

**Before the United States House of Representatives**  
**Committee on Homeland Security**  
**Subcommittee on Preparedness, Response, and Communications**

*RESILIENT COMMUNICATIONS: CURRENT CHALLENGES AND FUTURE ADVANCEMENTS*

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Chairman Bilirakis, Ranking Member Richardson, and may it please the Committee: My name is Trey Forgety,<sup>1</sup> and on behalf of the 9-1-1 Association’s more than 7,000 public- and private-sector members, I want to thank you for holding this hearing. Providing emergency response service is perhaps *the* core function of government, and 9-1-1 is the critical link between the public and emergency responders that enables counties and towns to perform that function quickly and efficiently. Next year, we will mark the 45<sup>th</sup> anniversary of the first 9-1-1 call. As we approach that important milestone, it is entirely appropriate that we should confront pressing questions about how our nation’s 9-1-1 systems are built and maintained now, how they will be designed and operated in the future, and how we can improve and sustain the reliability and resiliency of those systems as we transition to next-generation IP-based networks.

It is unfortunate, of course, that we must consider these questions in the wake of events that have shown us all too clearly the vulnerabilities of our existing systems. Damage to network and commercial power infrastructure in the wake of the *derecho* that struck the Midwest and the National Capital Region on June 29<sup>th</sup> of this year left tens of thousands of homes, businesses, and wireless subscribers without access to 9-1-1 service. As we consider the vulnerabilities that led to those outages, however, I believe it important that we keep in perspective the purpose of our in-

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<sup>1</sup>I joined NENA: The 9-1-1 Association in 2010 after two years as a Presidential Management Fellow in the Department of Homeland Security (DHS) Office of Emergency Communications. During my fellowship, I served temporarily with the Federal Communications Commission’s (FCC) Public Safety and Homeland Security Bureau and with the Department of Commerce’s National Telecommunications and Information Administration (NTIA). At the FCC, I developed recommendations for the Public Safety chapter of the National Broadband Plan. Later, at Commerce, I worked to implement the Plan’s recommendations as NTIA evaluated applications to the Broadband Technology Opportunity Program (BTOP). Both at NTIA and DHS, I participated in discussions with senior administration officials from the Office of the Vice President, the Office of Management and Budget, the Office of Science and Technology Policy, and the National Economic Council to develop policies for the deployment of the nationwide mobile broadband network for first responders, now known as FirstNet. I hold a Bachelor of Science in Applied Physics and a Doctor of Jurisprudence, both from the University of Tennessee.

quiries: When the safety of the public is at stake, we must put aside the temptation to assign blame, and focus instead on learning how we can prevent future failures. NENA has already engaged with the 911 community, with the carrier community, and with officials from the Federal Communications Commission to begin that process. Already, the Commission has issued a Public Notice asking important questions about the nature and causes of the 911 outages associated with the *derecho*. The comments received in response to that notice have included a frank and detailed account by Verizon of the equipment and procedural failures that occasioned the outages, along with robust and well-considered recommendations from Fairfax County, Virginia. It will take some time for the affected municipalities, the serving carriers, and the broader public safety community to fully analyze the causes of these outages. As we continue to do so, however, there are a few key lessons that I believe we can learn from the *derecho* and the outages it caused.

First, extended commercial power outages, whether resulting from severe weather or some other cause, are predictable, and carriers and public safety agencies responsible for 911 must both prepare for such outages. On the carrier side, this is particularly important for facilities that provide 911 service to Public Safety Answering Points. Given the architecture of legacy E9-1-1 systems, it is generally a single Central Office of a single Local Exchange Carrier that routes and terminates *all* 911 calls in a relatively large geographic area. This is one of the few public safety communications circumstances in which the absence of redundant facilities is tolerated, mostly because the cost of providing fully redundant 911 trunks from all End Offices in the served area to a redundant Selective Router would be prohibitively expensive. Consequently, it is all the more imperative that these non-redundant facilities have reliable, frequently-tested sources of backup power, and that those sources prioritize safety-of-life systems such as selective routing of 911 calls. Similarly, on the public safety side, it is important that Public Safety Answering Points (PSAPs) have reliable and frequently-tested sources of backup power, and that such capabilities are consistent across jurisdictions. As things stand today, the resilience of 911 centers is largely a matter of jurisdictional accident: Some states manage *all* 911 systems and PSAPs within their borders, and build-in backup power capabilities. Other states leave system and PSAP management to the discretion of local officials, but set mandatory requirements for resilience features such as backup power. Still other states, however, set no standards for the construction and operation of PSAPs *at all*. In those states, the actual preparedness of PSAPs for commercial outages can vary to the extreme: Some PSAPs will have diverse grid connections, quick-reaction battery systems, and standby generators to power the entire facility. Others may have only short-term battery protection, or, in some cases, no protection at all. Given the centrality of 911 service to public safety and homeland security, NENA believes that both the carrier community and the PSAP community must ensure that standards are in place and followed to keep 911 service available during predictable events like severe weather that deprive their facilities of commercial power.

Second, legacy circuit-switched networks will soon outlive their usefulness as the sole platform for providing 911 service. Over the last six

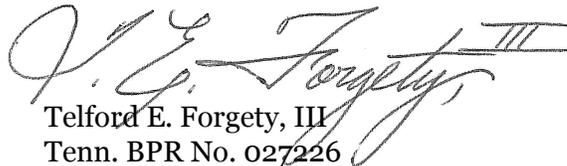
years, the public safety community, carriers, hardware manufacturers, and software developers have worked collaboratively through NENA to develop consensus standards for the architecture and operation of Next Generation 911 systems. Next Generation 911, or “NG9-1-1,” represents the first fundamental change in public communications with public safety agencies since the introduction of 911 service decades ago. Rather than relying on specialized and expensive-to-replicate facilities in a single carrier’s network, NG9-1-1 is based on open standards, commodity hardware, and fungible connectivity. For example, an NG9-1-1 PSAP will have the ability to procure connectivity from multiple, diverse carriers to increase resilience in the face of network failures. Indeed, NG9-1-1 systems can even be offered on a fully-redundant, cloud-hosted basis. This change in paradigm will provide the public with several benefits, including greater reliability and resilience of 911 service, an expansion of available communications media to include text and video, and lower costs of service resulting from competition for hardware, software, and connectivity. NG9-1-1 systems are already being deployed, in stages, around the country, but deployment timelines are inconsistent from state to state, and even from county to county. In some places, it may be a decade or more before the public has access to the advanced capabilities of NG9-1-1. At the same time, funding for 911 service, largely a fee-for-service model premised on wireline telephone revenues, is undergoing its own radical transition. Wireline subscribership continues to fall at a dramatic pace as wireless and broadband service replace it in consumer adoption. Not all states have prepared for or reacted to this transition, however, and many public safety agencies already find themselves underfunded as the user fees that once supported their operations dwindle while call volumes remain the same or continue to rise. Agencies will also face some additional costs as they transition to NG9-1-1 in order to continue operating legacy services and facilities in parallel with Next Generation facilities and software until a final cut-over can be effected. This is one area where NENA believes a relatively small amount of preparedness grant funding could have a major impact on the readiness of key public safety services for future natural disasters or terrorist events, and I recommend that the Committee consider including NG9-1-1 transition work as allowable costs in future rounds of federal grants.

Third, the public safety community needs access to analytic and visualization capabilities that are now common in the private sector in order to leverage the tremendous value of aggregated 911 data. During and after the *derecho*, for example, there arose significant questions and perhaps even disagreements as to precisely when 911 service failed, and precisely when it was restored. Had analytic capabilities been in place, however, affected PSAPs could have detected the outage quickly as 911 call volumes deviated from the expected range for that date and time. From a preparedness perspective, robust analytic capabilities will be key to future improvements in 911 service as they allow 911 authorities to better match staffing levels to expected call volumes, to reduce the instance of over-provisioning in circuits or bandwidth used to terminate 911 calls, and to detect service failures such as abnormally-long call ring times or abandonment rates. In addition, analytic capabilities will also play an important role in prioritizing the use of scarce public resources in the im-

provement of public safety and homeland security response services. For example, knowing the percentage of 911 calls in a given jurisdiction that require a response by fire protection services, and the type of response at that, will allow municipal officials to make better, more informed choices about how to expend taxpayer dollars with the greatest effect on taxpayer safety. Without these capabilities, the public safety community will remain largely blind to the drivers of its costs and largely unable to effectively articulate its impact on safety of life and property in data-driven regulatory and legislative processes. At the federal level, analytic capabilities can form a powerful tool for situational awareness and response prioritization. Near-real-time map-based visualizations, for example, could allow coordinating agencies such as FEMA and the FCC to detect incidents as they occur and monitor their progress as they expand, contract, and change in character. On a nation-wide basis, NENA estimates that deploying analytic and visualization capabilities to 366 metropolitan statistical areas would cost less than \$20 million in capital expenditures, and less than \$10 million in annual operating expenditures; expanding such capabilities to all 6,000+ primary PSAPs would be only marginally more expensive. Given the clear benefits that such capabilities can provide in terms of ongoing improvements to the preparedness and resilience of public safety communications and to the broader public safety enterprise, NENA believes that achieving a nation-wide deployment of such capabilities should be a key homeland security goal for the next five years.

Providing reliable and responsive emergency communications service to the public is the core mission of NENA's membership, and I am pleased, Mr. Chairman, that you and your Committee have called this hearing and allowed me to testify about how we can better do so in the future. I believe that significant improvements in the reliability and resilience of 911 service can be achieved over the short term and with minimal fiscal impact if only the necessary parties can work together with a common goal and a common understanding that 911 is a unique service with unique requirements and a central position in the preparedness of our nation. I look forward to working with you and with my counterparts from the carrier community to ensure that those improvements are made, and I am happy to take your questions.

Respectfully submitted,



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