Commission to Advance NG911 Across Maryland

Final Report

Prepared November 2018

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Re: Report required by Chapter 302, 2018 (MSAR #11656)

The most important phone number children learn is 9-1-1. In case of emergency, dial those three digits, and help will come. In Maryland, this happened over 5,000,000 times last year. Our police officers, firefighters, and paramedics are dispatched by well-trained call-takers. Together, lives and property are saved every day. Sometimes, however, the system doesn't work. Maryland's current technology is outdated. In times of catastrophic emergency, it gets overloaded. The Geographic Information System (GIS) can't reliably locate crises quickly and accurately. And, we can currently only communicate by actually dialing the numbers and talking to a 9-1-1 Specialist.

Maryland is working to transition to "Next Generation 9-1-1" or "NG911." This new technology will allow for phone, text, photos, and videos to be sent to our 24 centers. It will enable seamless rollover to other jurisdictions with all of the data intact. Our telecommunicators (often called the "First First Responders") will face even greater stress and need additional levels of training; this increases the challenge we face already with recruiting, training, and retention. We need to guard against cybersecurity hacks, which are happening with alarming frequency. To accomplish all of this, Maryland must adjust its funding structure. Currently, an average of just 39% of costs are covered by the $1 fee we have paid for the past 15 years.

This Commission's members— comprised of experts from 9-1-1, government, industry, and technology— have invested thousands of hours in the crafting of this report. Four subcommittees convened at least weekly for the past three months. Three day-long meetings in Annapolis allowed us to compare notes and seek consensus. Ultimately, we are presenting 23 recommendations for consideration by the Governor and General Assembly. Each one of them won unanimous support from Commissioners. Many will be included in urgently-needed, bipartisan legislation that will be introduced in January of 2019.

I am deeply grateful to the Commissioners and observers; Vice Chair, Steve Souder, with his 60 years of 9-1-1 expertise; subcommittee Chairs Bill Ferretti, Charlynn Flaherty, and Richard Brooks; Mission Critical Partners consultants; my legislative staff; and the devoted public servants who respond to 9-1-1 calls every day.

My personal dedication to this issue stemmed from the tragic death of a Rockville constituent and inspirational activist, Carl Henn, who was struck by lightning during a severe thunderstorm. His widow Carol wrote in an open letter that this Commission is a fitting tribute to him, as the unanimously approved recommendations will help save lives in the future.

Please contact me or anyone on the Commission if you have questions or need more information. We are united in our commitment to saving lives as we shift to NG911 in a thoughtful and effective way.

Respectfully submitted,

Cheryl C. Kagan

Cheryl C. Kagan
Senator, District 17 (Rockville & Gaithersburg)
NG911 Commission Chair

cc: Sarah Albert, Department of Legislative Services (5 copies)

Executive Summary

9-1-1 is an enduring social contract between government and the people they represent, connecting Responders and the general public they serve during the public's time of need.

In Maryland, 9-1-1 service is at a critical transition point. For more than 50 years, the State's residents and visitors have relied on the 9-1-1 system in their time of greatest need to receive emergency assistance. The public expects that when the digits 9-1-1 are dialed, they will receive assistance when the phone is answered and that help will soon be on its way.

However, while the current, legacy 9-1-1 network in Maryland has been upgraded over the decades, **it still is based on a design that is more than 50 years old and no longer meets our needs**. Indeed, the capabilities of the communications devices used every day by Marylanders far surpass the capabilities of the State's aging 9-1-1 infrastructure.

For example, texting is often the preferred method of communication, especially for individuals who are deaf, hard of hearing, or have a speech disability. In some circumstances, such as a home invasion or domestic violence incident, sending a text to 9-1-1 may be the safest way to request emergency response.

Recognizing the importance of text-to-9-1-1, Maryland has taken positive steps toward implementing this vital service. As of January 2018, only one jurisdiction in the state (Frederick County, home of the Maryland School for the Deaf) was providing such service. However, the Maryland Emergency Number Systems Board (ENSB or "the Board") initiated a project to provide an interim text-to-9-1-1 solution in the other 23 public safety answering points (PSAPs)—also known as 9-1-1 centers.

As compelling as text-to-9-1-1 service is, it represents the proverbial tip of the iceberg concerning the next generation of emergency response communications. This updated system of emergency response is referred to as Next Generation 9-1-1 (NG911). Once it is implemented statewide, it will be transformative for Maryland's residents and visitors as well as the emergency response community.

NG911 systems are Internet Protocol (IP)-based and broadband-enabled. As such, they offer capabilities that bring infinitely more capacity than the State's legacy 9-1-1 infrastructure, which only deliver voice calls. The following are some of the **benefits of NG911 systems:**

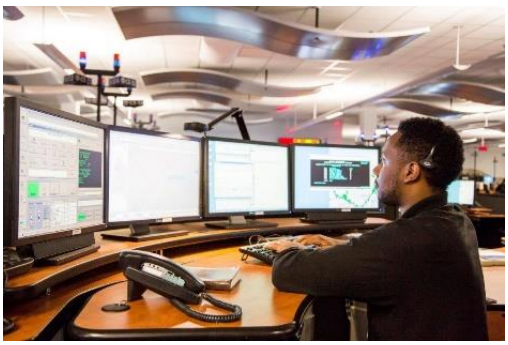
Benefits of NG911 Systems

NG911 systems are broadband-enabled to allow PSAPs to receive bandwidth-intensive data from callers—images, video, and sensor data—in order to provide telecommunicators with **unprecedented situational awareness, better informed decision-making, and the sharing of data** with First Responders to help them do their jobs more effectively while keeping them safer. A NG911 infrastructure is required to make this work.

NG911 systems are also IP-based, which means that PSAPs can be interconnected and share data, **or seamlessly and quickly transfer operations** to a neighboring PSAP when a disaster or an emergency renders it inoperable, inaccessible, or uninhabitable.

NG911 systems rely on geospatial data to locate callers in an emergency, a far more accurate approach than what's available with today's 9-1-1 system. As a result of **more accurate 9-1-1 caller location, fewer calls will be misrouted**, saving precious time when every second matters. Emergency response will also arrive more quickly.

Migrating to NG911 is a critical imperative for Maryland, as lives are at stake. However, there is much to do to make this a reality and we are far behind other states. Consequently, the State needs to accelerate its NG911 transition.



The activities described above are just the beginning. Those who answer the phones, our 9-1-1 Specialists, will need to be trained so they can handle the new and expanded responsibilities that will come with NG911. They also will need to be compensated differently as a result of their expanded skillsets. Intergovernmental agreements and Memoranda of Understanding (MOUs) will need to be established between interconnected PSAPs, and Service Level Agreements (SLAs) will need to be negotiated with NG911 providers.

IP-based networks, used in a NG911 system, are much more vulnerable to cyberattacks. The risk increases significantly when multiple NG911 systems are interconnected.

Perhaps most importantly, a new funding model needs to be implemented. Monies collected through the **current $1.00 9-1-1 fee cover an average of 39 percent of each county's 9-1-1 services.**

Unfortunately, this requires counties to supplement the 9-1-1 fee revenue with local funds. Based on information provided by the ENSB, the Commission to Advance Next Generation 9-1-1 Across Maryland ("the Commission") has concluded that **current 9-1-1 funding is grossly insufficient to support the current 9-1-1 system, let alone the updated NG911 technology.** Current estimates indicate the cost of transitioning to NG911 service across Maryland is estimated to be more than $13 million. The shift to NG911 will require the Maryland legislature to enact new laws; the ENSB, Maryland Association of Counties (MACo), and local 9-1-1 authorities will need to craft new policies that support the new environment.

In April 2018, Governor Larry Hogan signed a bill into law that authorized the formation of the Commission under the auspices of MACo. It was established to address the issues associated with the adoption of and transition to NG911 technology. Commissioners were divided into four subcommittees: Technology and Cybersecurity; Oversight and Accountability; Staffing; and Finance.

The commission voted unanimously to endorse 23 recommendations that will help advance NG911 in Maryland.

Table 1: Commission Recommendations to Advance NG911

Number	Category	Commission Recommendation
1	Standards	The ENSB shall recommend minimum technical guidelines based on nationally recognized standards and guidelines (e.g., APCO,[1] NENA,[2] ATIS,[3] FCC,[4] National 911 Program, NFPA,[5] NIST[6] and other applicable standards and best practices) that accommodate current and future technologies. Counties shall follow those recommendations and standards when procuring NG911 and GIS components, PSAP call-handling equipment, and cybersecurity systems to ensure secure, integrated, interconnected and interoperable systems to the degree required by their operations.
2	Cybersecurity	Local 9-1-1 authorities shall be required to maintain a Continuity of Operations Plan (COOP) that is updated annually to be eligible for funding. COOPs must include a cybersecurity risk-mitigation strategy based on findings from a critical infrastructure vulnerability and risk assessment.

[1] Association of Public-Safety Communication.
[2] National Emergency Number Association.
[3] Alliance for Telecommunications Industry Solutions.
[4] Federal Communications Commission.
[5] National Fire Protection Association.
[6] National Institute of Standards and Technology.

Number	Category	Commission Recommendation
3	Cybersecurity	The ENSB will adopt requirements based on industry standards and best practices for local agencies to comply with NG911 technology and cybersecurity protection and prevention measures. The ENSB and MACo ECC shall collaborate on funding needed to support these requirements.
4	NG911 Implementation	The MACo ECC may develop a transition document that supports the Strategic Plan adopted by the ENSB for the PSAPs that addresses the timing and order in which PSAPs will migrate to NG911.
5	Emerging Technologies	Maryland shall make every effort to procure and adopt NG911 technologies that improve access for people with disabilities and others who use assistive technologies, including mandatory connectivity to additional device-based and cloud-based data repositories at the Next Generation Core Services (NGCS) level.
6*	Liability	Liability protections must be provided for Emergency Services IP network (ESInet) and NGCS providers as they are for existing 9-1-1 providers (e.g., any of the commercial carriers able to provide services in Maryland).
7*	Records Retention	The General Assembly is encouraged to consider minimum standards to guide retention timelines. Local 9-1-1 authorities should ensure they have a document retention schedule in compliance with Annotated Code of Maryland State Government Article 10, sections 608-611 and COMAR 14.18.02 at minimum for 9-1-1 audio, video, 9-1-1 text messages, and 9-1-1 related CAD data (where applicable). This compliance should be reported and referenced in the annual inspection reports and in the county plans based on guidance provided by the ENSB.
8	Interconnectivity and Service Level Agreements	Local 9-1-1 authorities in Maryland shall have formal, written agreements (e.g., SLAs with vendors, and MOU, Interlocal Agreements, and Intergovernmental Agreements between and among 9-1-1 authorities) to foster effective call-handling and data-sharing practices in support of NG911 implementation and ongoing operations.
9*	Public Education and Outreach	The ENSB shall assist local 9-1-1 authorities with State-developed, consistent, and coordinated messaging and outreach activities, especially as they relate to the implementation of NG911 and text-to-911.

Number	Category	Commission Recommendation
10	Data Collection and Performance Metrics	The ENSB shall identify performance metrics guidance to provide to the local 9-1-1 authorities for inclusion in their procurement documents and service requests. Compliance with the performance metrics guidance shall be validated during the procurement requests for funding brought to the ENSB and annual reports/county plan updates brought to the board.
11	Offering Guidance and Support	The ENSB, in consultation with the Maryland Association of Counties (MACo) Emergency Communications Committee (ECC), shall work to establish guidance and support for: NG911 integration and interoperability, GIS, training, certification, quality assurance, and recertification standards for PSAPs and 9-1-1 Specialists.
12*	Staffing Levels	The Commission encourages the General Assembly to enact legislation to provide the ability for PSAPs to maintain the staffing levels necessary to manage and maintain the new needs that accompany NG911 [e.g., GIS, technical, cybersecurity, and resources to support the Maryland Privacy Information Act (MPIA)].
13	Establishing Certification	The ENSB shall establish statewide adoption of certification and recertification programs for 9-1-1 Specialists based upon national standards and use of third-party vendor products.
14*	Enhancing Recognition	The Commission commends the actions taken to initiate benefit parity for Telecommunicators and encourage more to be done to help with retention. One such step is by acknowledging the role of the Telecommunicator (9-1-1 Specialists)—who are often the "First of the First Responders"—as a key link in the chain of public safety, in partnership with law enforcement officers, firefighters, and emergency medical services (EMS) professionals.
15	Providing a Resource Repository	The ENSB, in consultation with the MACo ECC, shall establish a statewide educational and best practices repository to serve 9-1-1 Specialists and PSAPs.
16	Creating Educational Programs	Coordinate and advocate for professional-based education curricula that foster 9-1-1 communications careers by encouraging the development of programs at community colleges and high schools.

Number	Category	Commission Recommendation
17*	Privacy Protection	With the increased level of graphic data available to PSAPs as a result of the capabilities of NG911, special attention should be paid to how certain information is handled regarding Maryland Public Information Act (MPIA) requests.
18	Increase Total Compensation	Encourage localities to increase total compensation of 9-1-1 Specialists, commensurate with skillsets required to support NG911.
19	Staffing Levels	The Commission acknowledges that several of its recommendations may require that additional staffing be provided to the ENSB to support outreach, program development and communications program management.
20*	Funding Distribution	Based upon funding availability, the enabling legislation for the ENSB shall be expanded to include eligible expenses, such as recurring costs for maintenance and sustainment of NG911.
21*	Fee Adjustment	Amend the statutory language to modify the fee-collection methodology and restore protection for 9-1-1 fees in accordance with legislative language which was removed in 2010 legislation.
22*	Fee Adjustment	Adjust the funding model to increase the State portion of the 9-1-1 fee from $.25 to $.50.
23*	Fee Adjustment	Authorize counties to adjust the local $.75 fee up to an additional $.75.

*These recommendations require legislative change

1 Introduction

The digits 9-1-1 are the key to emergency services. The initial and arguably most important connection for someone in crisis is with the public safety communications specialist (9-1-1 Specialist), also known as a telecommunicator. When callers hear a voice and talk through their emergency, they are comforted by the knowledge that they are receiving the assistance needed and that help is on the way.

Nationally, **the infrastructure on which 9-1-1 service was built was designed more than 50 years ago**. Over the years limited modifications have been made to accommodate advancing technology. These adaptations and the aging infrastructure no longer meet the needs of today's evolving technology and Maryland residents. Accordingly, action is urgently needed to advance the 9-1-1 infrastructure across Maryland—Next Generation 9-1-1 (NG911) provides that opportunity.

NG911 creates a robust and redundant infrastructure that will deliver 9-1-1 service today and into the future. It will process all call types—including voice, text-to-9-1-1, and crash notification—as well as images and video. In addition, it will enable improved location accuracy that will allow emergency personnel to send help more quickly. The image below demonstrates the progression of 9-1-1 technology.

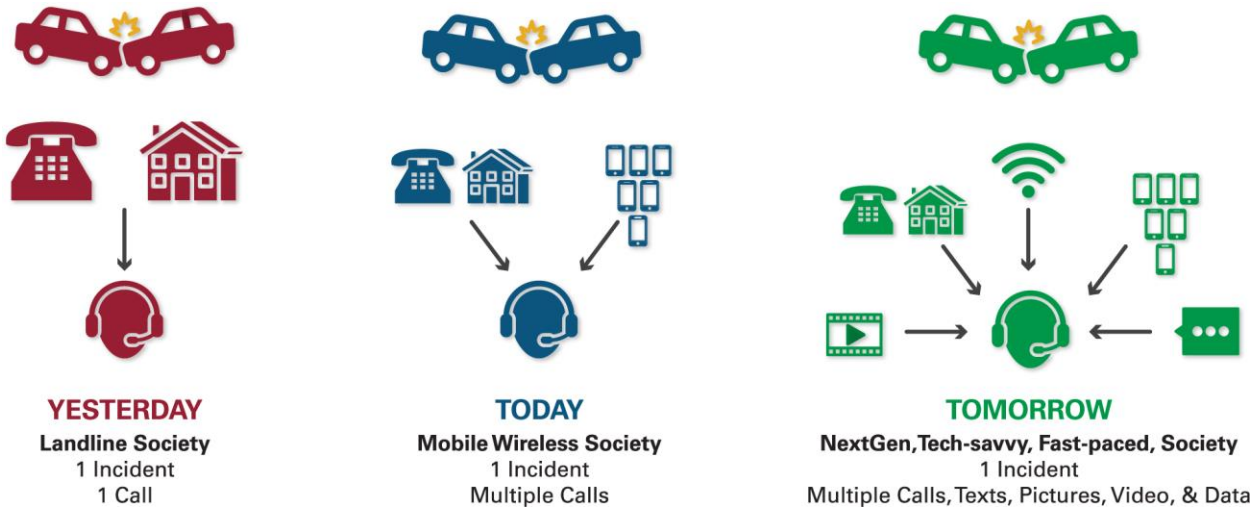


Figure 1: 9-1-1 Technology Progression

For its many benefits, NG911 and the move to an Internet Protocol (IP)-based infrastructure introduces risk of cybersecurity attacks. This risk makes the need for redundancy, resiliency and cybersecurity an integral part of the planning, procurement, and operations efforts. Any cybersecurity attack that brings down a 9-1-1 Center affects not only the specific Public Safety Answering Point (PSAP) or 9-1-1 Center targeted but also the individual in need of help. **Cybersecurity attacks are on the rise, and NG911 and security measures are necessary to thwart attacks and keep 9-1-1 systems functioning.**

In Maryland, the Emergency Number Systems Board (ENSB or "the Board") is coordinating the advancement and implementation of NG911. NG911 will require funding to implement the evolving technology and skillsets. It also will require changes to state statutes and policies to ensure that the necessary authority and support is available to assure continuity of 9-1-1 service across the state.

Accordingly, the Commission to Advance Next Generation 9-1-1 Across Maryland ("the Commission") was formed to address the needs associated with the adoption and introduction of NG911 technology. The Commission, chaired by Senator Cheryl Kagan with vital support from Vice Chair Mr. Steve Souder, was broken into four subcommittees: Technology and Cybersecurity; Oversight and Accountability; Staffing; and Finance. This report provides an overview of the Commission's recommendations and direction to help advance NG911 in Maryland.

2 Background

2.1 Terminology

Throughout this report, there are terms quite common in the public safety industry. Some are highlighted below; a full glossary can be found in Appendix A on page 56.

Terminology	Definition
Emergency Number Systems Board (ENSB)	The ENSB ("the Board") distributes capital funding and coordinates installation and enhancement of county 9-1-1 emergency systems. The Board issues guidelines and reviews procedures to approve or disapprove county plans for these systems; provides for audit of 9-1-1 Trust Fund accounts; and sets criteria for reimbursing counties.
Legacy (existing) Technology	For terms of this report, legacy technology is the traditional 9-1-1 infrastructure utilized by public safety.
Maryland Association of Counties (MACo)	A nonprofit and nonpartisan organization that serves Maryland's counties by articulating the needs of local government to the Maryland General Assembly.
Next Generation 9-1-1 (NG911)	An Internet Protocol (IP)-based system comprised of managed Emergency Services IP networks (ESInets), functional elements (applications), and databases that replicate traditional Enhanced 9-1-1 (E9-1-1) features and functions and enable enhanced call-routing, call-handling, and call-processing capabilities for PSAPs.

Terminology	Definition
Public Safety Answering Point (PSAP)	A 9-1-1 center that receives 9-1-1 calls and processes them according to a specific protocol or operational policy.
Public Safety Communications Specialist ("9-1-1 Specialist")	Professional responsible for answering, triaging, and dispatching 9-1-1 calls; with NG911 will be asked to manage emergency requests for service via text, video, and voice. They are often the "First of the First Responders" who provides for the appropriate emergency response either directly or through communication with the appropriate entities.

2.2 Next Generation 9-1-1 Initiatives

2.2.1 Next Generation 9-1-1

Today's 9-1-1 infrastructure was designed and built using technology that is now aging. Next Generation 9-1-1 (NG911)[7] enhances that infrastructure by using an IP-based network and standards-based technology. NG911 will enable enhanced services for the 24 PSAPs across Maryland.

NG911 will provide PSAPs with greater redundancy and resiliency and will enable more seamless continuity of service in the event of call overflow and when transferring 9-1-1 calls to another jurisdiction. The ENSB has made tremendous investments already to support establishing broadband fiber connectivity that will serve as the last mile of connectivity for PSAPs, preparing Maryland for the NG911 advancements.

The public safety community recognizes that the transition to NG911 will require coordination and collaboration[8] among numerous entities within Maryland as well as statutory updates. For that reason, this Commission was formed.

[7] Next Generation 9-1-1 is a secure, IP-based, open-standards system comprised of hardware, software, data, and operational policies and procedures that (A) provides standardized interfaces from emergency call and message services to support emergency communications; (B) processes all types of emergency calls, including voice, text, data, and multimedia information; (C) acquires and integrates additional emergency call data useful to call routing and handling; (D) delivers the emergency calls, messages, and data to the appropriate PSAP and other appropriate emergency entities based on the location of the caller; (E) supports data, video, and other communications needs for coordinated incident response and management; and (F) interoperates with services and networks used by First Responders to facilitate emergency response.

[8] https://www.911.gov/issue_nextgeneration911.html

2.2.2 Emergency Number Systems Board (ENSB)

The 24 PSAPs in Maryland are operated in accordance with the Maryland Public Safety Article and Code of Maryland Regulations (COMAR) and with the assistance of the ENSB. [9] The Board consists of 17 members appointed by the Governor and is supported by the Secretary of the Department of Public Safety and Correctional Services (DPSCS). The ENSB's mission is to "coordinate the implementation, enhancement, maintenance, and operation of county or multi-county 9-1-1 systems." Board members include stakeholders in Maryland's 9-1-1 community, including PSAPs, telecommunications carriers, First Responders, and standards organizations.

2.2.3 Maryland Next Generation Initiatives

2.2.3.1 Implementation of NG911

The ENSB has been working to prepare Maryland for NG911 and has studied the evolving technology to further understand what is required. In 2017, the ENSB hired Mission Critical Partners (MCP) to manage the coordination of NG911 across Maryland. The project included a feasibility study that ensured all PSAP directors and the Board were involved in the transition to NG911. The project included the delivery of several key documents including:

- Next Generation 9-1-1 Readiness Assessment and Strategic Procurement Plan
- Grant Initiatives for the National 911 Program Grant Program (ongoing effort)
- Several presentations and white papers for stakeholders to best understand NG911 and what is necessary to be fully NG911 ready

2.2.3.2 Maryland Next Generation 9-1-1 Strategic Plan

In early 2018, the ENSB approved a strategic plan to benefit not only its mission and vision but also that of the newly created Emergency Communications Committee (ECC), which falls under MACo's purview. The strategic plan evaluated the current state of 9-1-1 across Maryland and recommendations that support tasks related to the migration to NG911.

2.3 Commission

With the increased urgency of updating 9-1-1, Senator Cheryl Kagan and Delegate Michael Jackson were the lead sponsors, joined by several colleagues, of a bill to establish the Commission. Ultimately, the legislation passed unanimously in both the Senate and House and was signed into law.

[9] Maryland COMAR Public Safety Chapter. http://www.dsd.state.md.us/comar/comarhtml/12/12.11.03.03.htm

2.4 Commission Subcommittees

Four subcommittees were established within the Commission to review and provide subject-matter expertise regarding the main focus areas: Technology and Cybersecurity; Oversight and Accountability; Staffing; and Finance. Additional members and subject matter experts interested in the mission were invited to join and participate in the subcommittee discussions.

2.4.1 Technology and Cybersecurity

The Technology and Cybersecurity subcommittee focused on details relating to the technological needs and security concerns with the implementation and maintenance of the components of a NG911 network.

2.4.2 Oversight and Accountability

The Oversight and Accountability subcommittee focused on the governance, policies, process development, and statutory shifts needed to implement NG911 service.

2.4.3 Staffing

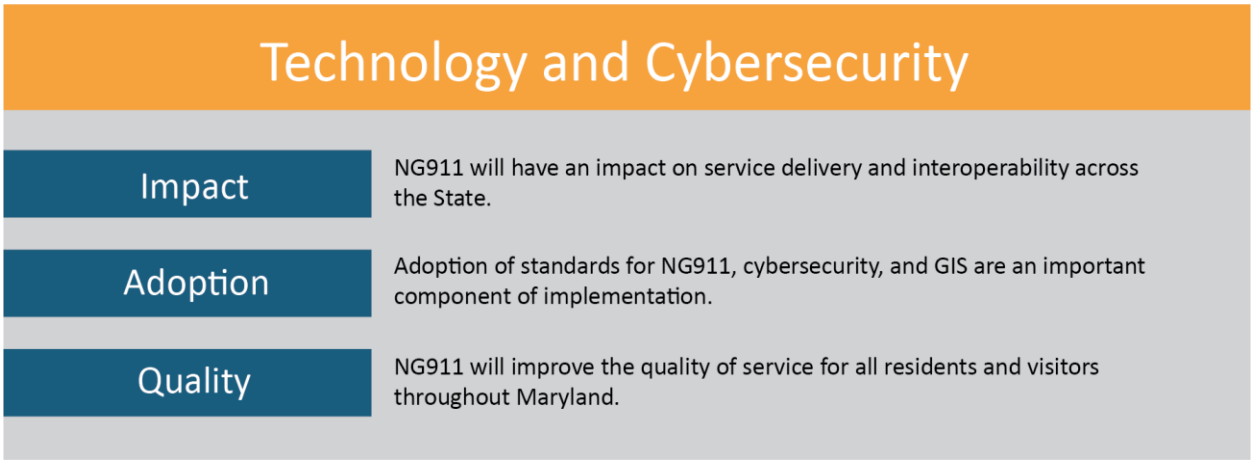
The Staffing subcommittee focused on the recruitment, training, and retention of staff with the introduction of NG911 service.

2.4.4 Finance

The Finance subcommittee evaluated the current funding structure. Based on that information, they focused on the changes required to create the funding structure and recommended funding category changes needed to bring efficient and effective NG911 technology to Maryland.

3 Technology and Cybersecurity

The Technology and Cybersecurity subcommittee recognizes that the adoption of NG911 technology will enrich the ability of Maryland PSAPs to respond to 9-1-1 calls. This will be done by providing a reliable, resilient, ubiquitous, and cybersecure digital communications network that enables callers to communicate to 9-1-1 in the same manner as they communicate to each other, regardless of where they are located.



3.1 Next Generation 9-1-1

The public safety infrastructure is in a significant transition. The legacy 9-1-1 infrastructure is aging and being surpassed by technologies that are available to consumers. As such, 9-1-1 technology must keep pace. Across America, jurisdictions are implementing NG911 solutions to provide a more effective, robust, and redundant framework. Over the past 18 months, Maryland has undertaken efforts through the ENSB and ECC to initiate NG911 planning and procurement efforts for PSAPs across the state. Meanwhile, the Commission formed the Technology and Cybersecurity subcommittee to identify recommendations to ensure that NG911 is implemented in a timely, well-coordinated, consistent, and secure fashion across the state.

3.1.1 Enhanced Location Technology

For years, the public safety community has struggled with inaccuracy in locating wireless callers. In 2015, the Federal Communications Commission (FCC), hearing concerns from the nation's PSAPs and 9-1-1 community leaders, established standards for location accuracy. Work groups and technology providers continue to develop ways to meet these standards and increase the accuracy of wireless caller location. These innovations will work in conjunction with geospatial routing capabilities imbedded in Next Generation Core Services (NGCS) solutions to provide enhanced capabilities for PSAPs. The Technology and Cybersecurity subcommittee recognizes the importance of these enhancements and encourages the continued activism of 9-1-1 community leaders in Maryland to provide the latest technology integrations.

3.1.2 NG911 Implementation Timelines

In September 2018, the ENSB approved a strategic plan for the implementation of NG911. It proposed an implementation timeline that calls for all 24 PSAPs to migrate to NG911 no later than December 31, 2021.

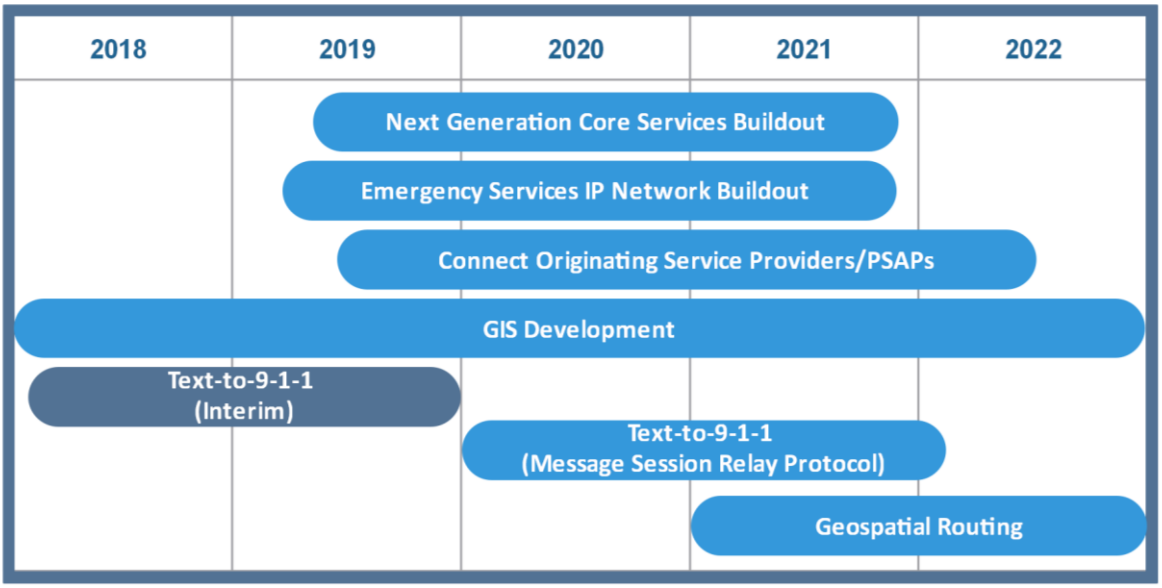


Figure 2: Maryland Proposed NG911 Strategic Plan Timeline

*Note: GIS work becomes an ongoing maintenance initiative that will extend beyond 2022

3.1.3 Technology and Cybersecurity Subcommittee NG911 Recommendations

- The ECC shall recommend timeline for integration of all 24 PSAPs to NG911 that follows the ENSB Strategic Plan.
- Decisions about procurement of NG911 technology and services should remain with local jurisdictions.
- The Emergency Services Internet Protocol Network (ESInet) and Next Generation Core Services (NGCS), which together provision NG911 service, must comply with the National Emergency Number Association (NENA) standard, NENA-STA-010.2-2016, *NENA Detailed Functional and Interface Standards for the NENA i3 Solution*,[10] and any subsequent updates to that standard.
- Every effort must be made to procure and adopt NG911 technologies that improve access for people with disabilities and others who use assistive technologies, including mandatory connectivity to additional device-based and cloud-based data repositories at the NGCS level.
- Service providers must be required to utilize enhanced location technology at call origination for call-routing purposes to enable the most accurate location from devices used to initiate contact with 9-1-1.
- Technology and standards will continue to evolve. Maryland must continue to address new and innovative technologies to enhance public safety.

Remainder of page is intentionally left blank.

[10] https://cdn.ymaws.com/www.nena.org/resource/resmgr/standards/NENA-STA-010.2_i3_Architectu.pdf

3.2 Cybersecurity – A Growing Threat

Public safety's telecommunications infrastructure is a growing target for cybersecurity attacks. We anticipate that the threat of attacks will continue for the foreseeable future. As the nation transitions from analog networks to IP-based solutions, the benefits of scalability, cost savings, and interoperability are balanced by the need to protect against the increased vulnerability. Like anywhere else, Maryland's 24 PSAPs are vulnerable to cyberattacks. Cybersecurity experts at SecuLore[11] who monitor trends in cyber-attacks, shared data with the Commission that demonstrates that attacks on public safety systems have been on the rise.

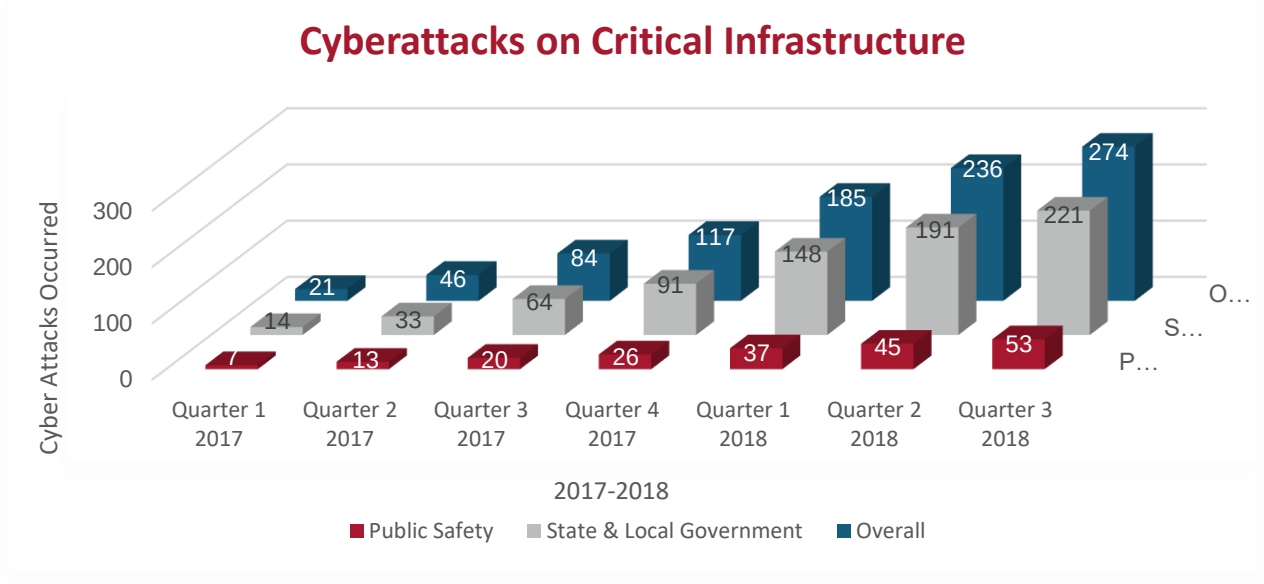


Figure 3: Cyberattack Trends – Disrupted Operations[12]

Clearly, cybersecurity threats are growing in complexity and sophistication, and are forecast to increase in severity and frequency, both regionally and statewide. Due to the increased risk, state and local agencies must take a proactive approach to cybersecurity risk mitigation. In many cases, cyber-attacks have resulted in service disruptions of public safety networks, as depicted in Figure 4 below.

[11] SecuLore Solutions™ is a Maryland-based cybersecurity company focused on public safety; https://www.seculore.com/
[12] Chart details provided by SecuLore Solutions™

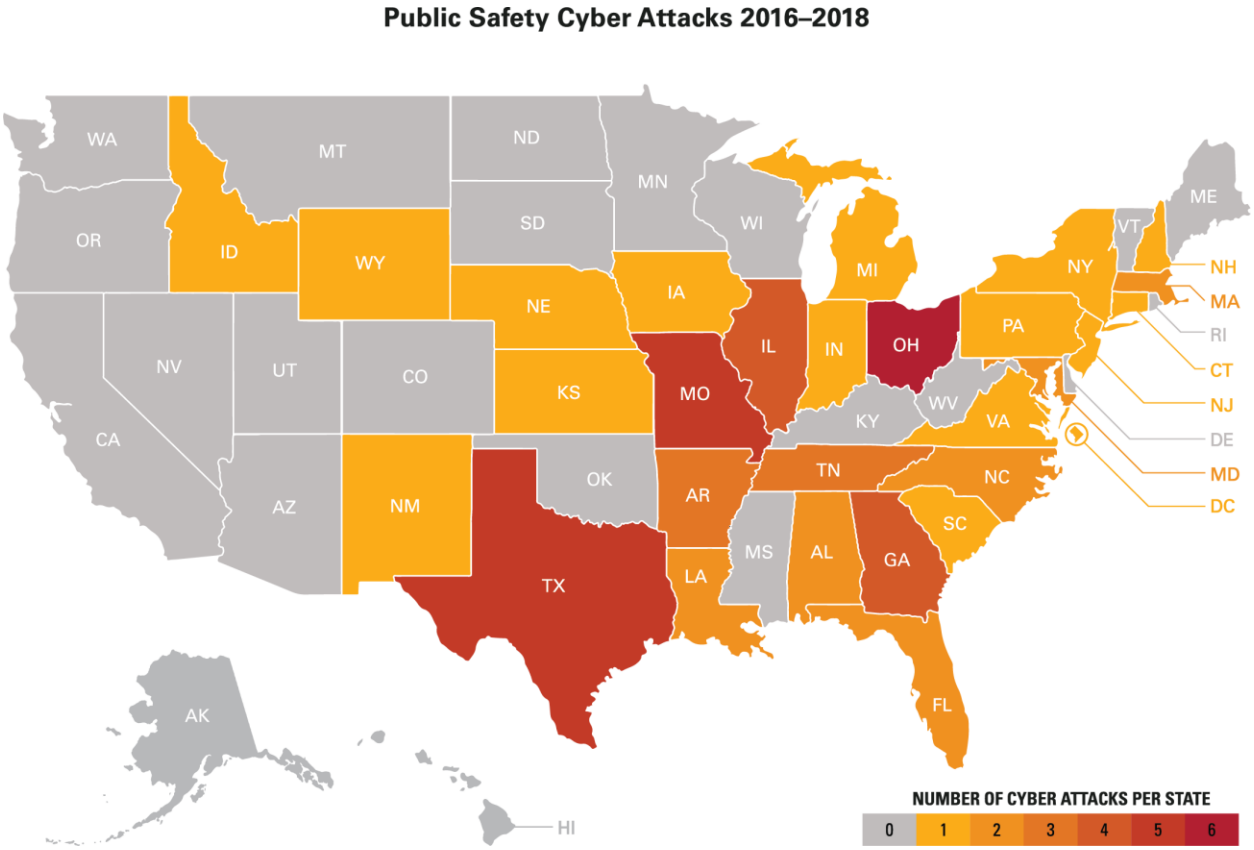


Figure 4: Public Safety-Reported Disruptive Attacks[13]

In 2018, the ENSB commissioned and funded a statewide cybersecurity assessment of all 24 Maryland PSAPs. The baseline assessment presents an opportunity for the State to build a comprehensive and ongoing program to maintain cybersecurity readiness for the protection of the future NG911 ESInet.

3.2.1 Technology and Cybersecurity Subcommittee Security Recommendations

- Each Maryland PSAP should review and adopt the following national standards and best practices, at a minimum, for the prevention and protection from cybersecurity threats.
    - FCC Communication Security, Reliability and Interoperability Council (CSRIC): Task Force on Optimal PSAP Architecture (TFOPA)[14]
    - National Emergency Number Association (NENA) 75-001, *Security for Next Generation 9-1-1 Standard* (NG-SEC)[15]
    - NENA 75-502, *Next Generation 9-1-1 Security Audit Checklist Information Document*[16]
- Any NG911 solution procured by Maryland PSAPs, including the ESInet and NGCS, must comply with the following standards and best practices, at a minimum:

[13] Map details provided by SecuLore Solutions™
[14] https://www.fcc.gov/document/fcc-releases-tfopa-final-report
[15] https://www.911.gov/pdf/NENA_Security_Next_Generation_911_Standard_2010.pdf
[16] https://www.nena.org/page/NGSecurityChecklist

- NENA 75-001, *Security for Next Generation 9-1-1 Standard (NG-SEC)*
- NENA 75-502, *Next Generation 9-1-1 Security Audit Checklist Information Document*
- NENA STA-010.2-2016, *NENA Detailed Functional and Interface Standards for the NENA i3 Solution*
- NERC CIP 002-009, *Critical Infrastructure Protection*[17]
- National Institute of Standards and Technology (NIST), *Cyber Security Framework*[18]

- Service providers that implement and manage NG911 elements are responsible for providing cybersecurity for NG911 networks and should identify the cost of securing such elements.
- Legislatively mandated requirements to comply with cybersecurity protection and prevention measures must be tied to adequate adjustments in funding.
- Revisions to COMAR may be required to allow the ENSB to oversee and fund cybersecurity initiatives; it is recommended that appropriate legislative action be taken.
- A cybersecurity risk assessment should be performed by the local authority or third-party vendor prior to implementation of all network changes and reported to the ENSB.
- Funding for PSAP cybersecurity capital and operating expenditures related to call-handling and computer-aided dispatch (CAD) should be provided by the 9-1-1 Trust Fund as illustrated below.

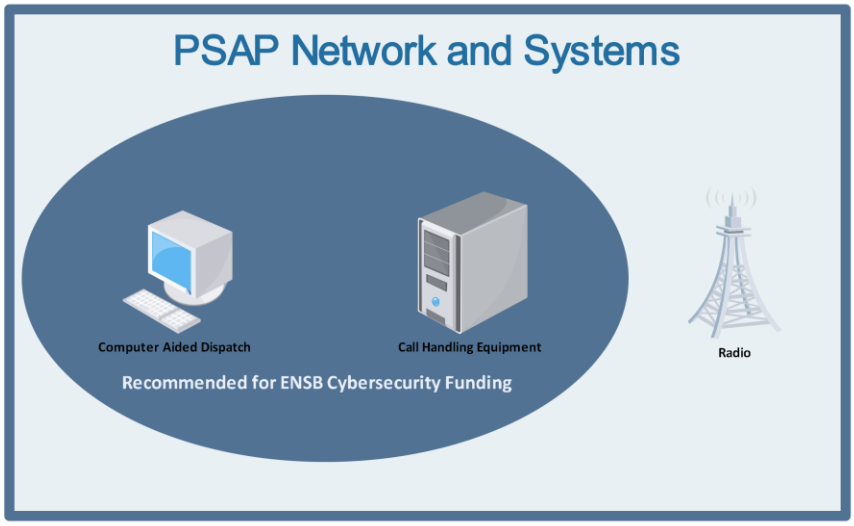


Figure 5: Basic PSAP Network Diagram – ENSB Cybersecurity Funding Support Highlight

[17] https://www.nerc.com/pa/Stand/Pages/Cyber_Security_Comments_02_18_05.pdf
[18] https://www.nist.gov/cyberframework

3.3 Geographic Information Systems Data Support for NG911

Geospatial data is a critical element of NG911. For decades, the legacy 9-1-1 call-routing process (mapping and dispatching solutions) has relied on location derived from the Automatic Location Identification (ALI) and Master Street Address Guide (MSAG) databases to send calls to the appropriate PSAPs. NG911 will allow 9-1-1 call data to be routed proactively to neighboring PSAPs during high call volumes, localized events, or planned outages. NG911 will require high quality, seamless, and timely GIS data for location accuracy. Local government agencies will need dedicated GIS staffing to meet and maintain accurate GIS data requirements.

3.3.1 Technology and Cybersecurity Subcommittee GIS Recommendations

- All GIS data provided by local 9-1-1 authorities to the NG911 service provider must comply with NENA standards.
    - NENA STA-015.10-2018, *Standard Data Formats for E911 Data Exchange and GIS Mapping*[19]
    - NENA STA-006.1-2018, *Standard for NG9-1-1 GIS Data Model*[20]
    - NENA STA-004.1.1-2014, *Next Generation United States Civic Location Data Exchange Format (CLDXF)*[21]
- Any NG911 solution procured by local government agencies should enable NG911-compliant GIS data to be interoperable with any new solution's geospatial routing functions.
- Review local staffing levels to ensure that they are sufficient to support GIS data readiness and maintenance activities.

3.4 Text-to-9-1-1 Translation and Enhanced NG911 Features

The public's use of mobile devices to place 9-1-1 calls continues to grow; the FCC estimates that 70 percent of all 9-1-1 calls are placed using such devices. Consequently, text-to-9-1-1 functionality for PSAPs has shifted from "nice to have" to "need to have." As of January 2018, Frederick County was the only jurisdiction in the state providing text-to-9-1-1 services. The ENSB initiated a project to provide an interim text-to-9-1-1 solution to the other 23 PSAPs. A subsequent need for support for text-to-9-1-1 foreign language translation was identified.

Voice call translation services are available, but the 9-1-1 text service does not yet have a technical solution for automated text-to-9-1-1 foreign language translation. Further complicating the translation issue is a question of liability and protections for telecommunicators and/or translators. Maryland is not alone in identifying this challenge, and the public safety community is looking to the marketplace to provide a technical solution in the coming years. Maryland has initiated meetings with Google and Apple to help drive this important need forward.

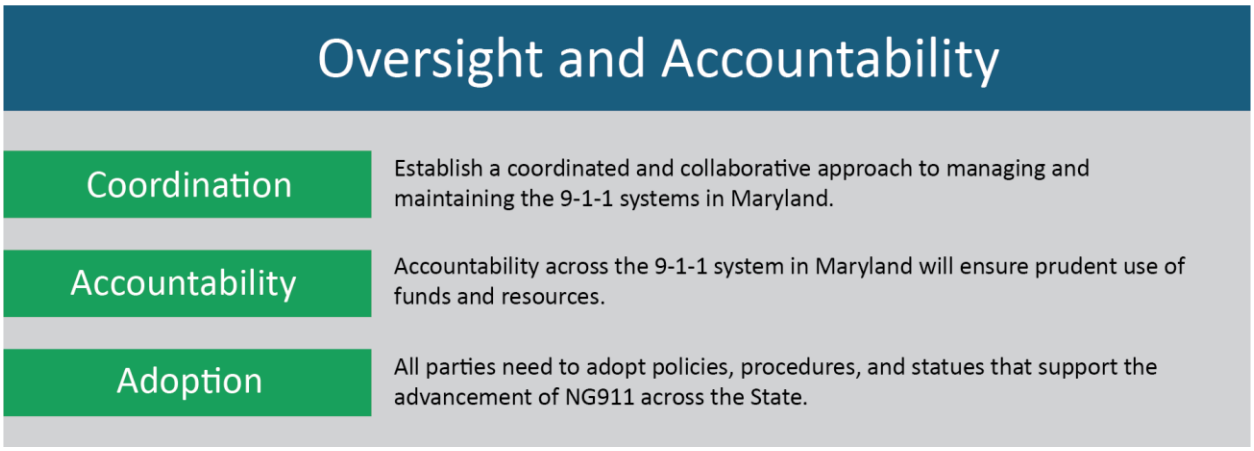
[19] https://cdn.ymaws.com/www.nena.org/resource/resmgr/standards/nena-sta-015.10-2018_datafor.pdf
[20] https://www.nena.org/page/NG911GISDataModel
[21] https://cdn.ymaws.com/www.nena.org/resource/resmgr/Standards/NENA-STA-004.1.1-2014_CLDXF.pdf

3.4.1 Technology and Cybersecurity Subcommittee Text Recommendations

- The 9-1-1 community should request support from industry—such as the Industry Council for Emergency Response Technologies (iCERT) and the Integrated Justice Information Systems (IJIS) Institute to encourage technical innovators to develop a solution and address the problem of automated text-to-9-1-1 foreign language translation services.

4 Oversight and Accountability

As technology, funding, and operational changes are introduced to build upon efforts already underway to facilitate the transition to NG911, modifications to statutes and policies are needed.



4.1 Current State

There are three components of 9-1-1 oversight and systems management in Maryland: Federal Communications Commission (FCC) oversight, state-level oversight, and oversight by the local 9-1-1 authority.

4.1.1 Federal Communications Commission (FCC) Oversight

The federal level authority, the FCC, provides regulation over interstate and international communications by radio, television, wire, satellite, and cable in all 50 states, the District of Columbia and U.S. territories. It is responsible for implementing and enforcing the laws and regulations of the U.S.[22]

[22] https://www.fcc.gov/about/overview

4.1.2 State-Level Oversight

The state-level authority, the ENSB, provides oversight, resources, and guidance to the 23 counties and one independent city (Baltimore) in Maryland concerning the delivery of 9-1-1 emergency communications from the caller to the PSAP. The Maryland Public Service Commission provides oversight to state-regulated carriers.

4.1.3 County and Local 9-1-1 Authorities

County and local 9-1-1 authorities also are responsible for aspects of 9-1-1 service oversight and management in Maryland. In some cases, regional authorities with established governance structures oversee 9-1-1 services in their region.

While the state entity, the ENSB, provides support and funding for statutory- and policy-defined aspects of 9-1-1 equipment, training, services, studies, etc., how 9-1-1 service is provided in each community has been—and is expected to continue to be—a local decision and a local responsibility.

For more information on the Maryland 9-1-1 program, please see Appendix B (on page 59).

4.2 Oversight and Accountability Recommendations

The Oversight and Accountability subcommittee evaluated current policies, processes, and statutes in place today, and identified recommendation needed to support NG911 service.

4.2.1.1 Governing Authority Coordination and Oversight for NG911

Maryland's 9-1-1 oversight entity must have the authority to ensure a functional and effective NG911 system.

Guidance from national entities such as the FCC and NHTSA[23] related to NG911 identifies the need for increased statewide governance, funding, and technological and operational leadership.

Annual inspection visits allow the ENSB staff and members to meet with PSAP management to discuss past and future plans; understand issues; and conduct oversight reviews. Among the topics reviewed are: training that has occurred over the past year and/or planned for the upcoming year; planned technology changes that might come before the ENSB for approval; staffing concerns; power-resiliency reports; disaster-planning discussions; and other pertinent topics.

[23] National Highway Traffic Safety Administration.

The Board requires the following from each PSAP on an annual basis: statistical reporting for the legislative annual report; an inspection report; a three-year funding plan; and an audit of the use of county 9-1-1 fees.

RECOMMENDATIONS:

- NG911 guidance should ensure coordinated, cohesive, and interoperable systems across Maryland.
- The ENSB, in consultation with the MACo ECC, shall work to establish guidance and support for: NG911 integration and interoperability; GIS; training; certification; quality assurance; and recertification standards for PSAPs and 9-1-1 Specialists.

4.2.2 Statutory Changes to Support Next Generation 9-1-1

The State 9-1-1 statutes need updating to include the coordination, collaboration, and oversight necessary to support NG911 and emerging technologies.

The Oversight and Accountability subcommittee conducted a review of the current statutes using the National 911 Program state assessment.[24] This section outlines the findings of that review.

4.2.2.1 Maryland Statute Analysis

The assessment revealed that the statutes and COMAR in Maryland are sufficiently flexible and clear in direction to allow for the necessary migration and transition to NG911 with three exceptions, as indicated in Figure 6 below:

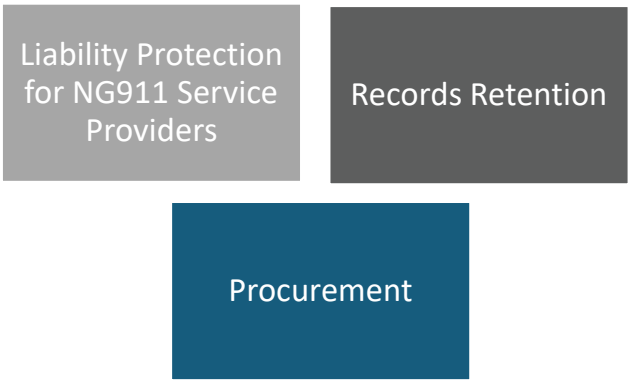


Figure 6: Maryland Statute Gaps

[24] National 9-1-1 Program State Assessment Handbook: A Guide for States Participating in the Statewide 9-1-1 System Assessment Process. This guide for assessing state programs includes 27 statutory and regulatory elements of state statutes and rules to be reviewed and compared against nationally established best practices.

4.2.2.1.1 Liability Protection for NG911 Service Providers

The statutory environment provides liability protection for wireless (§1-310(g)) and wireline (§1-303(a)(2)) providers and prepaid retailers (§1-313(k) and (l)). It may not cover NG911 providers unless they are defined as wireline or wireless providers in the state. Unless the same protections provided to legacy systems and providers are offered to new technologies, Maryland may limit its options.

RECOMMENDATION:

- Liability protections must be available for ESInet and NGCS providers as they are for existing 9-1-1 providers (i.e., any of the commercial carriers able to offer services in Maryland).

Note: Liability protection for the PSAP and the 9-1-1 Specialist also was reviewed and found to be adequately addressed in the case law providing the necessary protections.

4.2.2.1.2 Records Retention

Rules for retaining 9-1-1 calls and other 9-1-1-related data must be addressed legislatively and by local authorities. Currently, retention schedules for 9-1-1 call records and associated data such as audio recordings, law enforcement or fire response reports, or radio traffic, is a local decision and is predicated on system capabilities, resource availability, storage considerations, and costs. The Commission recommends all associated call-related data-retention schedules be aligned between 9-1-1 call data and response agencies' information.

RECOMMENDATIONS:

- The Commission encourages the ENSB to develop consensus guidance for local 9-1-1 authorities by establishing a minimum threshold for 9-1-1 records retention and encourages that all associated data-retention schedules be aligned.
- Local 9-1-1 authorities should ensure that they have a document-retention schedule in compliance with Annotated Code of Maryland State Government Article 10, sections 608-611 and COMAR 14.18.02, at minimum, for 9-1-1 audio and video, 9-1-1 text messages, and 9-1-1-related CAD data (where applicable) and that this compliance should be reported and referenced on the annual inspection reports and in the county plans based on guidance provided by the ENSB.

4.2.2.1.3 Procurement

Procurement guidance should consist of recommendations for such items as: contract language with the local selected vendor; performance metrics and requirements; the need for SLAs; and allowable expenses to be covered by the 9-1-1 Trust Fund.

RECOMMENDATION:

- As funds become available, the ENSB should modify future allowable expenses from the 9-1-1 Trust Fund in accordance with the recommendations in this report, along with State strategic initiatives. The ENSB also should establish procurement guidance for local 9-1-1 authorities.

4.2.3 Interstate/Intrastate Connectivity

Every NG911 system in Maryland will need to interconnect with its neighboring systems to ensure proper call routing, call-transfer capability, data sharing, and demarcation of costs and responsibilities.

4.2.3.1 Interconnection Requirements

Local 9-1-1 authorities, with guidance from the State, are contracting with the vendor that best meets both the needs of their community and the ENSB's technical standards.

Maryland shares physical borders with four states and the District of Columbia. As a result of these geographical boundaries, calls are transferred daily between neighboring agencies. For example, Prince George's County reports about 20,000 call transfers annually from Washington, D.C. While the improvements to call-routing accuracy anticipated with NG911 will reduce the need to transfer misrouted calls, it will not eliminate them. It is imperative that new technology address this challenge.

In most cases, Intergovernmental Agreements (IGAs), Memoranda of Understanding (MOUs), statutes, and/or regulations may require creation or updates to allow or enable the cooperative activities needed in a NG911 system.

RECOMMENDATION:

- Local jurisdictions are encouraged to review and evaluate existing IGAs and MOUs for the transfer of voice and data to neighboring agencies through negotiated agreements. They also should begin early communication regarding interconnectivity and interoperability to define expectations for operational and cost impacts.

4.2.4 Standards for Next Generation 9-1-1

When implemented using accepted standards, NG911 supports: significantly enhanced redundancy; real-time and alternate call routing; improved call-transfer capabilities; multimedia capability; additional data; and 9-1-1 backup options.

4.2.4.1 NG911 Technical Standards

NG911 networks in Maryland will be implemented at a county level; such networks then must be interconnected with other local networks to establish a standardized and interoperable statewide network of networks. It is also important that there be statewide standards that define the necessary interoperability requirements.

ESInets are critical infrastructure in the NG911 architecture. They provide call-routing, transport, interoperability, security, and related services that can most effectively and efficiently be coordinated at

the state level. A statewide ESInet can facilitate required intrastate and interstate connectivity that will be very difficult, if not impossible, to achieve at the regional or local level.

Maryland systems must be interconnected and interoperable to accomplish the full promise of NG911.[25]

RECOMMENDATIONS:

- The Commission recommends that Maryland and its local 9-1-1 authorities embrace the NENA i3 standards and recognize that the implementation and ongoing maintenance of an interoperable and interconnected system of systems, as defined by the ENSB, is a shared responsibility between state and local 9-1-1 authorities.
- Maryland will adhere to nationally accepted standards and best practices—Association of Public-Safety Communications Officials (APCO), NENA, Alliance for Telecommunications Industry Standards (ATIS), FCC, National 911 Program, National Fire Protection Association (NFPA) and other applicable standards and best practices—as the most effective way to ensure successful NG911 implementation and PSAP performance excellence.
- Counties shall follow those recommendations and standards when procuring NG911 components, PSAP call-handling equipment, NG911 GIS components, and cybersecurity systems to ensure secure, integrated, interconnected and interoperable systems.

4.2.4.2 Maryland NG911 Training Guidelines

The Commission believes it is vital that all Marylanders and visitors receive a consistent level of 9-1-1 service no matter where they live, work, or travel in the state. Consequently, there must be agreed-upon elements that ensure the person who answers the 9-1-1 call has achieved core competencies.

While it is important for each local 9-1-1 authority to retain autonomy, there must be consistent training requirements in the future.[26]

RECOMMENDATIONS:

- Maryland local 9-1-1 authorities' training programs must be aligned with nationally recognized training guidelines.
- The local 9-1-1 authority shall document compliance with recommended minimum training guidelines during annual inspections, county plan changes, or ENSB funding requests.

[25] "Policymakers at all levels should commit to the development and deployment of interoperable statewide ESInets as a fundamental 9-1-1 and emergency communications policy objective." https://cdn.ymaws.com/www.nena.org/resource/collection/B6781C63-012C-4E90-939B-001733976BBC/Policy_Maker_Blueprint_for_Transition_to_NG9-1-1.pdf (pg9)

[26] Please see Staffing section for more detail on training guidelines.

4.2.5 Oversight of Cybersecurity and Continuity of Operations

Cybersecurity threats are increasing; the vulnerability of our 9-1-1 systems must be assessed and risks mitigated.

Cybersecurity is of paramount importance for local 9-1-1 operations as systems continue to evolve. State and local leadership must be proactive in their approach to cybersecurity.

As new and emerging technologies enter the public safety market, the threat of breaches will increase. As equipment ages, is not kept updated, or reaches end of life, the potential risk increases as well. Risk assessment will mitigate potential impacts to local 9-1-1 operations by identifying vulnerabilities that must be addressed.

RECOMMENDATIONS:

- The ENSB will adopt requirements based on industry standards and best practices that local agencies should comply with concerning NG911 technology and cybersecurity protection and prevention measures. The ENSB and MACo ECC shall collaborate on funding needed to support these requirements.
- Local 9-1-1 authorities in Maryland should be required to complete the critical infrastructure vulnerability assessment/cybersecurity risk assessment. They also should share the compliance documentation with the ENSB as part of their annual county plan updates or any funding request. Cybersecurity risk assessments should be conducted at least annually.
- Local 9-1-1 agencies should have a cybersecurity plan and review it annually. The Commission further recommends that local 9-1-1 authorities be required to maintain a Continuity of Operations Plan (COOP) that is updated annually to be eligible for funding. COOPs must include a cybersecurity risk-mitigation strategy based on findings from a critical infrastructure vulnerability and cybersecurity risk assessment.

4.3 Administrative Changes to Support Next Generation 9-1-1

NG911 creates a need to educate and communicate with the public.

4.3.1 Public Education

The Oversight and Accountability subcommittee determined that a statewide public information campaign would offer both consistency and flexibility for local messaging. It also was acknowledged that the ENSB provides modest public education funding. The current amount is not likely to be sufficient for effective media outreach and education.

RECOMMENDATION:

- The ENSB shall assist local 9-1-1 authorities with State-developed, consistent, and coordinated messaging and outreach activities, especially as they relate to the implementation of NG911 and text-to-9-1-1 once all PSAPs are live.

4.3.2 Data Collection and Performance Metrics

Consistent collection of system and performance data improves planning and decision-making.

Development and consistent reporting of system and performance data, such as that suggested by NENA in its *NG9-1-1 Planning Guidelines*,[27] is a tool for ensuring transparency, a mechanism for demonstrating that operations meet standards, and a way to provide visibility into operational effectiveness. Consistent reporting also facilitates information dissemination with the ENSB, the governing body of the PSAP jurisdiction (such as a county board), stakeholders, and user agencies.

All Maryland PSAPs have management information systems (MIS) that collect system performance data and statistics that aid local 9-1-1 authorities in evaluating how their PSAP operations are functioning. Not all systems collect data in the same manner. Data should be collected and measured using the same criteria across all systems so that the data can be compared and is measurable against a defined metric.[28]

RECOMMENDATION:

- The ENSB shall identify performance metrics guidance to provide to the local 9-1-1 authority for inclusion in their procurement documents and service requests. Compliance with the performance metrics guidance shall be validated during the procurement requests for funding brought to the ENSB and the annual reports/county plan updates brought to the Board.

[27] NENA NG9-1-1 Planning Guidelines Information Document, NENA-INF-006.1-2014, January 8, 2014; Reference 13, page 7-34. National Emergency Number Association (NENA) NG9-1-1 Planning Guidelines suggests the establishment of performance measurement metrics by determining the methodology you will use to ensure that network and system operation and reliability meet acceptable and adopted standards. Solutions should provide the capability to monitor, record, and analyze system performance data against predefined metrics (i.e., establish system norms and flag exceptions). This activity supports the monitoring, recording, maintenance, and improvement of system performance data in accordance with adopted standards and best practices.

[28] Examples of performance metrics are 9-1-1 call count, time to first ring, time to answer, time of transfer, call duration, system up time, systems down time, outage notification thresholds, 9-1-1 call blockage reports, abandoned call rate, etc.

4.3.3 Emergency Number Systems Board Operations & Responsibilities

Administrative changes will help facilitate and ensure a coordinated and cost-effective NG911 implementation.

The Oversight and Accountability subcommittee discussed the many administrative changes that will be required to facilitate NG911 implementation. These changes are focused on the statutory, regulatory, procedural, process, policy, and functional changes to advance NG911 deployments. Examples in the 2019 final report to the legislature include:

- Statutory, rules, or functional policy references that do not accommodate NG911
- Administrative changes to the ENSB to clarify roles and responsibilities (if necessary)
- Defining interconnection points for the most cost-effective implementation
- Staffing changes to address requirements
- Addressing performance metrics as new systems are implemented
- The role of secondary PSAPs

This list is not exhaustive but illustrates the need for significant ongoing dialogue and policymaking to ensure effective operations at the state and local levels with the introduction of NG911.

RECOMMENDATION:

- The Commission will continue deliberation on changes that will define roles and responsibilities in the NG911 system.

4.3.4 Technology Maintenance and Service Agreements

Early planning is needed to help define responsibilities, expectations, costs, and requirements to ensure the necessary functionality and interoperability.

4.3.4.1 Technology Maintenance Agreements

When the ENSB approves a local 9-1-1 authority request for technology funding that requires an annual maintenance agreement, it currently covers solely the cost of the first year of maintenance on the approved technology. After the first year, the local 9-1-1 authority is responsible for covering the ongoing maintenance. This practice was established by the Legislature under Public Safety Article §1-309, where the State 9-1-1 fee funds enhancements, and the county local 9-1-1 charge supports operational and maintenance costs. This will require a statutory change.

RECOMMENDATION:

- Based upon funding availability, the enabling legislation for the ENSB shall be expanded to include eligible expenses such as recurring costs for maintenance and sustainment of NG911.

4.3.4.2 Service Level Agreements and Intergovernmental Agreements

SLAs are critically important to effective implementation and management of NG911. Particular aspects of the service—scope, quality, responsibilities of the parties, network testing, and performance criteria—are agreed upon between the service provider and the local 9-1-1 authority and then documented in the SLA.

IGAs are similar to SLAs.[29] They outline the roles, authority, and resource contributions to which the parties have concurred. Such an agreement identifies the responsibilities, any financial obligations or understandings, and demarcation of tasks and duties. An IGA is often used to clarify policies and voting rights of the participants. Informal agreements are fine for modest projects, but a complex undertaking such as linking two or more state NG911 networks demands a more formal approach.

A formal agreement documents everyone's understanding of responsibilities and the process that all parties have agreed to follow.

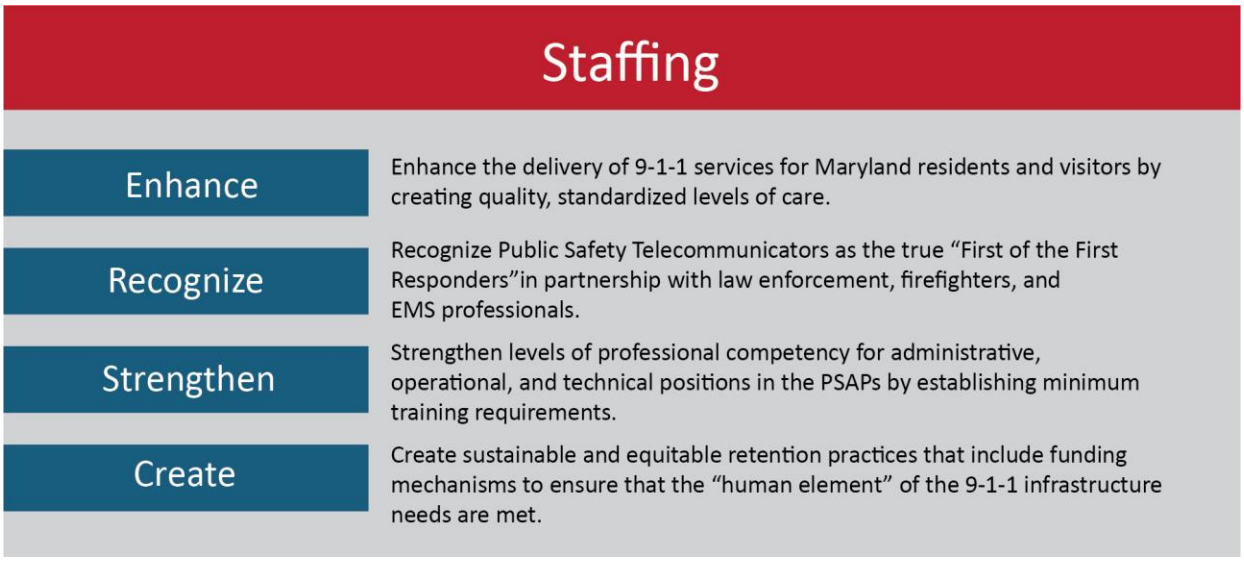
RECOMMENDATION:

- Local 9-1-1 authorities in Maryland shall have formal, written agreements (e.g., SLAs with vendors, and MOUs, IGAs and Interlocal Agreements between and among 9-1-1 authorities) to foster effective call-handling and data-sharing practices in support of NG911 implementation and ongoing operations.

5 Staffing

The staffing and operational components of 9-1-1 are vital to the day-to-day operations. All 9-1-1 Specialists, i.e., telecommunicators, must be recognized as true public safety partners. Effort must be made to ensure that Maryland's 9-1-1 systems provide the same standard level of care to callers in their greatest times of need, regardless of where they are located.

[29] May also be known as a memorandum of understanding (MOU), a memorandum of agreement (MOA), a cooperative agreement (CA), or an interagency agreement (IA).



5.1 Staffing Considerations

The 24 Maryland PSAPs employ nearly 1,400 9-1-1 Specialists who are responsible for the answering, triaging, and dispatching of emergency calls 24 x 7 across the state. Additionally, they have a plethora of other duties that can include: handling non-emergency calls for other county services; making notification to after-hours county personnel; providing pre-arrival instructions; dispatching nontraditional services (e.g., medical examiner and health department officials); and reporting state highway and county road issues. In 2017, these professionals answered 5,354,889 requests from Maryland residents and visitors.

The 24 PSAPs operate autonomously but with outdated technology; the migration to new technology will require 9-1-1 Specialists to have an enhanced skillset and the ability to work in a more interoperable and dynamic environment. 9-1-1 Specialists will play a larger role in the delivery of public safety services and providing real-time situation information to First Responders. A traditional voice-only 9-1-1 call will change dramatically with broadband-enabled NG911. With this comes the need to review and realign minimum training guidelines for 9-1-1 Specialists.

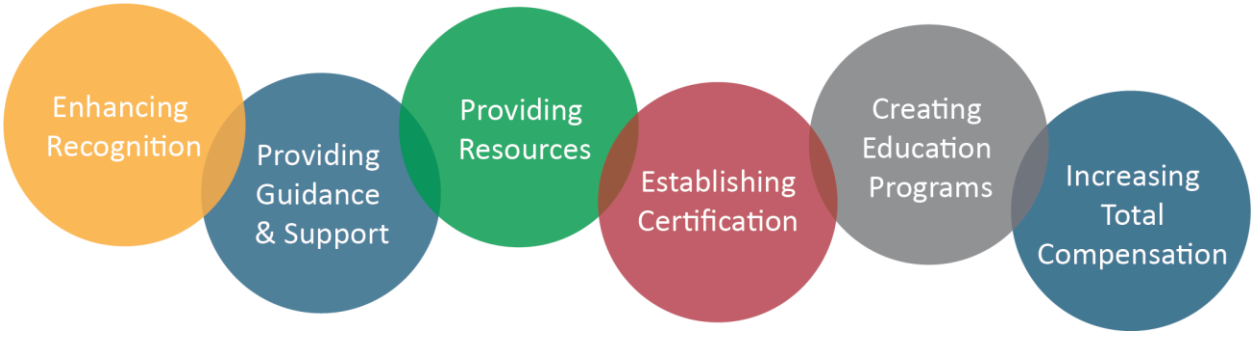
In today's environment, where most people have easy access to cellular devices and telematics (such as OnStar) that easily can reach 9-1-1, the number of emergency calls likely will continue to increase dramatically, even before NG911 is implemented. When the public relied on landline telephones, a witness to an event would have to find the nearest place with a phone to report it. Today, within seconds of anything occurring—such as major weather events, fires, auto accidents, active shooters, and terrorist attacks—PSAPs experience a tremendous influx of calls. All calls must be answered to guarantee that information is received and to ensure that calls regarding other incidents happening simultaneously get answered and triaged. While PSAPs can monitor call volumes to identify patterns, they can't be certain when an incident could occur that would greatly increase their call volume. As

Maryland transitions to NG911, callers will have the ability to send 9-1-1 texts and images, or even stream real-time video into the PSAP. Data points such as vehicle crash information and smoke alarm activations will be sent directly to the PSAP, bypassing the third-party call center, that processes and relays this information today.

Additionally, with increased expectations, including faster response times and minimal errors, statewide minimum training guidelines are vital to a PSAP's ability to ensure that incidents are processed in a consistent, effective, and efficient manner. Currently, Maryland's requirements are not as detailed as nationally recognized standards and best practices. Requirements must be developed that would allow PSAPs to better meet the public's expectations of high-quality incident processing and customer service skills. The lack of alignment creates liability concerns and does not provide the foundation necessary for robust training and operations.

5.2 Staffing Recommendations

The Staffing subcommittee has identified six recommendations that address the needs of the local 9-1-1 authorities as technology and the demands on 9-1-1 Specialists change. These recommendations are necessary to support the advancement of NG911 across Maryland.



The Staffing subcommittee recognizes that a wide range of personnel outside the PSAP itself will be affected by NG911. The effect will be seen in the need (and cost) to have enhanced skillsets for technical support personnel, training staff, supervisors, and Maryland Public Information Act (MPIA) processors. A significant impact will occur quickly with MPIA processing requirements. This includes personnel trained to research, analyze, sensor and generate the appropriate responses to requests for photos, videos, sound, and other data elements associated with NG911 service inquiries. The impact will include the legal team evaluating requests to ensure full compliance with the responses, while protecting the privacy of the resident or visitor requesting emergency assistance.

5.2.1 Enhancing Recognition

Recognize 9-1-1 Specialists as the "First of the First Responders" in the public safety community.

Currently, the United States Bureau of Labor Statistics' Standard Occupational Classification Policy Committee recognizes those responsible for answering, triaging, and dispatching 9-1-1 calls as clerical workers. It does not recognize them as First Responders or an integral part of the public safety response chain. While steps were taken in 2017 to initiate benefit parity, it is recommended that the General Assembly and the Governor encourage additional action to support employee retention. One such way is to recognize 9-1-1 Specialists in Maryland as public safety professionals. Without emergency communications personnel, other responders, e.g., law enforcement officers, firefighters, and emergency medical technicians (EMTs) would not receive the information they need to respond effectively.

5.2.2 Offering Guidance and Support

The ENSB, in conjunction with the ECC, shall work to establish guidance and support for training, certification, quality assurance, and recertification standards for PSAPs and 9-1-1 Specialists.

In the ever-evolving world of NG911, capabilities and technology advancements outpace the regulatory process. Maryland's boards and agencies responsible for 9-1-1 oversight must have the flexibility to review and revise training requirements on an ongoing basis.

Maryland 9-1-1 Specialists provide services beyond answering, triaging, and dispatching 9-1-1 calls. Additional job tasks may include:

- Answering after-hours calls for county agencies
- Acting as hostage negotiators
- Handling warrants
- Notifying communities of emergency alerts
- Dispatching animal control
- Providing 3-1-1 services

In the future, 9-1-1 Specialists will be responsible for processing data, images, live video, and perhaps sensor-generated information, which will require them to make decisions not only on what they are being told, but also on what they are witnessing.

With the plethora of new responsibilities coupled with ever-changing technology and capabilities, PSAP leadership benefits from the support and guidance from national standards development organizations

(SDOs) and their state or regional chapters. This includes APCO and NENA, as well as the National Association of State 9-1-1 Administrators (NASNA).

Along with the need to provide higher levels of training to 9-1-1 Specialists, this subcommittee recommends and supports the need to provide similar levels of training to the personnel processing the MPIA requests. With the increased level of graphic information available to PSAPs as a result of the capabilities of NG911, a need will arise to process MPIA requests associated with video, photography, sound, and other recorded information received via the 9-1-1 system and stored in the CAD system and Records Management System (RMS). In-depth knowledge of the NG911 technical processes and storage capabilities will need to be understood and incorporated into the research and analysis performed by the MPIA specialists compiling the recordings and the legal teams reviewing responses to these requests.

5.2.3 Providing Resources

Establish a statewide educational and best practices repository that is moderated by the ENSB executive director's office to serve 9-1-1 Specialists and PSAPs.

The ENSB frequently offers training opportunities that are generally conducted in physical classroom settings. In the 9-1-1 community, this method is not always feasible for several reasons, including travel limitations and staffing issues. A repository where information can be shared would be beneficial to 9-1-1 Specialists and PSAPs.

This includes a crucial need to ensure education and best practices are in place to protect the privacy of individuals contacting 9-1-1 for emergency assistance. NG911 brings the possibility for increased levels of graphic data transmitted to the PSAP and 9-1-1 Specialists. The privacy issues associated with information received via 9-1-1 will change as dramatically as 9-1-1 itself. In order to protect the privacy of the victims and reduce further stress on those that may review the files, legislation is needed to ensure these requirements are met.

5.2.4 Establishing Certification

Establish statewide adoption of certification and recertification programs for 9-1-1 Specialists based on national standards and use of third-party vendor products.

Maryland's residents and visitors must be assured that they will receive high-quality 9-1-1 services during their time of need. Currently, 9-1-1 Specialists must be certified through the Maryland Institute for Emergency Medical Services Systems (MIEMSS) to be emergency medical dispatchers. They can

triage medical calls and provide pre-arrival and post-dispatch instructions for events involving choking, cardiopulmonary resuscitation (CPR), childbirth, and the like. However, no certification is required to triage police and fire 9-1-1 calls—it is up to each PSAP as to whether they provide pre-arrival and post-dispatch instructions in the cases of fire/rescue and law enforcement emergencies. Furthermore, there is no program to ensure that personnel can demonstrate proficiency in all necessary areas of emergency communications.

Establishing certifications will solidify a 9-1-1 Specialist's role in the public safety link. Having such training will augment the situational awareness required to deal with First Responders in the field.

5.2.5 Creating Educational Programs

Coordinate and advocate for professional-based education curricula that foster 9-1-1 communications careers by encouraging the development of programs the community colleges and high schools.

It is known in one PSAP that at least 30 percent of newly hired 9-1-1 Specialists, i.e., telecommunicators, are not able to successfully complete the new-hire training program. Offering educational opportunities as a pathway to a career in emergency communications serves local communities well.

Some public high schools in Anne Arundel, Calvert, and Washington counties have implemented 9-1-1 vocational and apprentice programs. Additionally, community colleges have started to develop a professional-based training program for emergency communications. Partnerships between Maryland and colleges and universities will lead to programs that are consistent in nature and serve the mission. The high school and college programs will increase the number of qualified applicants in the pipeline and will reduce training and turnover costs.

5.2.6 Increasing Total Compensation

Encourage localities to increase compensation for 9-1-1 Specialists commensurate with skillsets required to support NG911.

A common theme among the 24 Maryland PSAPs and the personnel who staff them is the desire to help the public in their time of greatest need. To accomplish this in the future, PSAPs will need a workforce capable of handling a wide range of requests for services, from "traditional" 9-1-1 calls (i.e., voice only) to those containing incident-related images and videos. Broadband implementation will further impact the job tasks and the length and depth of training for new and veteran employees as they learn to master these skills.

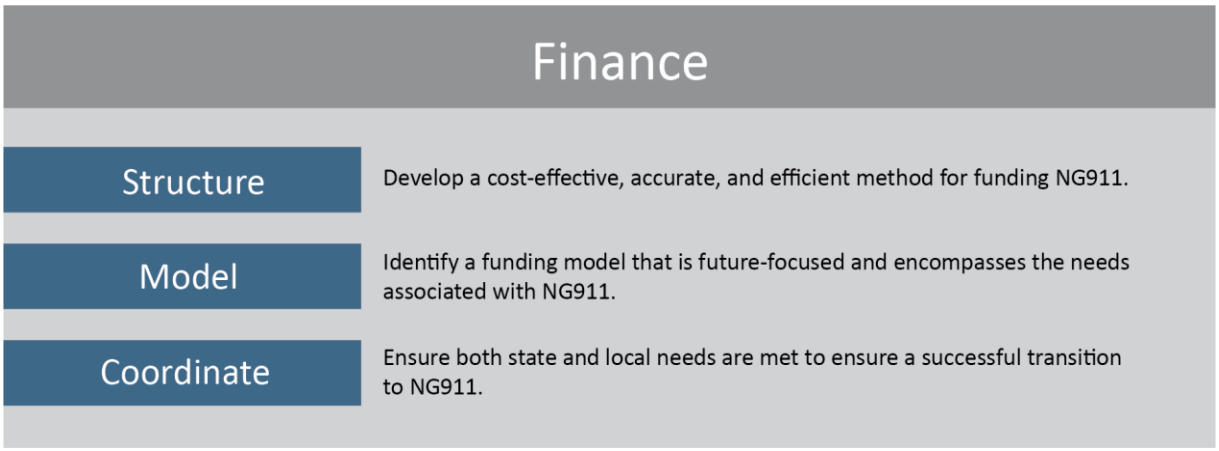
PSAP personnel retention dwindles when there is a breakdown in recognition, lack of understanding of job duties, and increased or prolonged stress; employees also are lost to jobs offering better salaries and/or benefits. The lack of budget and hiring flexibility in part accounts for the thirteen percent vacancy rate of 9-1-1 Specialists in Maryland. PSAPs must provide salary incentives, compensation adjustments, and promotion opportunities.

To support 9-1-1 Specialists, during the 2018 legislative session, the Maryland General Assembly passed a bill authorizing counties to grant a property tax credit in an amount not to exceed $2,500 per dwelling for 9-1-1 telecommunicators in the county or municipal corporation where the individual resides. Multiple jurisdictions have introduced legislation to enable parity in benefits for property tax credits that align with benefits for other First Responders in their jurisdictions. The Commission encourages that additional benefits that offer parity with other First Responders be enacted.

6 Funding

Changing communications technology has prompted the need to transition to NG911 to meet the public's expectations and provide the highest level of emergency services. In order to develop a fair, reasonable, efficient, and effective way to adequately fund the State's transition to NG911 so "all boats rise together," it is important to understand the current model and utilization of funds as well as examine how the structure will support the transition to NG911.

After recognizing that the current model only funds an average of 39 percent of the costs incurred by local 9-1-1 authorities, the Finance subcommittee worked to identify the necessary changes to support NG911, as well as greater distribution of funds to support the local authorities.



6.1 Brief History of 9-1-1 Funding in Maryland

Maryland established 9-1-1 in 1979, but it did not begin collecting a fee until 1983. The fee was increased in 1990 and 2003, which means that it has not been updated in 15 years. The figure below depicts the history of 9-1-1 funding in Maryland.

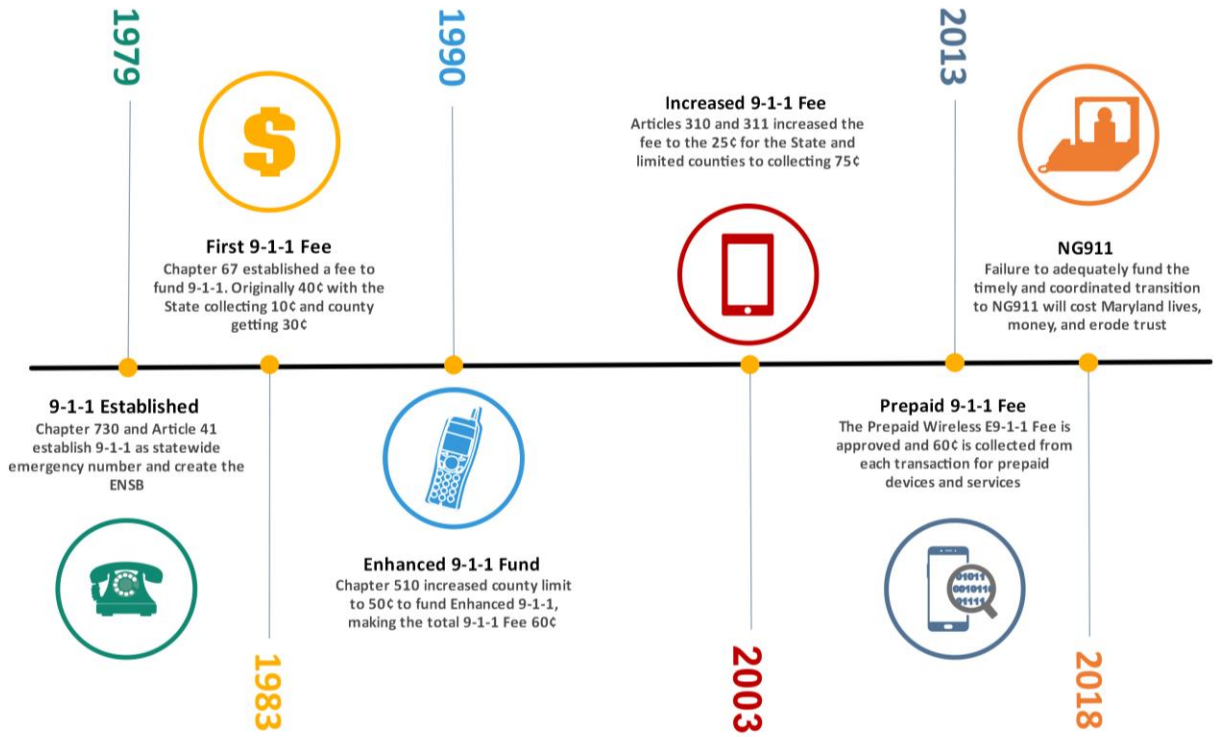


Figure 7: Maryland 9-1-1 Funding Timeline

Since the 9-1-1 fee was established in Maryland in 1983, the yearly inflation rate has been 2.68 percent; the average annual fee increase has been 1.94 percent. Not only has the fee not kept up with the increasing costs of providing 9-1-1 service, it hasn't even kept up with the cost of inflation!

Table 2: 9-1-1 Fee Evolution

Rate	1983	1990	2003	35-Year Total
Inflation	2.68%	16%	35%	94%
Fee Increase		33%	40%	60%

6.2 Current Maryland Funding Model

Maryland's 9-1-1 surcharge is levied on each telephone bill. It is comprised of two separate fees that offset local and state 9-1-1-related capital and operating costs. Of each $1 charged today, 25 cents are deposited into the 9-1-1 Trust Fund and allocated to the ENSB for capital expenditures. The remaining 75 cents are reserved for the home county of the customer. The bulk of this is used for staffing and recurring operating costs. For prepaid phones, the fee is 60 cents and is divided between the state and counties in the same proportion as the 9-1-1 surcharge.

In 2012, a process was established to accrue all net interest on special funds or accounts to Maryland's General Fund. Senate Bill 1301 changed how 9-1-1 Trust Fund interest was to be accrued. The new language amended the State Finance and Procurement Article, Section §6-226, which states that "net interest on all State money allocated by the State Treasurer under this section to special funds or accounts, and otherwise entitled to receive interest earnings, as accounted for by the Comptroller, shall accrue to the General Fund of the State."[30] However, COMAR provides that interest income earned on funds held by the Comptroller under this regulation (i.e., the 9-1-1 Trust Fund) shall be diverted to the 9-1-1 Trust Fund.[31] Exempting 9-1-1 revenue from the provisions of SB 1301 is important for Maryland's 9-1-1 community and is identified as a national best practice that is required to qualify for federal 9-1-1 grant funds.

In 2003, there was a section added to the Acts of the General Assembly, Chapter 451, Section 5 that stated, "And be it further enacted that, for State operating budgets beginning with fiscal year 2005, the Governor shall provide a plan for repayment to the 9-1-1 Trust Fund any monies transferred from the 9-1-1 Trust Fund under budget reconciliation and financing legislation or by any other means that would result in the use of the monies for a purpose other than the original intended use." The Commission

[30] http://mgaleg.maryland.gov/2018rs/statute_google/gsf/6-226.pdf.

[31] Title 12 Department of Public Safety and Correctional Services Subtitle 11 Office of The Secretary, Public Safety Article, Title 1, Subtitle 3, Correctional Services Article, §2-109; Annotated Code of Maryland, Chapter 03 9-1-1 Emergency Telephone System 16 9-1-1 System Violations B. (d.) (3).

recommends that this legislative language be reinstated and codified to further ensure a reliable funding model specifically for 9-1-1.

6.2.1 Use of Funds

The ENSB has established criteria regarding allowable uses of 9-1-1-related funds. Collections from both the State 9-1-1 Fee and 25 percent of all Maryland pre-paid fee collections may be used to reimburse counties for the cost of enhancing Maryland's 9-1-1 system through payment to a third-party contractor (Public Safety Article §1-308). Equipment qualifying for funding or reimbursement is defined in COMAR (12.11.03.12). It states that money distributed quarterly to the counties from the collection of the Local 9-1-1 Charge and pre-paid fee may be spent on the installation, enhancement, maintenance, and operation of a county or multi-county 9-1-1 system. Maintenance and operation costs typically include telephone company charges, equipment costs, equipment lease charges, repairs, utilities, personnel costs, and appropriate carryover costs from previous years (see Public Safety Article §1-312).

6.2.2 State 9-1-1 Fee Distribution

The funds collected under the State 9-1-1 Fee have been used to: fund upgrades to phone systems; provide adequate backup facilities; and enhance mapping capabilities. Funds collected but not awarded each fiscal year carry over to the next fiscal year. Here too, it is important to note that exempting 9-1-1 revenue from the provisions of SB 1301 is important for Maryland's 9-1-1 community and is a national best practice.

6.2.3 Local 9-1-1 Charge Distribution

The funds from the local 9-1-1 charge, as collected under Public Safety Article *§*1-311, are distributed by the Comptroller to the counties on a quarterly basis for maintenance and operation costs of the county's 9-1-1 system in accordance with the State budget.

As noted in Section 6.2.1, Use of Funds, the counties must pay for the operational expenses with funds from the Local 9-1-1 Charge. Operational expenses typically include 9-1-1-related personnel salaries/benefits, recurring maintenance and service fees, mapping maintenance/updates, network fees, and capital expenditures not covered by the ENSB.

6.3 Inability to Afford Current 9-1-1 Systems

Monies collected through fees assessed on wireline and wireless bills and prepaid wireless transactions fund approximately 39 percent of the current legacy 9-1-1 costs. The result is that counties must supplement the 9-1-1 system with local funds. Based on information provided by the ENSB, the Commission has concluded that the current 9-1-1 funding model is insufficient to support the legacy 9-1-1 system, let alone the NG911 transition.

> Maryland's current 9-1-1 funding model is **insufficient to support the legacy 9-1-1 system**—let alone the updated NG911 transition.

Counties must report to the ENSB each year how the monies received from the State were spent. The ENSB funds independent audits of county expenditures for compliance with applicable laws and regulations. The table below is based upon information presented in the 2016 ENSB Annual Report.

Table 3: 9-1-1 Revenue, Expenses, and Fee Offsets – 2016

County	County 9-1-1 Fee Revenues	County 9-1-1 Expenses[32]	Percent of 9-1-1 Fee Offset
Allegany County	$370,161	$2,429,009	15.24%
Anne Arundel County	$4,131,508	$6,956,026	59.39%
Baltimore City	$3,400,117	$9,440,737	36.02%
Baltimore County	$6,139,385	$10,860,890	56.53%
Calvert County	$615,659	$2,732,130	22.53%
Caroline County	$175,253	$1,012,557	17.31%
Carroll County	$1,088,029	$2,725,308	39.92%
Cecil County	$604,133	$2,052,732	29.43%
Charles County	$1,105,607	$2,413,538	45.81%
Dorchester County	$177,922	$1,493,678	11.91%
Frederick County	$1,597,201	$6,465,002	24.71%
Garrett County	$191,974	$1,332,731	14.40%
Harford County	$1,734,008	$6,135,994	28.26%

[32] 2016 ENSB Annual Report—9-1-1-related operational costs as reported by county-selected independent auditors.

County	County 9-1-1 Fee Revenues	County 9-1-1 Expenses[32]	Percent of 9-1-1 Fee Offset
Howard County	$2,283,975	$6,210,100	36.78%
Kent County	$130,741	$971,980	13.45%
Montgomery County	$7,358,479	$11,628,020	63.28%
Prince George's County	$6,513,718	$11,221,564	58.05%
Queen Anne's County	$316,835	$1,510,753	20.97%
Saint Mary's County	$107,335	$1,032,201	10.40%
Somerset County	$616,159	$2,686,662	22.93%
Talbot County	$271,724	$3,488,177	7.79%
Washington County	$821,318	$4,188,200	19.61%
Wicomico County	$549,694	$1,094,737	50.21%
Worcester County	$424,393	$2,476,317	17.14%
Total	**$40,725,328**	**$102,559,043**	**39.71%**

The table below is based on information the ENSB is compiling for the 2017 ENSB Annual Report. As noted for the table above, the table details the funds received by each county from 9-1-1 fee revenues, the total amount of the county 9-1-1 expenses, and the percentage covered by the 9-1-1 revenue per county for 2017.

Table 4: 9-1-1 Revenue, Expenses and Fee Offsets – 2017

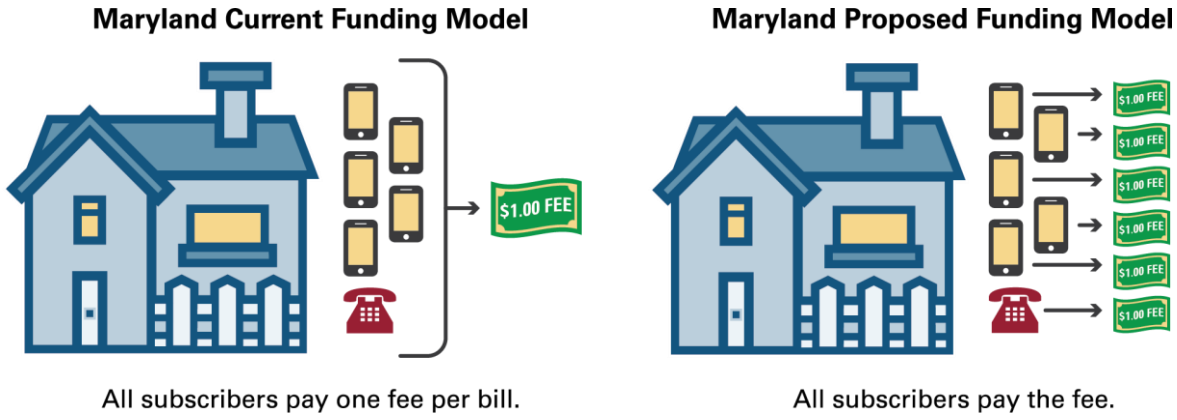
County	County 9-1-1 Fee Revenues	County 9-1-1 Expenses	Percent of 9-1-1 Fee Offset
Allegany County	$375,207	$2,690,790	13.94%
Anne Arundel County	$4,166,766	$7,289,572	57.16%
Baltimore City	$3,424,914	$6,581,499	52.04%
Baltimore County	$6,646,304	$10,058,036	66.08%

County	County 9-1-1 Fee Revenues	County 9-1-1 Expenses	Percent of 9-1-1 Fee Offset
Calvert County	$621,150	$3,106,183	20.00%
Caroline County	$172,738	$1,002,907	17.22%
Carroll County	$1,097,308	$2,995,659	36.63%
Cecil County	$599,740	$2,180,779	27.50%
Charles County	$1,118,062	$2,477,999	45.12%
Dorchester County	$179,113	$1,703,745	10.51%
Frederick County	$1,627,174	$7,137,361	22.80%
Garrett County	$191,227	$955,649	20.01%
Harford County	$1,525,570	$6,330,549	24.10%
Howard County	$2,308,340	$6,332,404	36.45%
Kent County	$128,767	$1,044,807	12.32%
Montgomery County	$6,530,894	$17,513,204	37.29%
Prince George's County	$6,717,751	$14,592,274	46.04%
Queen Anne's County	$314,204	$1,630,230	19.27%
Somerset County	$105,005	$987,344	10.64%
St. Mary's County	$608,905	$2,662,080	22.87%
Talbot County	$864,458	$2,589,200	33.39%
Washington County	$842,727	$4,364,749	19.31%
Wicomico County	$572,724	$1,110,731	51.56%
Worcester County	$430,639	$2,489,128	17.30%
Total	**$41,169,687**	**$103,245,380**	**39.81%**

6.4 The Challenge of Affording Next Generation 9-1-1 Technology

As Maryland counties prepare for the NG911 transition, it is imperative that a reliable, forward-looking, and sustainable funding model is established. **During the transition, it will be necessary to pay for both the current legacy technology and the new NG911 technology.** In order to reduce the amount of cost incurred during this transition, unbundled pricing for legacy 9-1-1 call routing and address management costs has been proposed by Verizon to the Maryland Public Service Commission (PSC). As of the writing of this report, the proposed tariff remains under PSC review. Additionally, the state will be applying for national grant funding; however, the amount available, while helpful, is expected to have minimal impact on the overall costs toward implementing NG911 in Maryland.

The current fee of $1.00 per phone bill is both inadequate and inaccurate. It does not reflect the reality that one phone bill may represent five people. Each is capable of dialing 9-1-1 and Maryland PSAPs need to provide staffing to answer all five calls and the network must accommodate all five calls; the funding model of $1.00 per phone bill clearly is not capable of supporting this.



The estimate for both one-time and ongoing NG911 technology costs is $13,190,199. This is based upon AT&T pricing provided to Fairfax County, Virginia, and Montgomery County, Maryland, for a regional procurement and implementation. As of the writing of this report, statewide pricing from other vendors has not been provided. Furthermore, we know there will be additional expenses that are not included in this estimate, as NG911 introduces not only the network and service fees, but also the need for greater storage capacity to handle images and video and address the restrictions of MPIA. These costs will add up and are imperative to the successful implementation, operation, and maintenance of NG911 services.

Using information from staffing studies in three Maryland counties, a projected cost for 9-1-1 Specialists was created. These staffing estimates include the current job functions. It is recognized that job functions and personnel costs will increase over time with the additional responsibilities being performed in many PSAPs, as well as those that come with NG911. Also, with MPIA, additional

resources, such as increased legal support, will need to be factored into personnel budgets. The table below details the cost for both the current legacy charges, along with the estimated NG911 technology charges, to help estimate the three-year to five-year costs associated with the transition to NG911.

Table 5: Maryland NG911 Transition Cost Estimates

Item	Estimated Cost
Legacy Technology Recurring Charges (Annual Total)	$7,001,958
ENSB Average Annual Distributions (PSAP Approved Projects)	$13,040,000
NG911 One-Time Cost (Capital)*	$3,156,924
NG911 Technology Recurring Charges (Annual Total)	$10,033,274
Current Statewide Total 9-1-1 Specialist Costs Estimate^	$72,100,566
Estimated Total Yearly Cost for Transition#	**$105,332,722**

* The NG911 one-time and recurring estimates are based on the Fairfax Contract for NG911 services.
^ The current statewide 9-1-1 Specialist costs include salary and benefits based on staffing study calculations.
# Estimated costs do not include additional storage capacity, alternate vendor pricing, additional personnel (lawyers, experts, etc.), and individual local needs. These additions will be costly and vary by jurisdiction.

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6.5 Proposed Funding Model

To create a reliable, forward-looking, and sustainable funding model capable of supporting both the current 9-1-1 system and NG911 implementations during the transition period, Maryland will need to resolve the issue of collecting a 9-1-1 fee from every subscriber capable of accessing 9-1-1 versus the current model of a per-bill fee.

Close the Loophole and Expand Eligible State Expenditures

The proposed model would increase the amount of money collected for the State 9-1-1 Fee from $.25 to $.50 and allow counties the option to increase the Local 9-1-1 Charge up to an additional $.75, for a county total not to exceed $1.50. Using the assumption that the Local 9-1-1 Charge remains at $.75, this would provide approximately $145,108,772 in total revenue. This provides more revenue in the State 9-1-1 Trust Fund; the Commission envisions expanding the permitted grants from the ENSB to include items like call-handling equipment, management information systems (MIS), and mapping software related to 9-1-1. This would provide a tremendous fiscal relief to the 24 local jurisdictions.

The chart included in Appendix D (page 63) illustrates the additional items that could be covered by the increased State 9-1-1 Fee, depending on the revenue collected. With legislative approval of broader ENSB funding capacity, it is anticipated that 84 percent to 100 percent of the county 9-1-1 costs could be offset by the additional State revenue.

The table below illustrates the amount of revenue collected based upon the current funding model, along with the amount that is anticipated to be collected using the proposed model, which increased the amount of the State 9-1-1 Fee from $.25 to $.50 and collects from **every subscriber versus every bill**.

Table 6: Maryland Proposed Funding Model

	Current Fee $1.00 ($.25 to State $.75 to County)	Proposed Funding Model * Adjusted Fee $1.00 to $1.25 (ENSB $.50/County $.75) Adjusted to Increase State Funding Capacity
State Revenue (ENSB)	$13,906,197	$58,042,886
County Revenue	$41,974,158	$87,065,886
Total Revenue	$55,880,355	$145,108,772

*Estimated revenue in Proposed Model is based on 2017 subscriber estimates from the FCC and the State.

With legislative approval of broader ENSB funding capacity, it is anticipated that even with the fee increase, the locals may have only 84 percent of their fees offset with the additional State revenue.

Table 7: Percentage of 9-1-1 Fee Offset

	Current County 9-1-1 Fee Revenues	Total County 9-1-1 Expenses	Percent of 9-1-1 Fee Offset
2016	$40,725,326	$102,559,043	39.71%
2017	$41,169,686	$103,245,380	39.88%
Proposed Funding Model	$87,065,886	$103,245,380	84.33%

*The Proposed Funding Model would allow more of the county's expenses to be covered by the State Fee, so the percentage covered is estimated between 84% - 100%

6.6 Funding Models in Other States and Territories

To assist in determining a funding model that will be sustainable and forward-looking for Maryland, research was done on funding models in other states. The chart below was provided in the MACo NG911 County White Paper.[33]

Table 8: State Fee Structure Comparison

Representative User Classes	Lines	MD	PA	VA	WV	DE	DC	NJ	NC
One landline	1	$1.00	$1.65	$0.75	$5.24	$0.60	$.076	$0.90	$0.65
Home – one landline, one separate wireless line	2	$2.00	$3.30	$1.50	$8.62	$1.20	$1.52	$1.80	$1.30
Home – one landline, separate wireless family plan with 4 lines	5	$2.00	$8.25	$3.75	$18.76	$3.00	$3.80	$4.50	$3.00
Prepaid – pays $100 for 3 months of service	n/a	$0.20	$1.65	$0.50	$2.00	$0.60	$0.66	n/a	$0.65
Small Business – 1 landline, separate wireless plan with 6 lines	7	$2.00	$11.55	$5.25	$25.28	$4.20	$5.32	$6.30	$4.20

[33] https://conduitstreet.mdcounties.org/wp-content/uploads/2018/09/NG-9-1-1-County-White-Paper-Working-Draft-FINAL.pdf

Representative User Classes	Lines	MD	PA	VA	WV	DE	DC	NJ	NC
Large Business – 5 landlines on one bill, separate wireless plan with 19 lines	24	$2.00	$39.60	$18.00	$93.00	$14.80	$18.24	$21.60	$14.40

7 Commission Recommendations

The Commission reviewed each of the subcommittee recommendations and meshed them into a list of 23 Commission Recommendations. As the group takes action and continues to expand its focus, it is recognized that additional recommendations may develop. The current list may expand as a part of the final report due in December of 2019.

Table 9: Commission Recommendations

Number	Category	Commission Recommendation
1	Standards	The ENSB shall recommend minimum technical guidelines based on nationally recognized standards and guidelines (e.g., APCO,[34] NENA,[35] ATIS,[36] FCC,[37] National 911 Program, NFPA,[38] NIST[39] and other applicable standards and best practices) that accommodate current and future technologies. Counties shall follow those recommendations and standards when procuring NG911 and GIS components, PSAP call-handling equipment, and cybersecurity systems to ensure secure, integrated, interconnected and interoperable systems to the degree required by their operations.
2	Cybersecurity	Local 9-1-1 authorities shall be required to maintain a Continuity of Operations Plan (COOP) that is updated annually to be eligible for funding. COOPs must include a cybersecurity risk-mitigation strategy based on findings from a critical infrastructure vulnerability and risk assessment.

[34] Association of Public-Safety Communication.
[35] National Emergency Number Association.
[36] Alliance for Telecommunications Industry Solutions.
[37] Federal Communications Commission.
[38] National Fire Protection Association.
[39] National Institute of Standards and Technology.

Number	Category	Commission Recommendation
3	Cybersecurity	The ENSB will adopt requirements based on industry standards and best practices for local agencies to comply with NG911 technology and cybersecurity protection and prevention measures. The ENSB and MACo ECC shall collaborate on funding needed to support these requirements.
4	NG911 Implementation	The MACo ECC may develop a transition document that supports the Strategic Plan adopted by the ENSB for the PSAPs that addresses the timing and order in which PSAPs will migrate to NG911.
5	Emerging Technologies	Maryland shall make every effort to procure and adopt NG911 technologies that improve access for people with disabilities and others who use assistive technologies, including mandatory connectivity to additional device-based and cloud-based data repositories at the Next Generation Core Services (NGCS) level.
6*	Liability	Liability protections must be provided for Emergency Services IP network (ESInet) and NGCS providers as they are for existing 9-1-1 providers (e.g., any of the commercial carriers able to provide services in Maryland).
7*	Records Retention	The General Assembly is encouraged to consider minimum standards to guide retention timelines. Local 9-1-1 authorities should ensure they have a document retention schedule in compliance with Annotated Code of Maryland State Government Article 10, sections 608-611 and COMAR 14.18.02 at minimum for 9-1-1 audio, video, 9-1-1 text messages, and 9-1-1 related CAD data (where applicable). This compliance should be reported and referenced in the annual inspection reports and in the county plans based on guidance provided by the ENSB.
8	Interconnectivity and Service Level Agreements	Local 9-1-1 authorities in Maryland shall have formal, written agreements (e.g., SLAs with vendors, and MOU, Interlocal Agreements, and Intergovernmental Agreements between and among 9-1-1 authorities) to foster effective call-handling and data-sharing practices in support of NG911 implementation and ongoing operations.

Number	Category	Commission Recommendation
9*	Public Education and Outreach	The ENSB shall assist local 9-1-1 authorities with State-developed, consistent, and coordinated messaging and outreach activities, especially as they relate to the implementation of NG911 and text-to-911.
10	Data Collection and Performance Metrics	The ENSB shall identify performance metrics guidance to provide to the local 9-1-1 authorities for inclusion in their procurement documents and service requests. Compliance with the performance metrics guidance shall be validated during the procurement requests for funding brought to the ENSB and annual reports/county plan updates brought to the board.
11	Offering Guidance and Support	The ENSB, in consultation with the Maryland Association of Counties (MACo) Emergency Communications Committee (ECC), shall work to establish guidance and support for: NG911 integration and interoperability, GIS, training, certification, quality assurance, and recertification standards for PSAPs and 9-1-1 Specialists.
12*	Staffing Levels	The Commission encourages the General Assembly to enact legislation to provide the ability for PSAPs to maintain the staffing levels necessary to manage and maintain the new needs that accompany NG911 [e.g., GIS, technical, cybersecurity, and resources to support the Maryland Privacy Information Act (MPIA)].
13	Establishing Certification	The ENSB shall establish statewide adoption of certification and recertification programs for 9-1-1 Specialists based upon national standards and use of third-party vendor products.
14*	Enhancing Recognition	The Commission commends the actions taken to initiate benefit parity for Telecommunicators and encourage more to be done to help with retention. One such step is by acknowledging the role of the Telecommunicator (9-1-1 Specialists)—who are often the "First of the First Responders"—as a key link in the chain of public safety, in partnership with law enforcement officers, firefighters, and emergency medical services (EMS) professionals.
15	Providing a Resource Repository	The ENSB, in consultation with the MACo ECC, shall establish a statewide educational and best practices repository to serve 9-1-1 Specialists and PSAPs.

Number	Category	Commission Recommendation
16	Creating Educational Programs	Coordinate and advocate for professional-based education curricula that foster 9-1-1 communications careers by encouraging the development of programs at community colleges and high schools.
17*	Privacy Protection	With the increased level of graphic data available to PSAPs as a result of the capabilities of NG911, special attention should be paid to how certain information is handled regarding Maryland Public Information Act (MPIA) requests.
18	Increase Total Compensation	Encourage localities to increase total compensation of 9-1-1 Specialists, commensurate with skillsets required to support NG911.
19	Staffing Levels	The Commission acknowledges that several of its recommendations may require that additional staffing be provided to the ENSB to support outreach, program development and communications program management.
20*	Funding Distribution	Based upon funding availability, the enabling legislation for the ENSB shall be expanded to include eligible expenses, such as recurring costs for maintenance and sustainment of NG911.
21*	Fee Adjustment	Amend the statutory language to modify the fee-collection methodology and restore protection for 9-1-1 fees in accordance with legislative language which was removed in 2010 legislation.
22*	Fee Adjustment	Adjust the funding model to increase the State portion of the 9-1-1 fee from $.25 to $.50.
23*	Fee Adjustment	Authorize counties to adjust the local $.75 fee up to an additional $.75.

*These recommendations require legislative change

8 The Commission's 2019 'Parking Lot' Issues

The Commission focused on issues necessary for Maryland's 9-1-1 services and infrastructure. Throughout the conversations, other topics were raised that were important but less urgent. Accordingly, a list of "parking lot" items was created. These topics will be addressed during the Commission's 2019 work.

- NG911 administration
- Secondary PSAPs
- County plan review process and assistance for struggling PSAPs
- Change the term "additional fee" in Maryland code
- Performance metrics
- Training for cultural sensitivities
- Additional agencies, e.g., federal campus, state police
- Monitor the evolution of Text-to-9-1-1 translations services

9 Conclusion

The passion and desire of the Commission to Advance Next Generation 9-1-1 Across Maryland to provide the highest level of 9-1-1 service to the State's residents and visitors shines through in the information gathered and shared throughout this report. Given communications technology evolution; the aging legacy 9-1-1 infrastructure; needed support for Maryland's 9-1-1 Specialists; and changing expectations of residents; the time for change is here. This change will be impossible without the technology, cybersecurity, staffing, oversight, and funding recommendations identified throughout this report. Many individuals on the Commission have spent their full careers in 9-1-1, and the migration to NG911 is an exciting opportunity to alter the course of 9-1-1 service in Maryland.

The hard work and dedication of this Commission was led by the **Honorable Senator Cheryl Kagan**, Commission Chair and **Mr. Steve Souder**, Commission Vice Chair and 9-1-1 expert. Their dedication and leadership helped drive the focus and direction taken by each subcommittee.

Each subcommittee then designated a Chair to lead its efforts. These leaders identified the key initiatives and helped direct the discussion and actions of their subcommittee.

Table 10: Commission Subcommittee Chairs

Subcommittee Chair	Representing
The Honorable Senator Cheryl C. Kagan	Commission Chair Finance Subcommittee Chair
Mr. Steve Souder, 9-1-1 Expert, Public Representative, Retired Director of Fairfax County PSAP	Commission Vice Chair
Chief Richard K. Brooks, III, Director	Oversight and Accountability Subcommittee Chair Cecil County Department of Emergency Services
Bill Ferretti, Director	Technology and Cybersecurity Subcommittee 9-1-1 ECC, Montgomery County Department of Police
Charlynn Flaherty, Deputy Director, Office of Homeland Security	Staffing Subcommittee Chair Prince George's County Office of Homeland Security

Contributing subcommittee members played an integral role in the discussions and recommendations to help drive NG911 forward in Maryland.

Table 11: Appointed Commission Members

Appointed Commission Member	Representing
The Honorable Senator Cheryl Kagan	Maryland State Senate
The Honorable Senator Edward "Ed" Reilly	Maryland State Senate
The Honorable Delegate Michael A. Jackson	Maryland House of Delegates
The Honorable Delegate Susan W. Krebs	Maryland House of Delegates
Ms. Cecilia Warren, Director of Emergency Preparedness Policy	Maryland Department of Disabilities
Mr. Scott Roper, Executive Director	Emergency Number Systems Board
Mr. Jack Markey, Director, Division of Emergency Management, Frederick County	Emergency Number Systems Board
Ms. Julia Fischer, Acting Chief of Applications and Maryland Geographic Information Officer (GIO)	Maryland Department of Information Technology

Appointed Commission Member	Representing
Mr. Anthony Myers, Executive Director	Maryland Public Service Commission
Chief Richard K. Brooks, III, Director of Department of Emergency Services, Cecil County	County Public Safety Answering Points*
Mr. Bill Ferretti, Communications Director, Department of Police, Montgomery County	County Public Safety Answering Points*
Ms. Charlynn Flaherty, Associate Director of Public Safety Communications, Prince George's County	County Public Safety Answering Points*
Ms. Bardona Woods, Assistant Director of Communications, Division of Emergency Services, Washington County	County Public Safety Answering Points*
Ms. Tracy German, Emergency Communications Specialist 4, Frederick County Emergency Communications	9-1-1 Public Safety Telecommunicators*
Jonathan Seeman, Director of Budget, Finance, and Information Technology, Queen Anne's County	County Purchasing and Finance*
Ms. Erin Sher Smyth, Chief Procurement Officer, City of Baltimore	County Purchasing and Finance*
Ms. Anna Sierra, Director, Department of Emergency Services, Dorchester County	Eastern Shore Communications Alliance
Mr. Tony Rose, Chief, Fire and EMS Communications, Charles County	Washington Council of Governments
Mr. J. Kevin Aftung, Director, County Office of Emergency Management, Anne Arundel County	Baltimore Metropolitan Council of Governments
Mr. Steve Souder, 9-1-1 Expert and Maryland Resident	Maryland Chapter of the National Emergency Number Association (NENA)
Mr. Wayne Darrell, Director, Emergency Services, Kent County	Maryland Emergency Number Systems Board
Mr. Sean Looney, Vice President, State Government Affairs, Comcast NBC Universal	Broadband Industry^
Mr. Colton O'Donoghue, Director of Network Engineering, Verizon	Wireless Communications Industry^

*Denotes Commissioners appointed by MACo

^Denotes non-voting member

The Commission was open to all those who had an interest in improving the 9-1-1 system in Maryland. The Commission would like to recognize the following individuals who were integral to our conversations and provided input throughout its work.

Table 12: Contributing Commission Members

Contributor	Representing
Kevin Kinnally, Policy Associate	Maryland Association of Counties (MACo)
Ron Zucker, Legislative Aide	Senator Kagan's Office
Robin Eilenberg, Esq., Research Director	Maryland Association of Counties (MACo)
Mr. Ross Coates, Manager Communication, Harford County	MACo Emergency Communications Committee
Mr. Bryan Ebling, Director of Emergency Services, Caroline County	Maryland Emergency Number Systems Board
Mr. Ken Miller, Public Safety Technical Specialist	Michael Baker International
Mr. William Frazier, Maryland Resident	Maryland Emergency Number Systems Board
Mr. Tim Lorello, President and Chief Executive Officer	SecuLore Solutions
Mr. Sean Scott, Chief Technical Officer	SecuLore Solutions
Legislative Staff Support	**Representing**
Claire Souhan, Chief of Staff	Senator Kagan's Office
David Fosse, Legacy Fellow	Senator Kagan's Office

Mission Critical Partners provided the consulting services and subject-matter expertise in support of the Commission's initiatives. The following staff members were a part of the Commission's proceedings and were assigned to specific subcommittees.

Table 13: MCP Personnel

Staff Member	Subcommittee Assignment
Walt Kaplan	Client Manager
Molly Falls, ENP	Project Manager
Jeff Wobbleton	Technology and Cybersecurity
Chad Brothers, PMP, ENP	Technology and Cybersecurity
Nancy Pollock, ENP	Oversight and Accountability
Jackie Mines, ENP	Oversight and Accountability
Nicole Unger	Oversight and Accountability
Heather McGaffin, ENP	Staffing
Nicola Tidey, RPL, ENP	Staffing
Sherri Griffith Powell, ENP	Finance
Colby Rachfal, J.D.	Finance

Appendix A – Glossary of Terms

Term	Definition
Administrative phone system	Typically, a multiline telephone system used for administrative calls and outgoing calls in the PSAP environment. These systems are separate from and should not be confused with the call-handling equipment (i.e., the 9-1-1 phone system).
Association of Public Safety Communications Officials (APCO)	APCO is the world's oldest and largest not-for-profit professional organization dedicated to the enhancement of public safety communications.
Automatic Location Identification (ALI)	The automatic display at the PSAP of the caller's address/location of the telephone and supplementary emergency services information of the location from which a call originates.
Computer Aided Dispatch (CAD)	A computer-based system, which aids PSAP telecommunicators by automating selected dispatching and record-keeping activities.
Core Service	A specific and essential function within the 9-1-1 industry. Examples of core functions are call routing, call processing, call dispatching, and logging.
Customer Premises Equipment (CPE)	Communications or terminal equipment located in the customer's facilities. (The 9-1-1 telephone equipment at the PSAP.)
Database	A collection of information that is organized, and typically computerized, so that it can be easily accessed, managed, and updated.
Emergency Medical Dispatch (EMD)	Refers to a system that enhances services provided by the PSAP telecommunicators by allowing the 9-1-1 Specialist to quickly narrow down the caller's type of medical or trauma situation, to better dispatch emergency services and provide quality instruction to the caller before help arrives.
Emergency Notification System (ENS)	General category for any systems used to notify persons/public of an emergency. May include changeable message signs, sirens, telephone and other media.
Emergency Service Internet-Protocol Network (ESInet)	An IP-based network dedicated for the use of public safety operations. An ESInet can route 9-1-1 calls to a PSAP and support other methods of data-sharing between public safety agencies. An ESInet cannot be proprietary to a specific core service product or group of products.
Emergency Number Systems Board (ENSB)	The Board coordinates installation and enhancement of county 9-1-1 emergency telephone number services systems. The Board also issues

Term	Definition
	guidelines and determines review procedures to approve or disapprove county plans for these systems; provides for audits of 9-1-1 Trust Fund accounts; and sets criteria for reimbursing counties.
Geographic Information System (GIS)	A system for capturing, storing, displaying, analyzing and managing data and associated attributes which are spatially referenced.
Geospatial	Relating to, occupying, or having the character of space, denoting data that is associated with a particular location. Geographic Information Systems store spatial data in regional databases.
Local Exchange Carrier (LEC)	A telephone company that provides the local exchange telephone services.
Logging System	A device that records, stores and plays back all communication media within the PSAP. Media can include—but are not limited to—voice, radio, text and network elements involved with routing a 9-1-1 call. Logging recorders should be able to simultaneously record from several sources.
Maryland Association of Counties (MACo)	A nonprofit and non-partisan organization that serves Maryland's counties by articulating the needs of local government to the Maryland General Assembly. The Association's membership consists of elected officials and representatives from Maryland's 24 counties.
Master Street Address Guide (MSAG)	A database of street names and house number ranges within their associated communities defining Emergency Service Zones (ESZs) and their associated Emergency Service Numbers (ESNs) to enable proper routing of 9-1-1 calls.
National Emergency Number Association (NENA)	The National Emergency Number Association is a not-for-profit corporation established in 1982 to further the goal of "One Nation-One Number." NENA is a networking source and promotes research, planning and training. NENA strives to educate, set standards and provide certification programs, legislative representation and technical assistance for implementing and managing 9-1-1 systems.
Next Generation 9-1-1 (NG9-1-1)	An Internet Protocol (IP)-based system comprised of managed Emergency Services IP networks (ESInets), functional elements (applications), and databases that replicate traditional E9-1-1 features and functions and provides additional capabilities. NG9-1-1 is designed to provide access to emergency services from all connected communications sources, and provide multimedia data capabilities for Public Safety Answering Points (PSAPs) and other emergency service organizations.

Term	Definition
Public Safety Answering Point (PSAP)	An entity responsible for receiving 9-1-1 calls and processing those calls according to a specific operational policy.
Public Safety Communications Specialists (9-1-1 Specialists)	Person employed by a PSAP that answers incoming emergency telephone calls and with NG911 will be asked to manage emergency requests for service via text, video, and voice. They are the 'first of the First Responders' that provides for the appropriate emergency response either directly or through communication with the appropriate entities.
Public Service Commission (PSC)	The Commission regulates public utilities and certain passenger transportation companies doing business in Maryland.
Records Management System (RMS)	The management of records for an organization throughout the record's life cycle. The activities in this management include the systematic and efficient control of the creation, maintenance, and destruction of the records along with the business transactions associated with them.
Secondary PSAP	A PSAP to which 9-1-1 calls are transferred from a Primary PSAP. A secondary PSAP is typically established to handle a specific sub-set of emergency traffic (e.g. – EMS and fire incidents). The Commission will address this in 2019.
Selective Router	An interfacing device located in a Central Office that routes the 9-1-1 calls to the appropriate PSAP based on the caller's location information.
Teletypewriter / Telecommunications Device for the Deaf (TTY/TDD)	A teleprinter, an electronic device for text communication over a telephone line that is designed for use by persons with hearing or speech difficulties.
Transmission Control Protocol/Internet Protocol (TCP/IP)	A protocol for communication between computers; also used as a standard for transmitting data over networks
Trunk	Typically, a communication path between central office switches, or between the 9-1-1 Control Office and the PSAP.
Voice Over Internet Protocol (VoIP)	An IP telephony term for a set of facilities used to manage the delivery of voice information over the Internet.

Appendix B – Maryland Oversight of 9-1-1

There are three components of 9-1-1 oversight and systems management in Maryland: Federal-level oversight, State-level oversight and the local 9-1-1 authority.

Federal-Level Oversight

The Federal Communications Commission (FCC) provides regulation over interstate and international communications by radio, television, wire, satellite, and cable in all 50 states, the District of Columbia, and U.S. territories. It is responsible for implementing and enforcing America's law and regulations.[40]

State-Level Oversight

The State-level authority, the Emergency Number Systems Board (ENSB), provides oversight, resources, and guidance to the 23 counties and one independent city (Baltimore) in the state concerning the delivery of emergency communications from the caller to the 9-1-1 Public Safety Answering Point.[41]

By statute, the ENSB is the statewide governing body for 9-1-1 oversight in Maryland and is charged with making sure that local 9-1-1 jurisdictions are following 9-1-1-related regulations as outlined in the Code of Maryland (COMAR). The 17-member ENSB was formed in 1979 and, according to the statute, is responsible for:

- Coordinating the installation and enhancement of the State's 24 9-1-1 emergency telephone number services systems
- Issuing guidelines and determining review procedures to approve or disapprove county plans for these systems
- Providing for the audit of 9-1-1 Trust Fund accounts
- Setting criteria for reimbursing counties

ENSB members are appointed to a four-year term by the Governor with the advice and consent of the State Senate. Members are selected from the private and public sectors, in accordance with statutory requirements, representing various aspects of public safety, public safety constituency groups, and the general public. The ENSB chair is named by the Governor.

The current ENSB membership includes a diverse group of police, fire, emergency management, regulatory, and communications industry professionals.

The ENSB is helping to coordinate and oversee the procurement of a NG911 solution that promotes interoperability, interconnectivity, and complies with relevant industry standards. To date, the ENSB reports it has incorporated NG911 readiness in relation to telephone equipment, logging recorders, and

[40] https://www.fcc.gov/about/overview

[41] The Maryland ENSB currently does not have authority over Computer Aided Dispatch (CAD), Land Mobile Radio (LMR), or Mobile Data.

diverse broadband fiber for last mile connectivity to PSAPs. The ENSB has also funded statewide ortho-photography done on three-year cycles that enhances GIS data throughout the state.

Local 9-1-1 Authorities

The third authority in Maryland responsible for aspects of oversight and management of 9-1-1 in Maryland is the county and local 9-1-1 jurisdictions. In counties, the local 9-1-1 authority has been assigned to the emergency management departments or the chief law enforcement agency, such as the Sheriff's office.

While the ENSB provides support and funding for statutory and policy defined aspects of 9-1-1 including equipment, training, services, studies, etc., management of 9-1-1 service is a local decision and a local responsibility. The local jurisdictions maintain and manage control of their operations and often collaborate with other jurisdictions to provide the best service possible with the resources available.

Appendix C – Transitioning from Independent to Interconnected Systems

The foundation of NG911 is an interconnected system that incorporates a multitude of technical standards and specifications to support the operational requirements of the network components and services. As Maryland 9-1-1 authorities transition to NG911 solutions, it becomes vital to anticipate how the implementation of these solutions can impact current operations where edge/border cases exist.

Interconnection

In the legacy 9-1-1 system, transfers typically do not include data with the call. This scenario must be avoided in NG911. Therefore, Maryland and local
9-1-1 authorities must hold service providers accountable to ensure that any technology implemented, not only supports call transfers between NG911 to legacy solutions with data, but also from one NG911 system to another. While most standards based NG911 solutions, currently being offered claim to be interoperable, this must be required and verified.

Next Generation 9-1-1 is designed to support an interconnected system of local, regional, and state emergency services networks. Effective interconnection requires the planning and coordination currently underway in Maryland. This will include (but is not limited to):

- local, regional, and state emergency event response considerations
- existing and desired joint service environments
- resource-sharing opportunities

A single NG911 statewide system is not being pursued in Maryland. Rather, local 9-1-1 authorities, with guidance from the state, are contracting with the vendor they determine best meets the needs of their community so long as it meets the agreed-upon standards established by the ENSB.

Maryland borders four other states and the District of Columbia. As a result of these geographical boundaries, calls are transferred daily between neighboring agencies; for example, Prince George's County reports about 20,000 call transfers annually from the District's Office of Unified Communications (OUC) that currently do not provide automatic location information (ALI) data with the voice call. While the improvements to call-routing accuracy anticipated with NG911 will reduce the need to transfer misrouted calls, it will not eliminate it. It is imperative that any future systems address this situation.

Governance

It is important to understand how the original, or legacy, 9-1-1 system was established. The first 9-1-1 systems in this country were like the first law enforcement agencies in this country. Each was responsible for a specific area or region and operated independently of each other. NG911 changes the 9-1-1 governance model and basic elements of 9-1-1 operational "culture." In the legacy system, it was not technically possible for PSAPs to be fully interconnected. Each PSAP tended to function as an

independent agency. This meant that governance was naturally decentralized in terms of authority, responsibility, and the location of 9-1-1 agencies within local and state governments.

This decentralized model has been in place for 50 years. Despite significant variances, it has generally worked well in providing excellent 9-1-1 service to the residents and visitors they serve. The PSAPs are increasingly working together as we prepare to shift to NG911.

Next Generation 9-1-1 supports standardized operational models that promote resource-sharing and interoperability. The nature of existing governance models and the relationships between and among jurisdictions will directly impact how, and to what extent, the NG911 model is utilized. In most cases, local agreements, MOUs, statutes, and/or regulations may require creation or updates to enable the cooperative activities envisioned by the NG911 system.

In the legacy 9-1-1 systems, PSAP managers needed fewer external relationships due to the environment:

- Collaboration with other PSAPs is limited to special events or call fail-over scenarios
- A single contractual relationship exists with the Local Exchange Carrier (LEC) that typically has enabled the receipt and processing of 9-1-1 calls
- Relationships with First Responders (law enforcement, fire service, emergency medical services) were relatively simple

With the migration to NG911, many more combinations and permutations of roles, relationships, and considerations are required, such as:

- Service Level Agreements (SLAs) with other PSAPS and other jurisdictions with PSAPs
- Human resources related to interconnected services
- Levels of certification (NCMEC,[42] Active Shooter, ADA[43])
- Multiple mutual-aid agreements and MOUs
- Geographic Information Systems (GIS) services
- Position location providers for First Responders
- Applications available to 9-1-1 callers and First Responders that may include data like historical medical information, vehicle information, etc.
- Expanded roles—enhanced interaction with medical community
- Video and photograph providers and technical support
- Text message service providers
- Advances in technologies used by Police, Fire, EMS

[42] National Center for Missing and Exploited Children.
[43] Americans with Disabilities Act.

Appendix D – Proposed ENSB Eligible Expenses Overview

The Finance subcommittee identified costs in Maryland today and outlined the current division of funding responsibilities between the ENSB and counties. Currently, for services and technologies the ENSB funds, they cover the capital (non-recurring fees) and solely the first year of maintenance costs. The subcommittee recommends that the ENSB fund recurring maintenance and additional operational technology expenses not currently covered.

Maryland Eligible Costs	Current Responsibility		Future Possibilities	
	Capital	Maintenance	Capital	Maintenance
9-1-1 Call-Handling Equipment (CHE)	ENSB	**County**	ENSB	**ENSB**
3-1-1 System Equipment (county-by-county basis)	ENSB	**County**	ENSB	**ENSB**
Management Information Systems (MIS) and Software	ENSB	**County**	ENSB	**ENSB**
Protocol Systems/Software	ENSB	**County**	ENSB	**ENSB**
Interpretation Service	ENSB	**County**	ENSB	**ENSB**
Voice/Data/NG911 Logging Recorders	ENSB	**County**	ENSB	**ENSB**
9-1-1 Trunking Facilities from Central Office to PSAP	ENSB	**County**	ENSB	**ENSB**
Automatic Number Identification/Automatic Location Identification	ENSB	**County**	ENSB	**ENSB***
Equipment to connect 9-1-1 Calls			ENSB	**ENSB**
Selective Router		**County**	ENSB	**ENSB**
Trunking for 10-digit emergency and non-emergency lines		**County**	ENSB	**ENSB**
9-1-1 Call Mapping	ENSB	**County**	ENSB	**ENSB**
Computer-Aided Dispatch (CAD) Interfaces^	ENSB		ENSB	
GIS related to 9-1-1 - hardware, licenses, contractor	ENSB	County	ENSB	ENSB/County
GIS Base Layer Management		County		County
Security Systems for PSAPs, Standby Power, Emergency Generators, and Uninterruptible Power Supply (UPS) Systems	ENSB	County	ENSB	ENSB/County#
Headsets, Console Chairs and Console Furniture	ENSB	County	ENSB	County
Public Education	ENSB		ENSB	**ENSB**
Other Equipment the Board May Require	ENSB		ENSB	
Personnel Salaries and Training (Travel, Time, etc.)		County		County
Training Courses, ETC, and Protocol Certification/ Recertification	ENSB		ENSB	
County Sponsored Continuing Education		County		County
ENSB Sponsored Continuing Education	ENSB		ENSB	
Contracted Services: Call-Taking and Dispatch Fees, Professional Services	ENSB	County	ENSB	County
Cybersecurity	ENSB	County	ENSB	County
Cybersecurity as Part of Core Services/ESInet	ENSB	County	ENSB	County

- *Requires legislative change
- ^ENSB does not pay for CAD, only interfaces to phone systems for the ANI/ALI spill or protocol interface
- #ENSB shall cover 9-1-1 related elements