current frequencies we use are so close to other signals that we have interference from them. This

interference is often heard on our radios during emergency operations. The 700 Mhz is fairly clean and mostly unused.

Digital - modulation is how a radio receives sound from a human voice and converts it to a signal that can be transmitted and received. A digital system is designed to fit a geographic area. Digital signals do not degrade with distance until they reach the end of their range. At that point the signal is dropped (cellphones are all digital systems now). An analog signal will begin to degrade at the point of transmission and continues to get worse as the signal drops off. This causes partial communication or increased interference when being "stretched" to the limit of the radio.

Trunked - simply stated this is a computer that is dealing out frequencies as needed at the point the push to talk button is depressed on a radio. The system uses fewer frequencies because it is more efficient in the use of the frequencies.

Fox Comm has failed to secure the funding needed to maintain the system described above. Each county has been left to secure the funding for both the system and the subscriber units (radio's). Calumet County had indicated that they would not be participating in the system. Outagamie County is planning on providing the infrastructure for the system in their county, but each agency will need to purchase their own subscriber units. Winnebago County had originally intended to purchase the entire system and provide the infrastructure and subscriber units for all users in the county. The capitol purchase of the system has not been an issue in the three counties, however the **projected** annual maintenance of the system has caused Calumet to bow out at this time. The projected maintenance costs have caused many to question whether or not the system needed and identified could be funded. As I stated earlier we do not know what the actual costs will be and we also do not know how Winnebago County will be participating in this system. There is a real concern that the county will choose to simply go "digital" and not fund anything beyond the infrastructure. The RFQ has been on the street for the 700 Mhz system for about a week now. The due date for proposals is May 16, 2011 and I don't believe any decisions will be made until then.

There are a couple of things that will be affecting NMFR's budget in the near future:

1. The current MDC system will be discontinued by the county at the end of 2011, as it will no longer carry the data being provided by the CAD system. This will cause all MDC's to have to be connected to the CAD system via cell card and a private vendor like Sprint or Verizon. This will be a monthly charge to NMFR for each of the MDCs we have on the system (7). We will also be billed by the county (yet to be determined) for each license needed to connect each MDC to the system. This is estimated at around \$100 per MDC per year.
2. If Winnebago County simply narrow-bands the infrastructure we will need to narrow-band our existing equipment. This includes all portable, mobile and station radios. *As of May 23, 2011, the proposal by Winnebago County is for them to pick up the costs of this upgrade.*
3. If Winnebago County goes to digital modulation we would need to purchase new radios that are digital. This would include all portable, mobile and station radios. *As of May 23, 2011, the proposal by Winnebago County is for them to pick up the costs of the radios.*
4. If Winnebago County goes with the 700 Mhz, digital, trunked system and does not fund the subscriber units, we would have to replace all of our radios with new subscriber units estimated at \$2,000 - \$3,500 each. *As of May 23, 2011, the actual costs of the radios will be between \$3,000 to \$4,000.* If the county maintains the funding for the agency subscriber units and the infrastructure we may still be assessed a "per radio" maintenance fee yet to be determined. Other systems have charged their uses upwards of \$150 per unit per year for similar systems.

I hope this helps, sorry it got so long, but there are many layers to this problem. The FCC mandate is the only thing that WILL NOT change. If you need anything further or if you would like me to attend, don't hesitate to ask.

Italicized information in red is an update of the original memo presented by Captain Victor Voss as of June 1, 2011.