Next Generation 911: Is Florida prepared?

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Abstract

Counties across Florida are preparing to transition to the next advancement in telecommunications called Next Generation 911 (NG911). NG911 will open possibilities in data sharing, location accuracy and reliability that has never been seen in the telecommunications industry. With the advancement in technology, public safety must keep pace in order to provide enhanced service to communities. Advancements in technologies also require additional funding, training and support. 911 and telecommunications professionals across the state of Florida were surveyed concerning NG911 knowledge, strategy, and opinions. Throughout this paper we will discuss preparations being made in the state of Florida for the transition to NG911.

Introduction

Since the late 1960s, citizens within the United States have used a universal and nationwide telephone number to contact emergency services. Since the birth of 911, this emergency number has become ubiquitous in emergency services. Public awareness campaigns, education, movies, and television have all highlighted the concept of 911 to the point it became commonplace in American culture.

The 911 system has become instrumental in providing emergency services to the public. The number is easy to remember and is prominently displayed on emergency vehicles. Children are taught the importance of 911 at an early age and the proper way to use the number. If used improperly, it often generates a visit from a law enforcement officer, fire department or emergency medical service. Accidental dials or idle curiosity will typically receive an admonishment from law enforcement or re-education from a parent. But intentional misuse could lead to an arrest, upon establishment of probable cause.

Over the last several decades, countless newspaper articles and television segments have highlighted success stories of 911 callers receiving the help they needed by using the number. Whether it is a child calling for an injured mother or a clerk reporting a robbery, almost every gripping public safety story told by the media begins with a 911 call recording.

There are also accounts of failures in the system and tragedy due to operational errors and limitations of the system. Technical failures, training failures and human failures have marred the public trust from time to time. And each time a failure occurs it shocks the conscience. The public expects 911 to work, each and every time without fail. It is the responsibility of public safety professionals to uphold these expectations and mitigate failures.

Currently, the technologies used in 911 call processing are evolving. Organizations like the National Emergency Number Association (NENA), which consists of 911

professionals and industry partners, have developed standards and a framework for future 911 technologies. The purpose of these standards are interoperability and the framework harnesses advancing technology. This future shift in technology has been coined “Next Generation 911”. The purpose of this research project will be to: educate the reader about Next Generation 911 and its capabilities, discuss the partnerships and resources needed to maintain a Next Generation system, and finally examine the financial cost and potential funding mechanisms for departments and managers to consider.

Looking forward, many questions are facing 911 operation centers. What exactly is Next Generation 911? How will public safety agencies fund the implementation of Next Generation 911? What level of Information Technology support will be needed for cyber security concerns? How will stakeholders be integrated into the process of geospatial routing? Finally, what will the cost benefit analysis reveal? These are all questions currently facing public safety agencies within the state of Florida, as well as, across the United States of America. The future of 911 is now.

Literature Review

History of 911:

The concept of a universal, easy to remember, three digit emergency number originated in Europe circa 1937. At that time, Great Britain used the number 999 as its national emergency number. That number is still in use today. In 1967, the United States, acting on a recommendation from the President’s Commission on Law Enforcement, requested its own three digit national emergency number. The American Telephone and Telegraph (AT&T) Company designated 911 for this purpose. In 1968, the first 911 call was placed in Haleyville, Alabama. (Dayharsh, et al, 1979)

The concept of 911 was unprecedented in America. Prior to this, a caller reporting an emergency was required to know and dial the seven digit number of the police, fire or medical department needed. Or the caller would call the operator and ask to be connected to first responders. AT&T worked with various professional organizations and received collective agreement to implement 911. (Dayharsh, et. al, 1979)

Following the increased popularity and use of mobile telephone and voice over internet protocol (VOIP), the legacy 911 system required enhancements to support this new technology. In 1996 the Federal Communications Commission (FCC) required that wireless phone carriers provide Public Safety Answering Points (PSAPS) with caller location, as well as, the phone number during an emergency call. To comply, wireless carriers began collecting location information from both GPS and network based location techniques (multilateration). Immediately, there were compatibility issues, as well as, global compatibility issues. While the enhanced architecture was an improvement on the legacy system, there were still limitations. (Gupta, et.al, 2010)

In a 2013 article in the *International Journal of Business Continuity and Risk Management,* authors Elaine Seeman and James Holloway describe the current E911 phase tracking of wireless caller information. “Phase I required provision of the phone number of the originating call as well as the location of the cell site or base station

receiving the call. Phase II required the actual location of the call by latitude and longitude within specified accuracy delimiters." (Seeman & Holloway, 2013)

Over the last few decades, 911 technology and features have advanced as technology capabilities expanded. But overall, the advancements have not kept pace with the digital age. 911 networks still rely mostly on "copper wire" connections or digital integration to copper wire connections. Some of the advancements and enhanced features of 911 were packets of information called ANI (Automatic Number Identification) and ALI (Automatic Location Identification). During a 911 call, this ANI/ALI information is sent to a PSAP who has jurisdiction in that particular area. This technology relies on records and information maintained by telephone company central offices. Where it falls short is in wireless phone location and voice over internet protocol (VOIP) phones. (Seeman & Holloway, 2015)

The majority of 911 calls received by 911 call centers originate from wireless phones or VOIP phones. Wireless and VOIP phone transfer information via internet protocol (IP) networks. Receiving location information (ALI) on wireless phones presents a challenge, due to the portability of wireless devices. The 911 industry has proposed a solution to wireless and VOIP phone location information. This solution is known as Next Generation 911. (Seeman & Holloway, 2013)

Next Generation 911 harnesses the power of an IP network to connect multiple databases together, while translating advanced location information sent directly from a wireless device. The advanced location information uses geospatial routing to increase the location accuracy. Location accuracy is critical to first responders in trying to locate emergencies. (Holloway, et.al, 2010)

Next Generation 911 will also create the ability for telecommunicators to receive multi-media messages, specifically pictures and video. Such an increase in information could enhance the reliability of reported incident descriptions and evidence preservation. Of course, an increase in data requires storage hardware and faster network requirements. (Baseman, et.al, 2018)

Next Generation 911: Overview

The National Emergency Number Association (NENA) has been instrumental in the development of Next Generation 911. This organization has published many documents outlining various concepts in the next generation system. NENA summarizes NG911 as follows:

> Next Generation 9-1-1 (NG9-1-1) networks replace the existing narrowband, circuit switched 9-1-1 networks which carry only voice and very limited data. Currently there are difficulties in supporting such things as text messages for emergencies, images and video (including support for American Sign Language users), and easy access to additional data such as telematics data, building plans and medical information over a common data network. In addition, the need for inter-communications across states, between states, and across international boundaries requires that we create a more flexible 9-1-1 system design with much greater data handling capabilities. A highly standardized system is essential and critical to seamlessly support communications and data transfer across county,

state, and international borders, and across the multitude of emergency response professions and agencies, from traditional PSAPs to Poison Control Centers, trauma centers, Coast Guard, and disaster management centers. (NENA, 2008)

Next Generation 911 is an internet protocol (IP) based system which is connected via an Emergency Services IP Network (ESInet). An ESInet can be statewide, regional or local depending on need. The respective PSAP connected to the ESInet are able to receive traditional voice and basic data from 911 callers. Additionally, they can receive text messages, photographs, video and other application data. (Holloway, et.al, 2014)

Session Initiated Protocol (SIP) is the information sent to an IP based network from a SIP enable device to begin a 911 call. The phone initiates a “session” and then begins to route through a variety of databases. The SIP user agent (UA) determines that the call is an emergency based on the numbers dialed, determines the location of the caller, and then using a location information server (LIS) locates the proper PSAP for the correct call route. Next, a mapping protocol called a location-to-service translation (LoST) is used to find the correct PSAP and provides that information to the UA. The call is then routed to the correct PSAP. This is in contrast to legacy technology, where the location of the telephone was fixed and utilized Public Switched Telephone Network (PSTN). (Gupta, et.al, 2010)

What is an ESInet?

As mentioned earlier, one of the basic requirements for Next Generation 911 (NG911) is the establishment of an Emergency Services IP Network (ESInet). An ESInet is essentially the network highway on which all information and data travels. It is reserved for emergency services and industry partners who provide services. Much like the current “world wide web” or internet, an ESInet functions in a similar manner. Use of an ESInet also allows for connectivity of IP networks at the local, state, regional, national and international level. (NENA, 2013)

ESInet’s allow for the transfer of information between multiple systems depending on their transport methods. These methods can be configured to interface with other networks. ESInet’s have the ability to grow and expand based on connectivity. For example, a local ESInet can be established and later connect to a state or regional ESInet. Likewise, state and regional ESInet’s could connect to national and international based on need, such as cities which share international borders. With this growth and connectivity comes risk. Cyber security is a vital concern to NG911 and associated networks. Cyber-attacks are becoming a frequent event in the realm of public safety. To protect the information and the integrity of the network, it is segmented from other traffic and employs a Border Control Function (BCF) to secure the information. The intent of the BCF is to protect the PSAP from cyber-attack through the use of firewalls and admission control. (Seeman, et.al, 2018)

Big Data:

With a robust network comes an influx of data. NG911 will dramatically increase the amount and complexity of data coming into a PSAP. Voice, text, pictures and video

will all have the capability to be sent via the ESInet and NG911 services. Additionally, automatic or non-human alerts could be sent in the form of alarms, telematics, sensor activations and medical alerts. Some of these may or may not also provide voice, text or video contact. Smart cars are becoming increasingly automated and could connect to networks to send automatic alerts. This data would also need to contain metadata to establish origin and location information. (Seeman, et.al, 2015)

The delivery and storage of this data presents some legal and privacy concerns, which must be addressed. State and federal policy makers must be proactive when it comes to regulating storage, use and dissemination of advanced NG911 data. Some of this data could be highly sensitive and include location information, medical information and criminal evidence. PSAP's, phone carriers and NG911 core services providers must determine the best practices for protecting this data, while storing it for potential public safety use. Currently there are federal communications statutes which govern privacy information and regulate the release of this information. Telephone carriers are typically prohibited from disclosing customer information. One exception is use of this information for NG911 purposes. Carriers can disclose to PSAP's call information, including location, to assist emergency services with providing assistance. This information must be "on a timely and unbundled basis, under nondiscriminatory and reasonable rates, terms, and conditions to providers of emergency services {…}" (Seeman, et.al, 2015)

Implementation and Integration of NG911:

One of the biggest hurdles facing PSAP's is transitioning from a legacy E911 system to NG911. Nationwide there are over 6000 PSAP's, 50 State 911 commissions and 3 federal agencies to consider when implementing NG911. Thankfully, not all are required to have full implementation and connectivity at the exact same time. Legacy E911 systems can be phased out during the implementation of NG911 systems. But currently, NG911 is being implemented or has plans for implementation in many states. Additionally, many regions have plans to integrate their network for redundancy and interoperability. (Seeman, et.al, 2018)

In 2012, the Middle Class Tax Relief and Job Creation Act created this nation's first Nationwide Public Safety Broadband Network (NPSBN). The NPSBN is privately owned and operated by The First Responders Network Authority (FirstNet). The purpose of FirstNet is to provide emergency services and first responders an interoperable network dedicated to emergency services. This is akin to the ESInet previously discussed, but on a legislated national level. Using this dedicated broadband network, first responders can harness the full potential of NG911. Phone calls, text, MMS, streaming video and other forms of streaming data could use this network to connect first responder to the public, with NG911 services at the PSAP being the pass through. (Seeman, et.al, 2018)

Integration is perhaps the most powerful tool with NG911 capabilities. PSAP's use a variety of databases to access and store information. Computer Aided Dispatch (CAD) systems, live video feeds from a variety of sources (traffic cameras, school cameras, etc…) and records management. NG911 will expand the availability of the databases to integrated, as well as, add additional tools to assist with calls. Social media integration is possible to potentially detect emergencies or assist with prediction of patterns. A key

component of this integration is the analytics and predictive analysis. For instance, traffic data which populated from social media, could integrate with 911 mapping software to provide the fastest route to the CAD software for a particular emergency, while taking into account traffic flow. Additionally, integration into the Wireless Emergency Alerts (WEA) and the Integrated Public Alert Warning System (IPAWS) is possible and could provide localized public safety alerts using the NG911 system. (Seeman, et.al,2018)

Funding the implementation of NG911 will be costly. 911 is primarily funded at the state level through fees charged to telephone customers. The current fee structure is built to sustain the current 911 systems. A next generation system will require additional expense in hardware, service and implementation. Many PSAP's will require a full upgrade, whose costs are not considered in the current fee structure. Currently, federal agencies have empaneled committees to review state funding mechanisms and to review the costs of providing NG911 services. At present, there is no solution to the funding problem. The funding component is currently the biggest hurdle facing implementation of NG911 technologies. (Seeman, et.al,2018)

Methods

The purpose of this research was to measure the current readiness or implementation of Next Generation 911 (NG911) systems throughout the state of Florida. Data was collected to identify NG911 awareness, current or pending projects and issues counties are facing implementing NG911 systems.

The Florida Emergency Communications Number E911 State Plan requires counties to designate a knowledgeable individual to serve as the county 911 coordinator. Typically, a 911 coordinator will work closely with the Public Safety Answering Point (PSAP) manager or administrator. For this research, data was collected from surveys sent to all 67 Florida county 911 coordinators. To broaden the scope and potentially capture key decision makers, their respective managers/administrators were also surveyed.

The survey questions captured the participant's base knowledge of NG911 and asked if there were current or future plans to implement the system in their county. The role of the participant in the decision making process was also captured. Challenges facing implementation such as time constraints were addressed, as well as cost of ownership and maintenance sustainability.

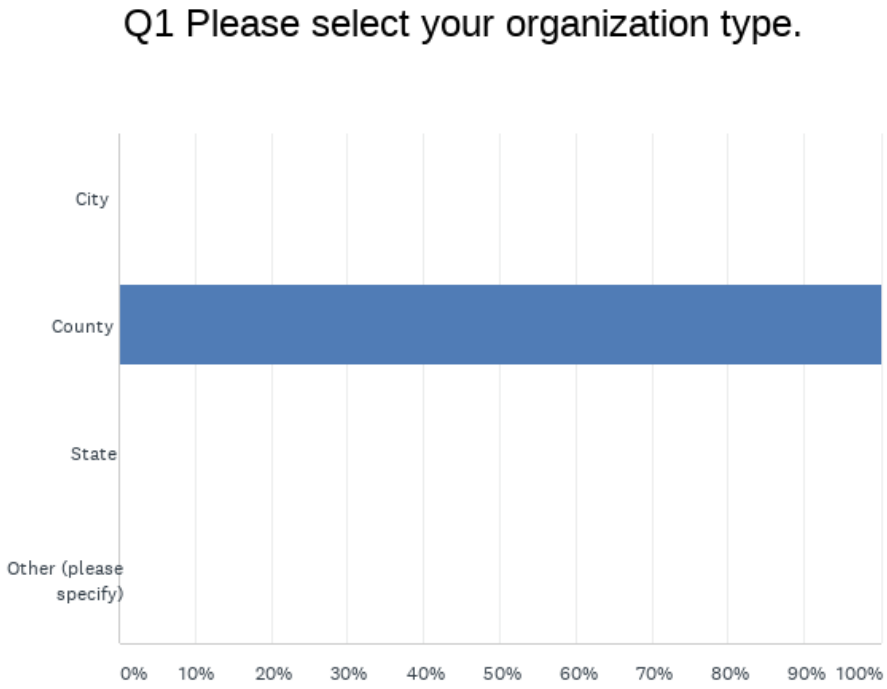
The survey questions were built using best practices to maximize participation, clarity and focus. One concern is the possibility of a participant skewing the data out of embarrassment over their lack of knowledge of NG911. The survey answers will be kept anonymous to hopefully alleviate this concern, especially among managers and/or administrators.

Results

This topic is highly technical and localized to focus on Florida's readiness. Therefore, the survey was sent to all Florida's 67 county 911 coordinators. Each coordinator was instructed to share the survey with their respective PSAP manger. This would yield a potential responses from 134 participants. Out of 134 potential responses, 31 were received for a twenty three percent (23%) response rate.

Several of the questions were specifically biographical in nature and identified the respondent's role at their agency. The first question asked the respondent to identify their organization type: City, County, State or Other. 100% of those who responded identified their organization as County.

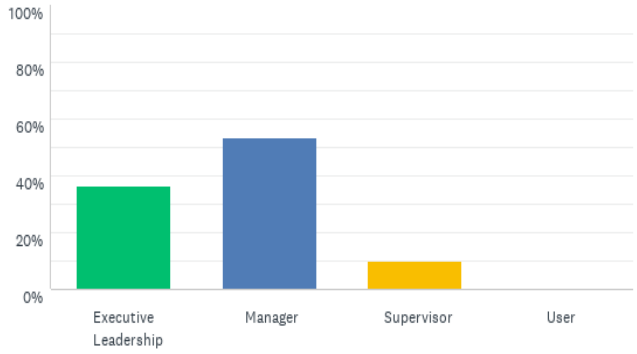
TABLE 1:



Question 2 asked the participants to consider their 911 operations and describe their role in that operation: Executive Leadership, Manager, Supervisor or User. Out of the 31 responses, eleven (36.67%) respondents described their role as executive leadership. Sixteen respondents (53.33%) describe themselves as managers and 3 (10%) identify as supervisors. One respondent skipped this question.

TABLE 2:

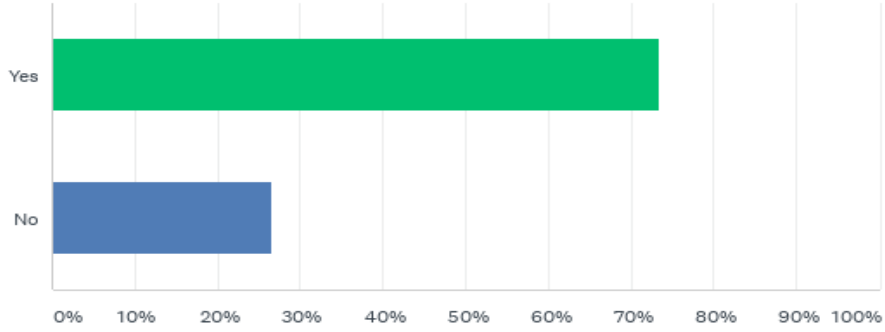
Q2 Thinking about the operations of your 9-1-1 center how would you describe your role?



Question 3 asked the participants to identify themselves as the county 911 coordinator. Each county has an appointed 911 coordinator, in keeping with the E911 State Plan. Out of 30 responses, Twenty two respondents (73.33%) identified themselves as the appointed county 911 coordinator. Eight respondents (26.67%) did not identify as the 911 coordinator. One person skipped the question.

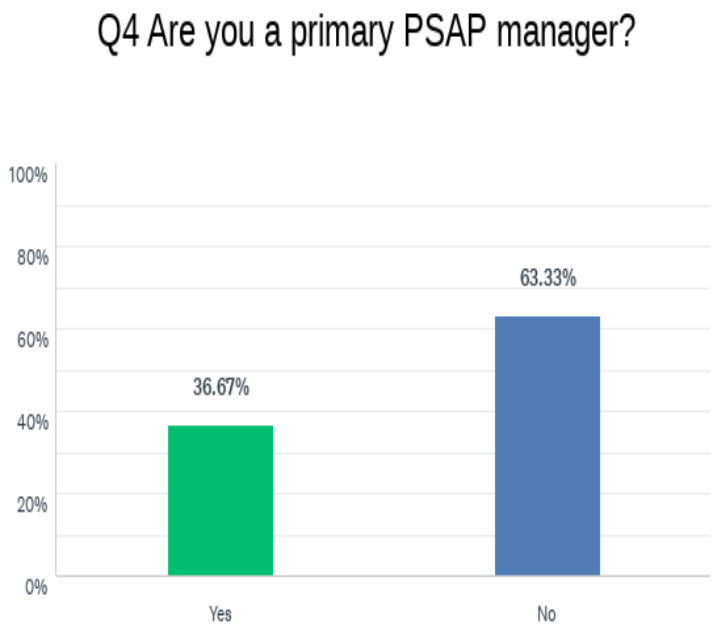
TABLE 3:

Q3 Are you the county 911 coordinator?



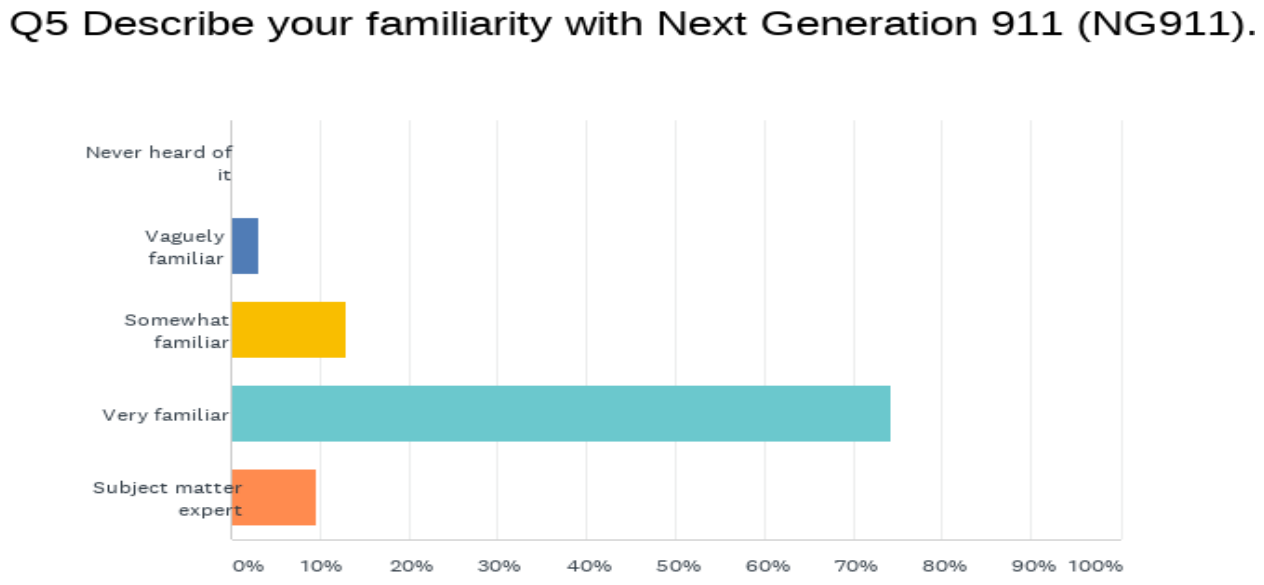
Question 4 asked the participant to identify if they are a primary PSAP manager. This question ran concurrent with question 3 as some position may serve a dual role as a PSAP manager and 911 coordinator. Nineteen respondents (63.33%) identified themselves as a primary PSAP manager. Eleven respondents (36.67%) did not identify themselves as a primary PSAP manager. One person skipped this question.

TABLE 4:



Question 5 sought to identify the participant's depth of knowledge on the topic of Next Generation 911 (NG911). All participants expressed some knowledge of the topic. One respondent (3.23%) described themselves as vaguely familiar. Four respondents (12.90%) described themselves as somewhat familiar. The majority, 23 (74.19%) claimed they were very familiar with the topic. Three respondents (9.68%) identified themselves as subject matter experts in the field of NG911.

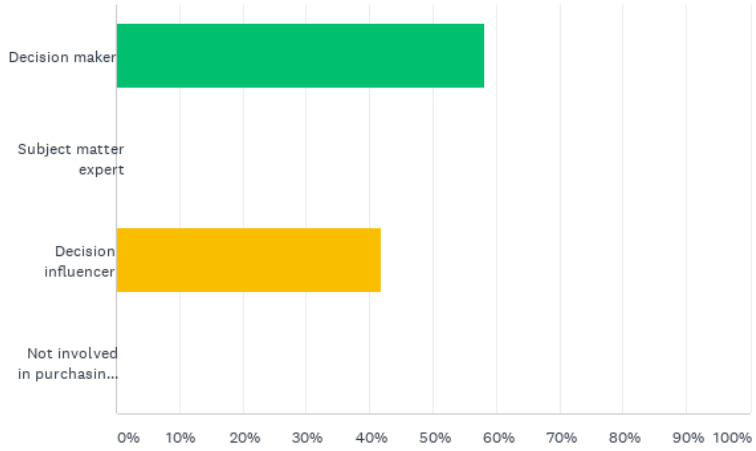
TABLE: 5



Question 6 asked the respondents to identify their roles, when considering the purchase of an NG911 system: Decision Maker. Subject Matter Expert, Decision Influencer or not involved in a purchasing decision. Eighteen respondents (58.06%) described themselves as decision makers. Thirteen respondents (41.94%) described themselves as decision influencers and no one identified themselves as a subject matter expert or not involving in purchasing decisions.

TABLE 6:

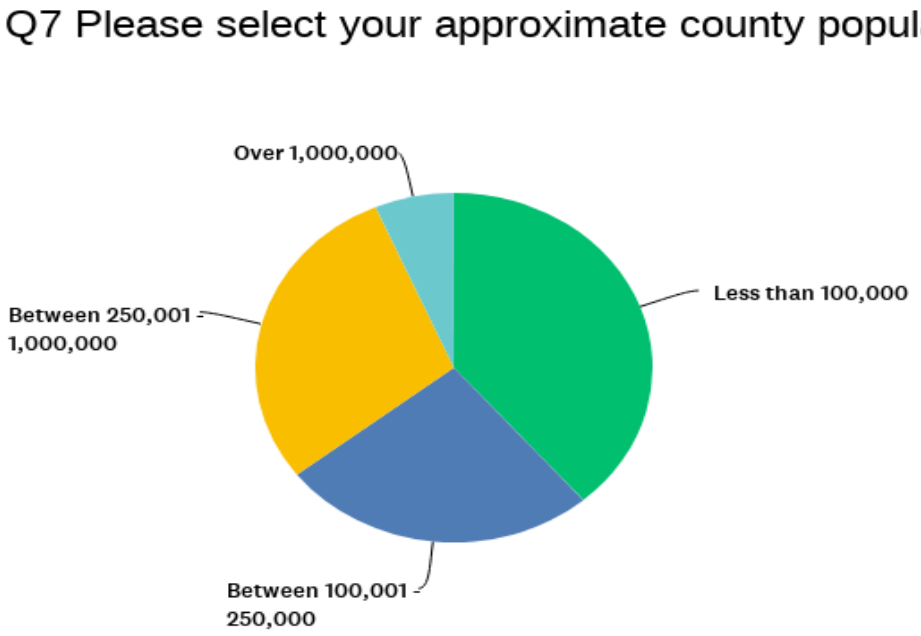
Q6 Thinking about the purchase of a NG911 system how would you describe yourself?



Question 7 sought to identify the approximate county population size for the participant's jurisdiction. The categories were broken up into: Less than 100,000, between 100,001 and 250,000, between 250,001 and 1,000,000 and over 1,000,000.

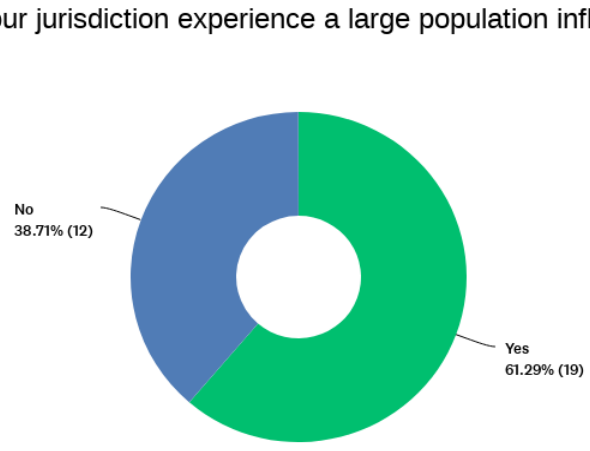
Twelve respondents (38.71%) participants estimated their county size as less than 100,000. Eight respondents (25.81%) listed their county population as between 100,001-250,000. 9 (29.03%) listed their county population between 250,001-1,000,000 and two respondents (6.45%) described their county population as over 1,000,000.

TABLE: 7



Questions 8 built upon question 7 by asking the respondents if their jurisdiction experiences a large influx in population due to tourism. Nineteen respondents (61.29%) reported yes and twelve respondents (38.71%) reported no large spike in population due to tourism.

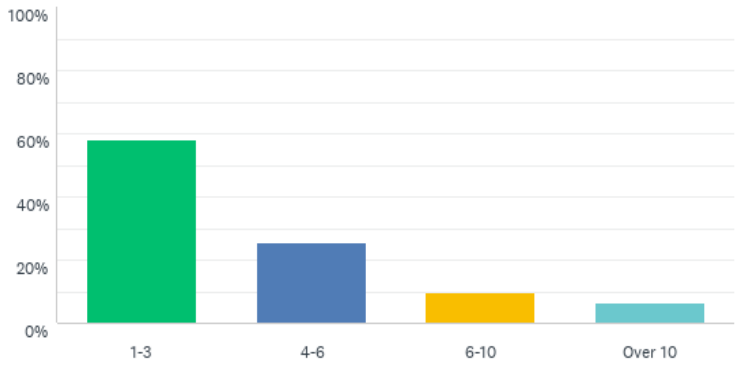
TABLE 8:



Question 9 solicited the approximate number of Public Safety Answering Points (PSAP) located in their jurisdiction. Eighteen respondents (58.06%) reported having 1-3 PSAP's. Eight respondents (25.81%) reported having 4-6 PSAP's. Three respondents (9.68%) reported having 6-10 PSAP's and two respondents (6.45%) reported having over 10 PSAP's.

TABLE 9:

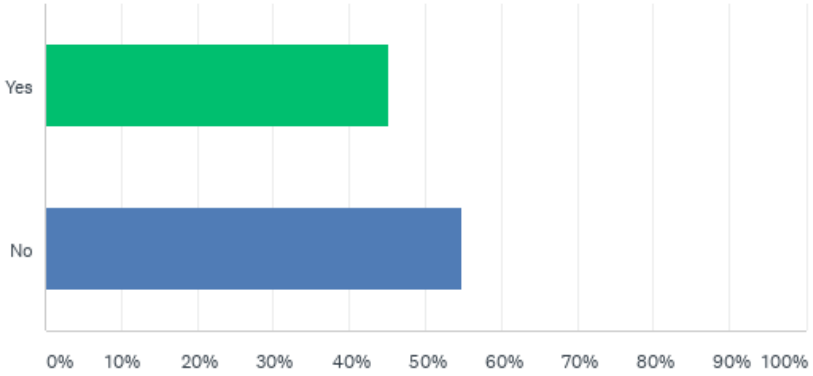
Q9 How many Public Safety Answering Points (PSAP) are located in your counties jurisdiction?



Question 10 went more in depth from the response in question 9. Answered as a yes or no, the respondent was asked if all of the PSAP's operate as a primary PSAP. Primary typically designates initial emergency call handling. Fourteen respondents (45.16%) responded yes and seventeen (54.84%) responded no.

TABLE 10:

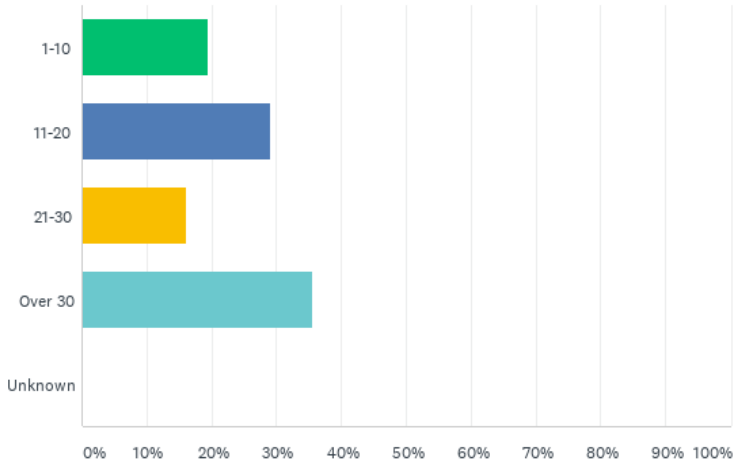
Q10 Do all your PSAPs operate as a primary PSAP?



Question 11 built upon question 9 and 10 by narrowing down the approximate number of 911 answering positions for the entire county. Six respondents (19.35%) reported 1-10 answering positions. Nine respondents (29.03%) reported 11-20 answering positions. Five respondents (16.13%) reported 21-30 answering positions and eleven (35.49%) reported over 30 answering positions countywide.

TABLE 11:

Q11 How many 911 answering positions (consoles) are there in your county?

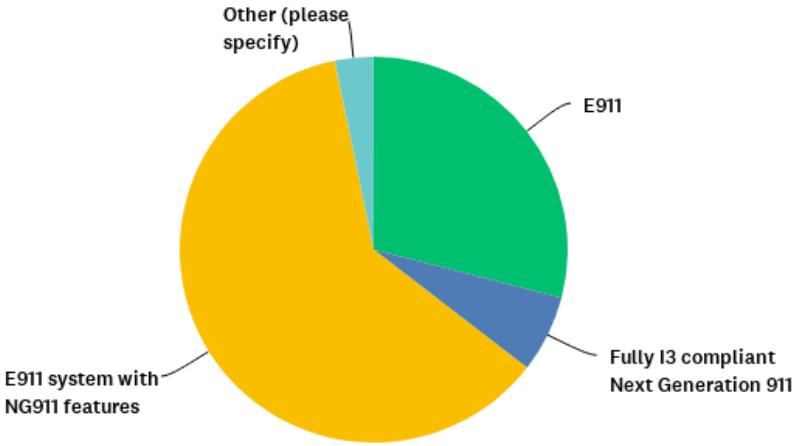


Question 12 asked the respondents to select the type of 911 system they currently operate. The choices were: Enhanced 911 (E911), fully i3 compliant Next Generation 911, E911 system with NG911 features, or other.

Nine respondents (29.03%) selected E911 as their current system. Two (6.45%) selected the fully i3 compliant NG911 system. Nineteen respondents (61.29%) selected an E911 system with NG911 features and one (3.23%) selected other. The respondent who selected other shunted to a free text field where they described their system as “Next Gen with RFAI, migrating to full i3”. RFAI is an acronym for Request for Assistance Interface. This is a standard that is separate from NENA i3 standards.

TABLE 12:

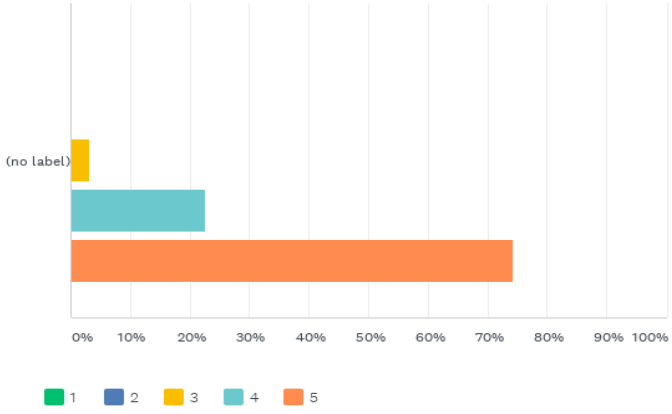
Q12 What type of 911 system do you currently operate?



Question 13 asked the respondents to rate the reliability of their current 911 system. This rating was done on a sliding scale from 1 to 5 with 1 being unreliable and 5 being very reliable. Twenty-three respondents (74.19%) selected 5, or very reliable to describe their 911 system. Seven (22.58%) selected 4, or somewhat reliable and one (3.23%) selected 3, neither reliable nor unreliable. No respondent described their system as unreliable.

TABLE 13:

Q13 Thinking about your 9-1-1 system, on a scale of 1 – 5, with 1 being unreliable and 5 being very reliable, how would you rank the reliability of your current 9-1-1 system?

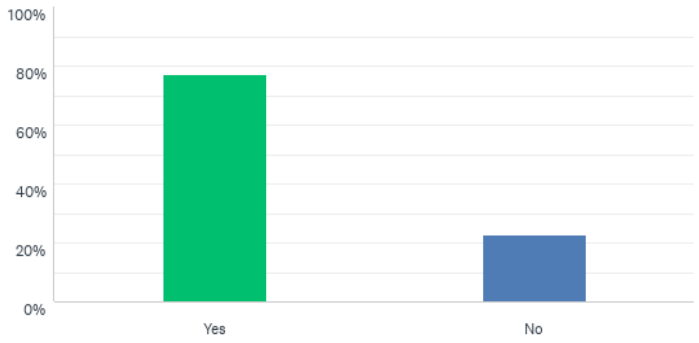


Question 14 asked the participant if their 911 system had experienced any outages in the last 5 years. This question was answered via a yes or no free text format. If the answer was yes, the participant was asked how many outages they have had in the last 5 years. Twenty-six people respondents answered this question and 5 people skipped it. Out of the twenty-six responses, fourteen (53.85%) stated they had not experienced an outage in the last 5 years. Ten (38.46%) stated they had experienced an outage. The free text answers ranged from 1 to “too many to list”. Many accompanied the response with an explanation, such as a weather event or equipment failure. Two (7.69%) responded with unknown or not applicable. See appendix for responses.

Question 15 asked the respondent if they currently had operational agreements with another PSAP in the event of an outage. Twenty-four (77.42%) responded yes and seven (22.58%) responded no.

TABLE 15:

Q15 Do you currently have operational agreements with another PSAP in the event of an outage?

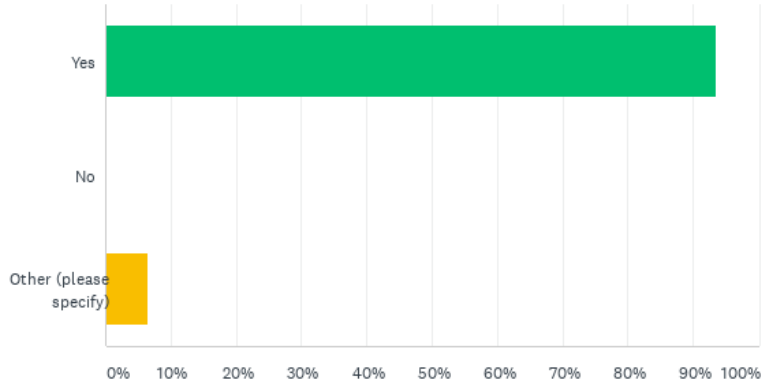


Question 16 asked the respondents to specify if their 911 system was compliant to NENA i3 standards. The answers available were yes, no and other with a free text area for further explanation. Eight respondents (25.81%) answered yes and sixteen (51.61%) responded no. Seven (22.58%) responded other. The general consensus of the free text responses indicated that many respondents were in the process of becoming i3 compliant. Some were partially compliant and one participant cited that the cellular carriers were incapable of providing i3 compliant data in their area. See appendix for related data.

Question 17 asked if the respondents organization was planning to transition to an NG911 system. The possible responses were yes, no and other with a free text area for further explanation. Twenty-nine (93.55%) respondents answered yes and no respondents answered no. Two (6.45%) responded other and provided an explanation. Those two explanations were “researching” and “we are already there”.

TABLE 17:

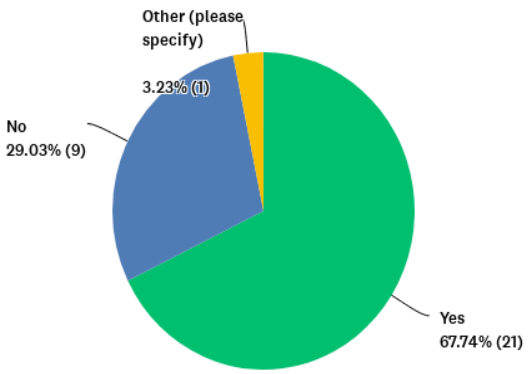
Q17 Is your organization currently planning to transition to a NG911 system?



Question 18 addressed the cost of NG911. Specifically, the respondents were asked if they had conducted any cost analysis to convert their existing 911 systems to a NENA i3 compliant (NG911) system. Twenty-one (67.74%) responded yes and nine (29.03%) responded no. One (3.23%) responded other, citing they were waiting for the analysis.

TABLE 18:

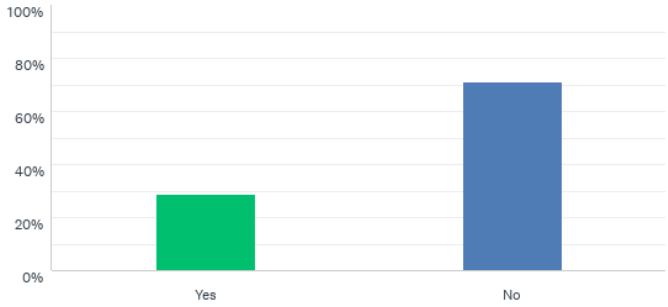
Q18 Have you conducted any cost analysis to convert your current 9-1-1 to a NENA i3 compliant system?



Question 19 asked the respondents if their current 911 revenue was sufficient to support the transition of their 911 system to NG911. Nine (29.03%) responded yes. Twenty-two (70.97%) responded no.

TABLE 19:

Q19 Is your current 911 revenue sufficient to support the transition of your 911 system to NG911?



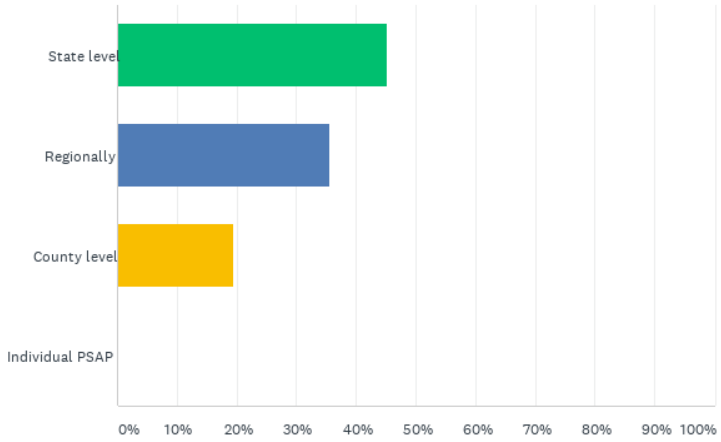
Question 20 was an extension of question 19 and requested suggestions for other revenue options to raise funds for increased funding. Nineteen of the twenty-two who answered no to the previous questions and twelve skipped the question.

The general consensus of the suggestions involved an increase of the 911 fee which generates revenue and the use of state and federal grants. Several participants also requested administrative rules change regarding spending authority. See the appendix for detailed responses.

Question 21 sought the opinion of the respondent as to what level of government should NG911 and ESInet be procured. The possible responses were: State Level, Regionally, County Level or Individual PSAP. Fourteen (45.16%) respondents believed NG911 should be procured at the state level. Eleven (35.48%) stated it should be procured regionally and six (19.36%) stated it should be procured at the county level. No respondent believed it should be procured at the individual PSAP level.

TABLE 21:

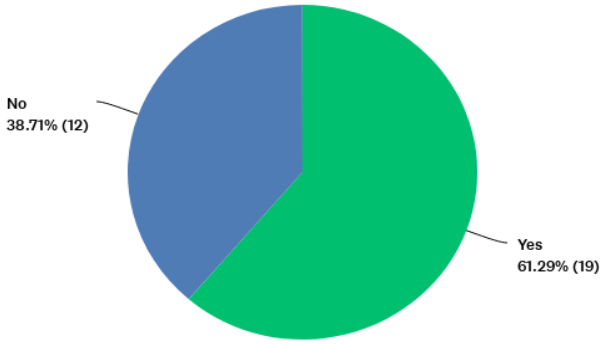
Q21 In your opinion, at what level of government should NG911 and or ESInet be procured?



Question 22 asked the respondent if the number of PSAP's per county should be limited to one primary with a secondary or backup center to reduce operational costs, improve effectiveness, and the efficiency of delivering emergency services? This was a yes or no response only. Nineteen (61.29%) respondents answered yes and twelve (38.71%) responded no.

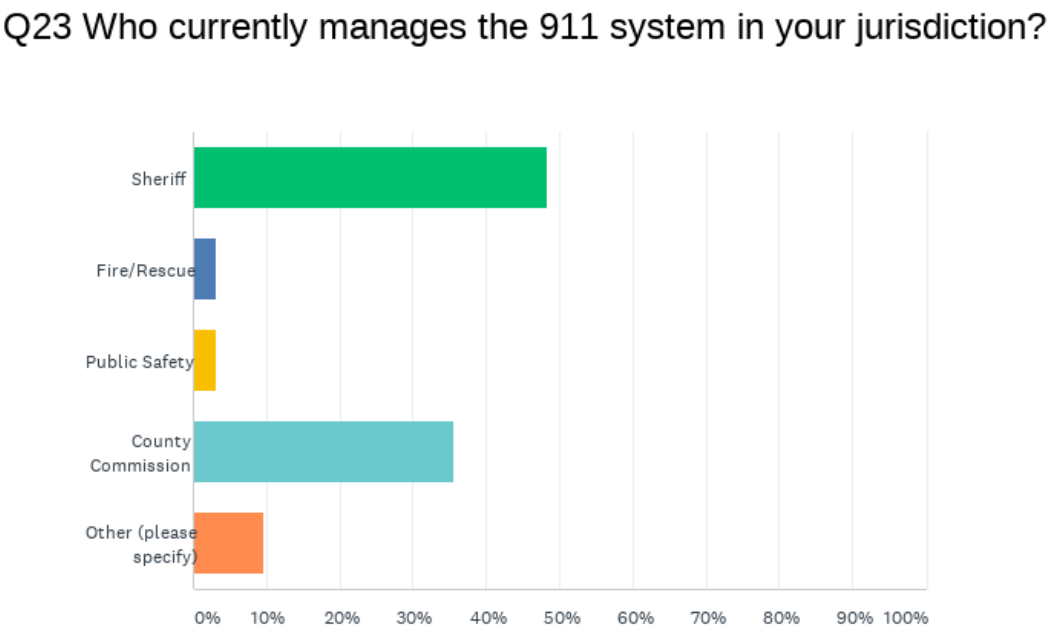
TABLE 22:

Q22 Should the number of PSAP's per county be limited to one primary with a secondary or backup center to reduce operational costs and improve effectiveness and the efficiency of delivering emergency services?



The final question asked about the 911 management organization in their respective jurisdiction. The potential answers were Sheriff, Fire/Rescue, Public Safety, County Commission or Other with a free text area for further explanation. Fifteen (48.39%) of the respondents answered that the Sheriff was responsible for 911 management. One (3.23%) selected Fire/Rescue. One (3.23%) selected Public Safety. Eleven (35.48%) selected County Commission and three (9.67%) selected other and provided a response. Out of those three responses, two explained the sheriff managed, but the county commission funded and one cited a sheriff and a police chief managed 911.

TABLE 23:



Discussion

Although the response rate was lower than anticipated, we can still glean crucial information and make recommendations. A high-level review of the survey data helps to paint a picture of the general state of readiness for the sampling of industry professionals who participated. Hopefully this data can be of assistance to PSAP managers, 911 coordinators and administrators across the state, who are currently facing this major and necessary technological shift. Next Generation 911 (NG911) is the next inevitable iteration of 911 technology in public safety communications.

There are several notable areas of the data that demand further examination and unpacking. First, let's examine the familiarity and the ability to steer critical decisions regarding the 911 system. All the participants claimed some type of knowledge of NG911.

What is encouraging is 74.19% report being very familiar with the technology with some being self-reported subject matter experts. NG911 architecture is very complex and requires in depth study and/or training. Couple that with 100% of participants claiming to be decision makers or influencers when it came to the purchase of a NG911 system. It is encouraging to see that the people with the knowledge are poised to make or influence crucial purchasing decisions.

Secondly, it appears that PSAP's have been leaning towards NG911 services while still operating their current E911 systems. This is evident from the responses to question 12 citing 61.29% using an E911 system with NG911 features. The data suggests that PSAP's are showing interest in NG911 without a commitment to full transition. Overall, 74.19% seem confident in the reliability of their system. Conversely, intermittent outages are still being experienced at PSAP's throughout Florida. The 911 system is critical infrastructure. As such, it should be given the same priority, attention and maintenance as other critical functions such as the National Crime Information Center (NCIC), redundant power at hospitals and even commercial commerce such as Amazon Web Service (AWS). Unified standards and compliance to standards are important to maintaining a healthy and reliable system. The responses to question 16 indicate that those not in compliance with NENA i3 standards understand the importance and are striving to meet those standards in their future outlays.

Finally, the survey addressed the most crucial component to the future of NG911. That component is funding. Questions 18, 19 and 20 all addressed funding. Over 67% of participants have conducted cost analysis regarding the cost of switching to an NG911 system. Building on that concept, over 70% do not believe their current 911 revenue stream is sufficient to support a transition to NG911. Thankfully, we have many suggestions to solve this issue which will be discussed in the recommendations portions of this document.

The literature and survey underscore the need for Florida to advance its current 911 technology into the Next Generation 911 (NG911) environment. Increased reliability, redundancy and features are some of the many advancements NG911 will bring to the network. It is evident from the data that Florida is ready and willing to implement this new technology. The main obstacle is procurement and funding.

There seems to be a difference in opinion on the level of government that should procure the NG911 and Emergency Services Internet Protocol Network (ESInet). As we learned earlier, ESInet's main function is to connect PSAP's to facilitate the transfer of information, specifically both voice and data emergency calls. This connection is crucial for the seamless, timely transfer of information. It also provides redundancy to PSAP's in the event of equipment failure. ESInet's can be connected locally, regionally or state to state. This stands to reason that a network that connects everyone in the state and connects to other states should be built and managed by the state. Currently the Department of Management Services supports the individual 911 networks throughout the state. However, there is not a unified network at this time.

The Department of Management Services also manages the funding for 911 across the state. The money collected from telephone fees at the state level is disbursed to the counties based on population size. These 911 monies are restricted to 911 use and the spending is outlined in the state 911 plan and Florida statutes. Currently Florida collects 0.40 cents per telephone, per month from Florida residents. Comparatively,

Alabama collects $1.75 per telephone per month and Georgia collects $1.50. Based on the survey data, sustainable funding is very important to the future of NG911 in Florida. An increase to this fee could provide enough revenue to properly fund all of Florida's counties to transition to NG911 and sustain the hardware refresh and maintenance requirements.

Recommendations

In light of this research and the information and opinions gathered from the survey, listed below are some recommendations for achieving the overall goal of transitioning to next generation 911.

The first recommendation would be to push for legislation that would increase funding. As noted, Alabama collects more than 4 times (Georgia collects 3 times more) the amount of taxes per telephone than Florida. With a small change that would have minimal impact on the users, our state could see a noticeable increase in 911 funds. NG911 core services and ancillary services (geospatial information services and cyber security) are expensive to implement and expensive to maintain. Vendors will offer maintenance and support contracts to customers for these services. Unless an agency is willing to hire and train their own support staff, a maintenance and support contact with a vendor is crucial. Think of it as a car warranty and insurance bundled into one package. No administrator of critical public safety infrastructure should operate without proper support and maintenance.

The second recommendation would be for the Florida Department of Management Services, through the State 911 board, to establish and manage a statewide ESInet. It is in the interest of the state and all the counties that Florida's PSAP's be interconnected on a dedicated network. With the state managing the network, this allows individual counties to pick the vendor(s) of their choice for NG911 core services. The county 911 coordinators can voice any concerns or requests to their respective representative on the state 911 board for redress.

Finally, additional research is needed. The limited scope and responses received in this research project are not comprehensive or binding. Florida has a unique geography and an enormous population, which increases exponentially during tourist season. A "one size fits all" approach will likely not succeed. Many states across America have implemented NG911 systems throughout their state as other are preparing the same. We should learn from the mistakes of others who have already made the transition and profit from their achievements, and in doing so realize our own.

Is Florida ready for NG911? The answer is no. But optimistically with the right support, Florida's telecommunications professionals are ready for the challenge.

Lieutenant Matthew Abbott has 15 years of sworn law enforcement experience with the Okaloosa County Sheriff's Office. Lieutenant Abbott began his career in law enforcement in 2003 as a communications officer for the Fort Walton Beach Police Department. In 2005 he joined the Okaloosa County Sheriff Office Posse as a volunteer. He became a full-time deputy in 2006 where he patrolled the southern portion of Okaloosa County. In 2008, he was competitively selected for the Street Crimes Unit. In 2011, he was promoted to Investigator and transferred to the Investigations Bureau where he specialized in property crime investigations. In 2013, Lieutenant Abbott was promoted to patrol Sergeant and assigned to the East District of the Operations Bureau. In 2016, he was transferred back to the Investigations Bureau where he supervised Investigators assigned to the Major Crimes, Property Crimes and Financial Crimes Units. In 2017, he was promoted to Lieutenant and served as a patrol Watch Commander. In 2018, Lieutenant Abbott transferred to the Special Operations Division, and currently serves as the Director of Communications. Matt is a graduate of the Florida Leadership Academy, Class 33. He holds a Bachelor of Arts degree in Criminal Justice from the University of West Florida.

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Appendix A

Next Generation 911

Senior Leadership Program Class 23 Research Survey
Please share this link/survey with any other 911 or PSAP managers.

1. Please select your organization type.
   - City
   - County
   - State
   - Other (please specify)

2. Thinking about the operations of your 9-1-1 center how would you describe your role?
   - Executive Leadership
   - Manager
   - Supervisor
   - User

3. Are you the county 911 coordinator?
   - Yes
   - No

4. Are you a primary PSAP manager?
   - Yes
   - No

5. Describe your familiarity with Next Generation 911 (NG911).
   - Never heard of it
   - Vaguely familiar
   - Somewhat familiar
   - Very familiar
   - Subject matter expert

6. Thinking about the purchase of a NG911 system how would you describe yourself?
   - Decision maker
   - Subject matter expert
   - Decision influencer
   - Not involved in purchasing decisions

7. Please select your approximate county population.
   - Less than 100,000
   - Between 100,001 - 250,000
   - Between 250,001 - 1,000,000
   - Over 1,000,000

8. Does your jurisdiction experience a large population influx due to tourism?

Yes
No

9. How many Public Safety Answering Points (PSAP) are located in your counties jurisdiction?

1-3
4-6
6-10
Over 10

10. Do all your PSAPs operate as a primary PSAP?

Yes
No

11. How many 911 answering positions (consoles) are there in your county?

1-10
11-20
21-30
Over 30
Unknown

12. What type of 911 system do you currently operate?

E911
Fully I3 compliant Next Generation 911
E911 system with NG911 features
Other (please specify)

13. Thinking about your 9-1-1 system, on a scale of 1 – 5, with 1 being unreliable and 5 being very reliable, how would you rank the reliability of your current 9-1-1 system?

1 2 3 4 5

14. Has your 9-1-1 experienced outages in the last 5-years? If yes how many?

Yes
No

15. Do you currently have operational agreements with another PSAP in the event of an outage?

Yes
No

16. Is your 911 system NENA i3 compliant?

Yes
No
Other (please specify)

17. Is your organization currently planning to transition to a NG911 system?
- Yes
- No
- Other (please specify)

18. Have you conducted any cost analysis to convert your current 9-1-1 to a NENA i3 compliant system?
- Yes
- No
- Other (please specify)

19. Is your current 911 revenue sufficient to support the transition of your 911 system to NG911?
- Yes
- No

20. If no, please provide any suggestions you have concerning funding in the space below.
- Free text

21. In your opinion, at what level of government should NG911 and or ESInet be procured?
- State level
- Regionally
- County level
- Individual PSAP

22. Should the number of PSAP's per county be limited to one primary with a secondary or backup center to reduce operational costs and improve effectiveness and the efficiency of delivering emergency services?
- Yes
- No

23. Who currently manages the 911 system in your jurisdiction?
- Sheriff
- Fire/Rescue
- Public Safety
- County Commission
- Other (please specify)

Appendix B

Next Generation 911

Q14 Has your 9-1-1 experienced outages in the last 5-years? If yes how many?

Answered: 26 Skipped: 5

#	RESPONSES	DATE
1	no	9/28/2020 10:58 AM
2	No	8/12/2020 9:03 AM
3	No	8/7/2020 7:05 AM
4	None	7/29/2020 3:35 PM
5	0	7/29/2020 2:24 PM
6	No	7/29/2020 12:39 PM
7	No	7/29/2020 10:55 AM
8	Yes 1 cut line	7/29/2020 10:28 AM
9	One 9-1-1 trunk problem that was related to hardware in a CO. We have had several wireless carrier outages, but they are related to the carriers.	7/29/2020 9:48 AM
10	0	7/29/2020 9:39 AM
11	No	7/29/2020 8:57 AM
12	No	7/29/2020 8:04 AM
13	unknown	7/29/2020 7:54 AM
14	0	7/29/2020 7:52 AM
15	1	7/29/2020 7:49 AM
16	No	7/29/2020 7:32 AM
17	Yes due to Hurricane Michael. Only one I can recall.	7/29/2020 7:23 AM
18	yes, 1 cable cut due to construction	7/29/2020 7:21 AM
19	1	7/29/2020 5:29 AM
20	2	7/28/2020 6:45 PM
21	During IRMA	7/28/2020 5:47 PM
22	No	7/28/2020 4:19 PM
23	No.	7/28/2020 4:13 PM
24	N/A	7/28/2020 4:06 PM
25	too many to list, occurs 2-4 times a month,	7/28/2020 4:04 PM
26	Yes- 3	7/28/2020 3:51 PM

Q16 Is your 911 system NENA i3 compliant?

Other responses:

Although we are not using it I3, because the carriers are not delivering I3

7/29/2020 10:55 AM

Partial. We have a Geo diverse system that shares processing with neighboring Highlands County. We plan to upgrade to full i3 capable in 2021

7/29/2020 8:04 AM

In progress

7/29/2020 7:52 AM

we are in the process of transitioning to an ESInet for compliance

7/29/2020 7:49 AM

will be upgrading as soon as contract is signed

7/29/2020 7:21 AM

RFAI => i3

7/28/2020 4:19 PM

Cutting over in 30 days

7/28/2020 3:49 PM