

## **The Emergency Communications System in Mendocino County** **Protecting Life, Health, Safety, and Welfare**

June 3, 2020

### **SUMMARY**

Every emergency this County faces creates a greater than expected risk for first responders due to the state of the Emergency Communications System (ECS). The Mendocino County 2019-2020 Civil Grand Jury (GJ) reviewed the County's current system and evaluated the plan for its replacement.

Following the devastating wildfires in California, emergency preparedness is a phrase which has become all too familiar. Escape routes, go-bags, MendoAlert, and neighborhood FireSafe councils are now a part of everyday life. Mendocino County must be ready to deal with all emergencies efficiently and safely.

The Board of Supervisors (BOS) is supporting efforts towards preparedness and recovery by partnering with local, state, and federal agencies to fund emergency services, disaster recovery and resiliency. Some of these mitigation projects can be clearly seen by looking east and west at the new fuel breaks in the hills surrounding the Ukiah Valley. An operational emergency communications system is also key to protecting the **life, health, safety, and welfare** of Mendocino County residents. The phrase 'life, health, safety and welfare' is used by County departments to prioritize projects and funding.

October 22, 2019 at the BOS meeting, a presentation by ClientFirst, a technology consulting firm, emphasized the existing ECS has reached *end of life* (EOL). The system is experiencing an ever-increasing failure rate causing loss of communication between emergency responders.

ClientFirst recommended a five-year, three phase replacement schedule for the ECS which has an estimated cost of \$11.3 million. Of the total amount, \$1.6 million for Phase 1 was approved by the BOS on April 20, 2020.

During the October 22, 2019 presentation it was apparent that some members of the BOS were surprised by the current state of the ECS, although two previous GJ reports had recommended changes to strengthen it. Some of these recommendations appear to have been disregarded which highlights an absence of focus in this area by the BOS since 2007.

### **GLOSSARY**

**ClientFirst** – technology consulting firm

**Co-location** – the location of two or more facilities or equipment on a single structure or otherwise sharing a common location.

**EOL** – end of life

**ECS** – Emergency Communications System which includes the radio-microwave, towers, sheriff’s dispatch console, patrol car radios and related equipment

**Facilities** – Mendocino County Facilities Department

**IS** – Mendocino County Information Services Department

**IT Master Plan** – a five-year plan showing how an organization will enable the IT infrastructure to operate and function in line with its business objectives

**Wiki** – a server program that allows users to collaborate in forming the content of a web site.

## **BACKGROUND**

The Redwood Complex fire in 2017 and Mendocino Complex fire in 2018 devastated Mendocino County with a combined total of 10 lives lost, 24 people hospitalized, 495,000+ total acres burned, 863 structures damaged or lost, and an untold number of lives affected. This report highlights the state of the Emergency Communications System in Mendocino County pertaining to the radio-microwave system.

The GJ reviewed two previous reports on the Mendocino County ECS. The following are key statements taken from the April 5, 2007 Grand Jury report, ‘Can You Hear Me Now?’

*“The geography of Mendocino County, and the distance between population centers, requires a reliable emergency communication system (ECS). The current ECS is complex and in imminent danger of permanent failure. Failure will result in it being unable to meet the existing demands, including dispatching of 911 calls, creating an emergency of its own.”*

Findings 3 and 4 stated, *“Each communication vault contains both the repeaters and the microwave equipment. These vaults are wood frame buildings, shipping containers or concrete block houses. Most of the vaults are old and have significant structural problems resulting in leaks. Some wood frame vaults are in areas which experience large amounts of snow and high winds.”*

Recommendation 3 stated: *“The GJ recommends that defective or deteriorating communication vaults be repaired or replaced”.*

The 2019-2020 GJ found no record of the communication vaults being repaired or replaced or maintained.

Two years later, the Grand Jury May 18, 2009 report, ‘Out With The Old And In With The New’ stated that the \$4 million microwave replacement project was completed in December 2008. The new system was maintained by County Information Services (IS) and the capital lease/purchase

contract provided funding for training and five years of maintenance costs. Recommendations in the 2009 report included:

*R2: “the BOS appoint an individual or committee to establish procedures to receive suggestions regarding upgrades to the system, to evaluate any new or expanded uses and to initiate planning and budgeting for such improvement that are found to have merit”.*

The 2019-2020 GJ found no official record of meetings of any such committee in the past eight years.

*R3: “the BOS direct staff to develop a long range plan for board review and adoption to ensure maximum emergency communication coverage by public and private entities with the goal of offsetting costs of ongoing maintenance and upgrades”.*

The 2019-2020 GJ found no long-range plan was developed and no cost sharing plan through co-location chargebacks was pursued.

Reference GJ reports: *Can You Hear Me Now?* 2007 and *Out With the Old and In With the New* 2009.

## **METHODOLOGY**

The GJ interviewed County staff from the Executive Office, Information Services department, Facilities department, and law enforcement. The GJ researched Mendocino County budgets, Facility Condition Reports, the Information Technology Master Plan and the ClientFirst presentation to the BOS. The GJ attempted remote microwave site inspections. The initial visit was postponed by IS and there were repeated delays in re-scheduling over several months. The County ‘Shelter In Place’ requirements for COVID-19 ultimately precluded any further attempts to schedule inspections.

## **DISCUSSION**

In 2017, the County contracted with ClientFirst to prepare the Information Technology Master Plan. That plan, delivered to the Executive Office in 2018, led to an additional contract to produce the Radio Network Assessment and Needs report. A link to the Radio Network Assessment and Needs presentation is appended to this report.

On October 22, 2019, ClientFirst presented the Radio Network Assessment and Needs report to the BOS stating the current ECS is at end of life. EOL means the equipment is no longer supported by the manufacturer, parts are no longer manufactured but may be available from a third-party source, e.g. eBay, or the manufacturer may no longer be in business. Although the County stockpiles refurbished and secondary market parts, the ECS is experiencing an ever-increasing failure rate. Seven failures occurred in 2019, two of which were over four hours in duration. Outages within the ECS are increasing yearly.



The above graph depicts the number of failures indicated in blue (spiked line) and the average rate of failure indicated in red (sloped line). Supporting data for this graph is in appendix A.

During a failure, an affected area can be completely without communications for local fire departments, CAL FIRE, law enforcement, ambulance service and some out of county services. There are twenty-four County, state and federal departments that currently use the ECS. Every emergency the County faces puts first responders at even greater than expected risk. A complete list of departments using the ECS can be found in Appendix B.

In addition to presenting the current EOL status of the ECS and a plan for replacement and upgrade of radio-microwave equipment, the presentation highlighted the poor condition of the remote sites with leaks, rodent intrusion, and a patchwork of commercial and undersized residential generators. Sensitive electronic equipment is covered with tarps causing heat retention and circuit pack degradation.

In the 13 years since the 2007 GJ report detailed the poor condition of remote sites, the GJ could not establish that the BOS had allocated funding to repair the buildings (vaults) and infrastructure which house current ECS equipment, and will also house \$8.2 million in proposed new ECS equipment. The BOS at its April 20, 2020 meeting (agenda item #20-03.02) approved \$1,600,500 for the Public Safety Microwave Phase 1 Repeater Replacement Project. While the BOS has been periodically updated on the condition of the microwave system by the IS department, the October 22, 2019 presentation by ClientFirst and IS appeared to be a wake-up call.

Phases 1-3 would create a reliable and redundant radio communication network. Phase 1 replaces microwave repeaters to improve communication resiliency and stability. Phase 2 includes replacing microwave radios and ethernet routers to increase the speed of communication. Phase 3 includes completion of redundancies in the sixteen site County system to reduce the likelihood of communications failures. The ClientFirst presentation also listed relocation and replacement of the 20-year-old sheriff's dispatch console, a central part of the ECS, as a critical need. Funding for Phase 2, Phase 3 and the sheriff's dispatch console has not been addressed.

The current economic climate due to COVID-19 could easily derail the replacement of the ECS in Phase 2, Phase 3, and the sheriff's dispatch console. The BOS must actively engage with the Executive Office and commit to completing this project, ensuring the life, health, safety, and welfare of Mendocino County residents.

## **Buildings**

The remote sites are a combination of County owned, leased and co-located buildings. The following is a list provided to the GJ of the most recent remote site building conditions from the Mendocino County Executive Office Facilities Condition Report:

**Sanhedrin** – water soaks onto walls, standing water inside when it rains, roof evaluation needed w/approval of forest service, entire bldg. electrical upgrade, repair flooring that has rotted through, replace rusting electrical conduits and junction boxes

**Point Arena** – tree removal needed because of signal blockage

**Spanish Mountain** – water soaks onto walls, standing water inside when it rains, need remote location master receiver antenna, rusting electrical conduit replacement

**Ft. Bragg Justice Center**- water in cable and equipment conduit, microwave data and electrical room needs improved cooling, lighting infrastructure is blocking tower

**Sheriff Console** – needs UPS replacement and cooling, need generator replacement, needs console relocation, water soaks onto walls, standing water inside when it rains

**Willits Justice Center** – main radio tower unsafe to climb, trees obstructing signal, need cooling in room, need generator replacement

As can be seen above, these remote sites have suffered substantial degradation and will take a significant cost to restore. In the ClientFirst presentation, remote site facility upgrades are considered a critical need. Only two of the above capital improvement projects for remote sites are in the current budget, and all improvements are at risk with the financial impact of the COVID-19 crisis. Not making necessary upgrades to the remote sites prior to installing an approximate \$8.2 million in new ECS equipment is equivalent to buying all new furniture for a house with a leaking roof. The GJ finds the County is reactive in their planning.

As noted in the 2009 GJ report R3 and by a Supervisor at the October 22, 2019 BOS meeting, the County needs to investigate and pursue co-location charges with other entities using remote microwave sites. This would help offset the budgetary impact of repairing remote site buildings.

## **System Maintenance**

While IS maintains the ECS microwave equipment, Facilities is responsible for remote site building maintenance including power to the ECS equipment. Other than quarterly site checks, Facilities relies on IS personnel to advise of problems at remote sites. Notification is either by work order or, in emergencies, a phone call. When a phone notification of a maintenance issue is made, a corresponding work order is seldom entered, and no subsequent tracking or status is

recorded. Emergency repairs made by contractors are not regularly tracked by work orders. Consistent tracking would support accurate forecasting and budgeting for both IS and Facilities. The GJ found that ineffective methods of communication between Facilities and IS contribute to a lack of coordinated effort to maintain remote sites and associated ECS equipment. The separate tracking and reporting systems used by Facilities (work orders) and IS (Wiki) to report remote site problems and issues do not interface. In the absence of a joint system for tracking, the work order system needs to be used consistently by both departments independent of any internal tracking method. A searchable database with access by both departments would increase efficiency and aid in coordination and communication between the two departments.

The combination of procedural documentation and formal staff training facilitates staff development and supports efficiencies in equipment repair and maintenance. IS relies on a single individual's historical knowledge of the microwave system, as opposed to formally documented processes and procedures, which puts maintenance of the ECS at risk.

## FINDINGS

- F1. County leadership has not published a strategic plan for the maintenance, upgrade, and replacement of the system. This has allowed the ECS microwave equipment to continue at *end of life* with an increasing number of outages,
- F2. With an increasing ECS failure rate, as shown in the graph on page 3, every emergency the County faces puts first responders at even greater risk.
- F3. There is substantial building degradation at the remote sites (vaults), and deferring the needed site upgrades puts any new ECS equipment in jeopardy.
- F4. The lives of Mendocino County residents depend on the integrity of the remote microwave-radio buildings. By de-prioritizing these buildings, the County is not well positioned to protect the Life, Health, Safety, and Welfare of its residents through the ECS.
- F5. The current BOS faces a planning scenario similar to the 2007 and 2009 BOS, including impending risks to funding due to the current economic situation. Tabling funding for the new microwave system and infrastructure upgrades a second time will impact Mendocino County residents' safety.
- F6. By not actively pursuing chargebacks for co-location from participating entities at remote microwave sites, the County is losing a potential revenue stream to augment funding for the new system.
- F7. By not using the work order system consistently to track maintenance and repairs, there is no supporting documentation for accurate forecasting and budgeting.

- F8. The separate tracking and reporting systems used by Facilities and IS do not interface. This inhibits communication between the two departments and severely limits a coordinated effort to maintain remote sites and associated ECS microwave equipment.
- F9. The lack of cross training within IS and little formal documentation of maintenance procedures put the ECS at risk by leaving the department without a sufficient number of qualified technicians to manage the County's investment.
- F10. While the GJ found budgeted line items for Phase 2, Phase 3, and the sheriff's console relocation and replacement, in the IT Master Plan it found no evidence of committed funding by the BOS. This leaves all residents and first responders vulnerable.

## **RECOMMENDATIONS**

The Grand Jury recommends that:

- R1. the BOS commit funding for Phase 2 and Phase 3 of the Public Safety Microwave Replacement Project and replacement of the sheriff's dispatch console. (F1, F5, F10)
- R2. the Executive Office classify structures housing ECS equipment with the same priority as buildings housing people to ensure the required maintenance issues are promptly addressed. (F3-F4)
- R3. both IS and Facility departments utilize the existing work order system for all maintenance and repairs of the ECS and associated remote sites to promote accurate forecasting and budgeting. (F7)
- R4. as part of Phase 2 of the ECS replacement, the Wiki and work order systems be replaced with a single, index-based system used by both departments which would create efficiency in tracking projects and work orders. (F8)
- R5. IS develop maintenance procedures for the ECS equipment and documented maintenance schedules. This would support efficiencies in equipment repair and maintenance and facilitate training of new technicians. (F9)
- R6. the County pursue co-location chargebacks for revenue as recommended in the 2009 Grand Jury report 'Out With The Old And In With The New'. (F6)

## REQUIRED RESPONSES

Pursuant to Penal Code § 933 and 933.05, the Grand Jury requires responses as follows:

From the following governing body within 90 days:

- Board of Supervisors (All Findings) and (All Recommendations)

## REQUESTED RESPONSES

Pursuant to Penal Code § 933 and 933.05, the Grand Jury requests responses as follows:

From the following County official within 90 days:

- Chief Executive Officer (All Findings) and (All Recommendations)

Reports issued by the Grand Jury do not identify individuals interviewed. Penal Code § 929 requires that reports of the Grand Jury not contain the name of any person or facts leading to the identity of any person who provides information to the Grand Jury.

## REFERENCES

*October 22, 2019 Agenda: Item 5M.* (2019, 10 30). Retrieved from Supervisors' Agenda:  
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MCGJ 2008-2009. (2019, Nov 18). *Out With the Old and In With the New.* Retrieved from  
<https://www.mendocinocounty.org/government/grand-jury/past-reports/2008-2009-reports>: <https://www.mendocinocounty.org/home/showdocument?id=4094>

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APPENDIX A: Radio-Microwave Failure Data 1-1-2017 to 10-4-2019

APPENDIX B: Mendocino County Radio-Microwave System Users

APPENDIX A Radio-Microwave Failure Data 1-1-2017 to 10-4-2019

2017				Phase 1 or Phase 2 Equipment?	Resolution
1/9/2017	Microwave	Sanel site down completely down, Power/Generator/Microwave failure	Loss of SO, Fire, EMS, CHP, F&G, P&R, 128-South	Phase 1	Field repair generator, Microwave Power supplies, transmitters,
6/26/2017	Microwave	Severe fading, Cahto-Laughlin-Matheson, Sanel, Cold Springs	Intermittent loss of Radio and Data across systems	Phase 2 will reduce outages from atmospheric fading	Failures caused by unusual atmospheric conditions, cleared up with weather conditions

2018				Phase 1 or Phase 2 Equipment?	Resolution
7/17/2018	Microwave	Laughlin MW I/O and BAYLY showing alarms	Sporadic loss of PS Radio audio circuits in the systems	Phase 1	Reset/reboot I/O cards, BAYLY TDM Ring switches, Dispatch BAYLY Ring Switch
7/18/2018	Microwave	Willits JC and Laughlin MW I/O cards showing alarms	Sporadic loss of PS Radio audio circuits in the systems	Phase 1	Willits JC and Laughlin reset/reboot I/O cards
7/23/2018	Microwave	Howard Forest MW RSSI showing degraded performance	Intermittent audio to/from CALFIRE ECC to Fire Radios	Phase 2	MW dish and transmitter alignments

2019				Phase 1 or Phase 2 Equipment?	Resolution
1/15/2019	Microwave	Ft Bragg JC, FBPD reported loss of Dispatch to Officers comms	Ft Bragg PD dispatch lost comms with all field units	MPLS Phase 1	Repaired/Reset Ukiah MW Charles Mux to 4W audio routing/multiplexing equip
7/1/2019	Microwave	Ukiah Dispatch, DSO Secondary T1 Card Failure	Loss of South Coast Radio Sites T1 backup	MPLS Phase 1	Locate and obtain used Sec T1 module, (30 days)
7/14/2019	Microwave	Multiple complaints of lost audio across Sheriff, Fire, FBPD, CHP	Sporadic loss of PS Radio audio circuits in the systems	MPLS Phase 1	Reset/reboot I/O cards, BAYLY TDM Ring switches, Dispatch BAYLY Ring Switch
8/29/2019	Microwave	MW Syst Major Fading/Fails, BAYLY T1 Master Switch failure	Intermittent impairment of many radio/data circuits	MW RF Phase 2 will reduce outages from atmospheric fading	Check all Microwave paths signal, errors, performance, atmospheric cleared
8/29/2019	Microwave	Bayly TDM switch failed/locked up during excessive Microwave fading	Intermittent loss of all Radio circuits countywide	MPLS Phase 1	Reset locked up Bayly Master T1 switch at dispatch.
9/7/2019	Microwave	Matheson Bayly T1 Switch failure, loss of DSO audio to Matheson S	Loss of TDM T1 carrier from Ukiah Dispatch	MPLS Phase 1	Reset Locked up/failing Bayly T1 switch at Matheson
9/8/2019	Microwave	Microwave 7250 MPLS Switch lockups, Cahto and Ft Bragg	Complete failure and loss of Data to/From Ft Bragg	MPLS Phase 1	Reset locked up 7250 MPLS Switched at both Ft Bragg and Cahto
9/27/2019	Microwave	Ukiah MW, complete failure of Charles Mux TDM channel bank system	Loss of SO, Fire, EMS, CHP, F&G, P&R, 128-South	MPLS Phase 1	Replace failed Charles Mux Primary and Secondary T1 modules, reprogram, test

2020				Phase 1 or Phase 2 Equipment?	Resolution
1/10/2020	Microwave	Willits, Ukiah Microwave, Howling on BLM Audio Circuit	Loss of Audio between Ukiah office and Cahto Control Station	MPLS Phase 1	Replace intermittent DSO I/O board in Charles Mux, Willits JC
2/11/2020	Microwave	Sanhedrin Microwave, Charles Mux Audio failure, DOT repeater	Loss of Audio between Ukiah HQ and Sanhedrin repeater	MPLS Phase 1	Reroute DOT repeater audio channel to alternate channel, Sanhedrin/Ukiah
2/24/2020	Microwave	Laughlin ATT Microwave transmitter to Cahto failed again, replace	Loss of MW primary transmitter operation,	MPLS Phase 1	Repair MW transmitter, tune/align/cal, FCC PM all MW equipment
2/24/2020	Microwave	Laughlin Bayly DS1 Ring Switch system failed and locked up	Loss of Radio audio systemwide	MPLS Phase 1	Complete Bayly DSO Ring System restart, Ukiah, Laughlin, Willits,
2/25/2020	Microwave	Laughlin 11 GHz transmitter failure to Howard Forest, audio dropping	Loss of MW primary transmitter operation,	MPLS Phase 1	Replace MW transmitter, tune/align/cal, FCC PM all MW equipment
3/27/2020	Microwave	Willits JC Microwave, Charles Mux/Bayly DSO failure,	Loss of radio audio circuits, WJC to Ukiah Dispatch	MPLS Phase 1	Reset Charles Mux, Bayly Ring Switches, Ukiah and Willits, Re-provision WJC CM
4/2/2020	Microwave	Sanel Microwave, Ring Switch fail, lost audio from South Coast	Loss of Bayly Switch affecting South Coast sites	MPLS Phase 1	Reset Bayly Ring Switch, Sanel Mtn
4/3/2020	Microwave	Oak Ridge Charles Mux, Install repaired T1 Mux unit, program and test	Errors on T1 span between Sanel and Oak Ridge	MPLS Phase 1	Repair and Install Charles Mux T1 multiplexer at Oak Ridge, re-provision and test.

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**APPENDIX B: Mendocino County Radio-Microwave System Users**

Anderson Valley Fire	Mendocino County Parks & Recreation
Bureau of Land Management	Mendocino County Sheriff
CAL FIRE	Mendocino County Dept. of Transportation
California Highway Patrol	Redwood Coast Fire
computer data transmission-Mendocino Co.	Sonoma County EMS
Federal Bureau of Investigation	Sonoma County Fire
Fort Bragg Police	South Coast Fire
Mendocino County Animal Control	South Coast Life Support
Mendocino County Building & Planning	U.S. Air Force / Civil Air Patrol
Mendocino County EMS	U. S. Department of Fish and Wildlife
Mendocino County Fire	Ukiah Police Department
Mendocino County Major Crimes Task Force	Willits Police Department