DOCKET FILE COPY ORIGINAL

Before the
Federal Communications Commission
Washington, D.C. 20554

MAILED
DEC 27 2010
FCC Mail Room

In the Matter of	)	
	)	
Framework for Next Generation 911 Deployment	)	PS Docket No. 10-255
	)	
	)	
	)	
	)	
	)	
	)	

NOTICE OF INQUIRY

Adopted: December 21, 2010 **Released: December 21, 2010**

By the Commission: Chairman Genachowski and Commissioners Copps, McDowell, Clyburn, and Baker issuing separate statements.

Comment Date: (45 days after publication in the Federal Register)
Reply Comment Date: (60 days after publication in the Federal Register)

TABLE OF CONTENTS

Heading Paragraph #

I. INTRODUCTION 1
II. BACKGROUND 2
III. TECHNICAL COMPARISON OF LEGACY 911 AND NEXT GENERATION 911 12
A. Legacy 911 13
B. Next Generation 911 18
IV. DISCUSSION 27
A. NG911 Capabilities and Applications 31
1. Potential Media Types in an NG911 Environment 32
2. Primary vs. Secondary Usage of Media Types 39
3. SMS for Emergency Communications 41
4. NG911 Applications for Persons with Disabilities and Special Needs 44
B. NG911 Network Architecture 49
1. Transport Mechanisms in an NG911 Environment 49
2. NG911 Participants 50
3. Interoperability and Standards 54
4. PSAP Functions in an NG911 Environment 56
C. Other Specialized NG911 Applications 58
D. Issues Related to NG911 Implementation/Transition 64
1. Disparate PSAP Capabilities in an NG911 Environment 66
2. 911 Competition 67
3. Liability Concerns 71
4. Confidentiality and Privacy Concerns 74

5. Location Capabilities 76
6. Network and Data Security Concerns 77
7. Education 78
8. Unidentified Caller Access to NG911 79
9. International Issues 82
E. JURISDICTION AND REGULATORY ROLES 83
V. PROCEDURAL MATTERS 87
A. Paperwork Reduction Act 87
B. *Ex Parte* Presentations 88
C. Comment Filing Procedures 89
VI. ORDERING CLAUSE 91

I. INTRODUCTION

1. As recommended in the National Broadband Plan, this Notice of Inquiry (NOI) initiates a comprehensive proceeding to address how Next Generation 911 (NG911) can enable the public to obtain emergency assistance by means of advanced communications technologies beyond traditional voice-centric devices. In the telecommunications industry overall, competitive forces and technological innovation have ushered in an era of advanced Internet-Protocol (IP)-based devices and applications that have vastly enhanced the ability of the public to communicate and send and receive information. At the same time, our legacy circuit-switched 911 system is unable to accommodate the capabilities embedded in many of these advanced technologies, such as the ability to transmit and receive photos, text messages, and video. Accordingly, in this proceeding, we seek to gain a better understanding of how the gap between the capabilities of modern networks and devices and today's 911 system can be bridged. We also seek comment on how to further the transition to IP-based communications capabilities for emergency communications and NG911.

II. BACKGROUND

2. Since AT&T first made the digits "911" available nationally in 1968 for wireline access to emergency services, the American public increasingly has come to depend on the service. Today, the National Emergency Number Association (NENA) estimates that some form of 911 service is available to 99 percent of the population in 96 percent of the counties in the United States,[1] and 240 million calls are made to 911 in the United States each year.[2] "911" is as well known as any popular brand, and is what we routinely teach to children as the way to summon help from police, fire, and ambulance services. In more recent times, 911 has become increasingly important for homeland security, as the means for ordinary citizens – in some ways the true "first responders" – to report suspicious activity or summon emergency assistance for themselves and others in times of natural or man-made disasters. It should therefore come as no surprise that the American public has developed clear expectations with respect to the availability of 911 emergency services via certain classes of communications devices.

3. The availability of this critical service is due largely to the dedicated efforts of state, local, and Tribal authorities and telecommunications carriers, who have used the 911 abbreviated dialing code to provide access to increasingly advanced and effective emergency service capabilities.[3] Indeed, absent

[1] *See* National Emergency Number Association, *9-1-1 Statistics* (NENA 9-1-1 Statistics), available at http://www.nena.org/911-statistics (last visited Oct. 13, 2010).

[2] *See id.*

[3] *See* Implementation of the 911 Act; The Use of N11 Codes and Other Abbreviated Dialing Arrangements, WT Docket No. 01-110, CC Docket No. 92-105, *Fourth Report and Order and Third Notice of Proposed Rulemaking*, (continued....)

appropriate action by, and funding for, states, Tribes, and local jurisdictions, there can be no effective 911 service.

4. At the same time, new voice communications technologies have posed technical and operational challenges to the 911 system, necessitating the adoption of a uniform national approach to preserve the quality and reliability of 911 services for such communications technologies. This was first recognized following the introduction of commercial mobile radio services (CMRS) in the United States, when the Commission in 1996 established rules requiring CMRS carriers to implement basic 911 and Enhanced 911 (E911) services.[4]

5. In 1999, Congress continued this recognition when it enacted the Wireless Communications and Public Safety Act (911 Act) to promote and enhance public safety through the use of wireless communications services.[5] The 911 Act directed the Commission to designate 911 as the universal emergency assistance number for wireless and wireline calls,[6] and to establish a transition period for areas of the country where 911 was not yet available.[7] In 2000, the Commission adopted an order which established 911 as the universal emergency telephone number in the United States.[8] In 2003, the Commission revised "the scope of [its] enhanced 911 rules to clarify which technologies and services will be required to be capable of transmitting enhanced 911 information."[9] In adopting rules tailored to specific services, the Commission clarified, inter alia, the following matters: (1) telematics service

(Continued from previous page)

and Notice of Proposed Rulemaking, 15 FCC Rcd 17079, 17084 ¶ 9 (2000) (*N11 Codes Fourth Report and Order*) (citing Revision of the Commission's Rules to Ensure Compatibility with Enhanced 911 Emergency Calling Systems, CC Docket No. 94-102, RM-8143, *Report and Order and Further Notice of Proposed Rulemaking*, 11 FCC Rcd 18676, 18679 ¶ 5 (1996) (*E911 First Report and Order*)); In the Matter of Wireless E911 Location Accuracy Requirements, PS Docket No. 07-114, *Second Report and Order*, __ FCC Rcd ____ ¶ 33 (2010)(*Location Accuracy Second Report and Order*).

[4] The basic 911 rules require covered carriers to deliver all 911 calls to the appropriate PSAP or a designated answering point. *See* 47 C.F.R. §§ 20.18(b), 64.3001. Basic 911 requirements, however, do not address what information the PSAP should receive from that call; rather they are designed to ensure the appropriate delivery of 911 calls. *See E911 First Report and Order*, 11 FCC Rcd at 18679, 18692-99 ¶¶ 4, 29-46. The Commission therefore adopted Enhanced 911 rules requiring covered wireless carriers to be capable of delivering the calling party's call back number and the calling party's location information to requesting PSAPs. *See* 47 C.F.R. § 20.18; *E911 First Report and Order*, 11 FCC Rcd at 18703-18 ¶¶ 54-84; *see infra* note 36.

[5] Wireless Communications and Public Safety Act of 1999, Pub. L. No. 106-81, 113 Stat. 1286, § 2(b) (1999) (911 Act).

[6] *See* 911 Act § 3(a) (codified at 47 U.S.C. § 251(e)(3)).

[7] *Id.* The 911 Act further requires the Commission to "consult and cooperate with state and local officials" in its role of encouraging and supporting the deployment of "comprehensive end-to-end emergency communications infrastructure and programs." 911 Act § 3(b) (codified at 47 U.S.C. § 615).

[8] *See N11 Codes Fourth Report and Order*, 15 FCC Rcd at 17083-85 ¶¶ 8-14. Subsequently, the Commission adopted a period for carriers to transition to routing 911 calls to a Public Safety Answering Point (PSAP) in areas where one has been designated or, in areas where a PSAP has not yet been designated, either to an existing statewide established default point, if one exists, or, if not, to an appropriate local emergency authority. *See* Implementation of 911 Act, The Use of N11 Codes and Other Abbreviated Dialing Arrangements, WT Docket No. 00-110, CC Docket No. 92-105, *Fifth Report and Order, First Report and Order, Memorandum Opinion and Order on Reconsideration*, 16 FCC Rcd 22264 (2001). *See* 47 C.F.R. §§ 64.3001-002.

[9] In the Matter of the Commission's Rules to Ensure Compatibility with Enhanced 911 Emergency Calling Systems, CC Docket No. 94-102, IB Docket No. 99-67, *Report and Order and Second Further Notice of Proposed Rulemaking*, 18 FCC Rcd 25340, 25341 ¶ 1 (2003) (*E911 Scope Order*).

providers offering interconnected CMRS voice calling service may have an E911 service requirement and need to coordinate with the underlying wireless carriers, so that, regardless of the legal relationship between them, E911 requirements can be met;[10] and (2) resold and prepaid mobile wireless service providers must meet 911 rules to the extent the underlying licensee has deployed the necessary technology for E911 service.[11] The Commission declined, however, to impose E911 requirements on: (1) telematics-only services providers, reserving the right to revisit E911 obligations in the future,[12] (2) manufacturers of disposable phones or personal data assistants (PDAs) that contain a voice service component,[13] and (3) multi-line telephone systems, except for the Commission's monitoring of states' progress on implementing E911 for those systems.[14]

6. The next significant step in the evolution of 911 followed the introduction of Voice over Internet Protocol (VoIP) services in the United States. In this regard, in 2005, the Commission established rules requiring interconnected VoIP service providers to supply E911 capabilities to their customers as a standard feature from wherever the customer is using the service.[15]

7. While the Commission and the 911 industry acted to enable 911 service availability for wireless and VoIP providers, today's 911 system remains reliant on increasingly antiquated analog or digital circuit-switched facilities. It is thus not capable of supporting certain functionalities made possible by a transition to broadband IP-based communications technologies – functionalities that have become commonplace in other communications systems. At the same time, the introduction of these new technologies has created the potential for development of and transition to NG911 to take advantage of the enhanced capabilities of IP-based devices and networks.

8. In the last few years, there have been several important efforts to address the need for a transition to a NG911 network. In the New and Emerging Technologies 911 Improvement Act of 2008, Congress tasked the National E9-1-1 Implementation Coordination Office (ICO) to develop "a national

[10] *See E911 Scope Order*, 18 FCC Rcd at 25342 ¶ 2.

[11] *See id. See* 47 C.F.R. § 20.18(m). *See also* 47 C.F.R. § 20.18(a)(including within the scope of the rule section "entities that offer voice service to consumers by purchasing airtime or capacity at wholesale rates from CMRS licensees.").

[12] *See E911 Scope Order*, 18 FCC Rcd at 25374 ¶ 82 (encouraging telematics-only service providers to continue efforts "to implement advanced telematics safety capabilities.").

[13] *See id.* at 25342 ¶ 2 (finding that for such devices the obligation for providing enhanced 911 service is with wireless service providers to ensure that the devices used with their service satisfy their 911 obligations).

[14] *See id.* Multi-line telephone systems (MLTS) are private branch exchanges, Centrex telephone systems, key telephone systems, and hybrid systems. *See E911 Scope Order*, 18 FCC Rcd at 25361 n.170.

[15] Interconnected VoIP services (1) enable real-time, two-way voice communications; (2) require a broadband connection from the user's location; (3) require Internet protocol-compatible customer premises equipment (CPE); and (4) permit users generally to receive calls that originate on the Public Switched Telephone Network (PSTN) and to terminate calls to the PSTN. *See* 47 C.F.R. § 9.5; IP-Enabled Services; E911 Requirements for IP-Enabled Service Providers, WC Docket Nos. 04-36, 05-196, *First Report and Order and Notice of Proposed Rulemaking*, 20 FCC Rcd 10245 (2005)(*VoIP 911 Order and VoIP 911 NPRM*), *aff'd sub nom. Nuvio Corp. v. FCC*, 473 F.3d 302 (D.C. Cir. 2006). In 2008, Congress enacted the New and Emerging Technologies 911 Improvement Act of 2008 that, among other things, amended the 911 Act to codify the Commission's E911 rules for interconnected VoIP providers. New and Emerging Technologies 911 Improvement Act of 2008, Pub. L. No. 110-283, 122 Stat. 2620 (2008) (NET 911 Act).

plan for migrating to a national [Internet Protocol] IP-enabled emergency network capable of receiving and responding to all citizen-activated emergency communications and improving information sharing among all emergency response entities."[16] The ICO, managed jointly by the Department of Commerce's National Telecommunications and Information Administration (NTIA) and the Department of Transportation's National Highway Traffic Safety Administration (NHTSA), released its migration plan in September 2009.[17] In March 2010, NENA released a handbook to serve as a guide for public safety personnel and government officials responsible for ensuring that federal, state, and local 911 laws and regulations effectively enable the implementation of NG911 systems.[18] Specifically, the NENA Handbook provides an overview of key policy, regulatory, and legislative issues that need to be considered to enable the transition to NG911. The NENA Handbook states that "it is critical that state regulatory bodies and the FCC take timely and carefully scrutinized action to analyze and update existing 9-1-1, PSTN, and IP rules and regulations to ensure they optimize 9-1-1 governing authority choices for E9-1-1 and NG9-1-1 and foster competition by establishing a competitively neutral marketplace."[19]

9. On March 16, 2010, the Commission delivered the National Broadband Plan to Congress, which included several recommendations related to NG911.[20] Specifically, the Plan noted that the Commission was already considering changes to its E911 location accuracy requirements and recommended that the Commission expand that proceeding to explore how NG911 may affect location accuracy and provision of automated location information.[21] The Plan further recommended that the Commission initiate a new proceeding "to address how NG911 can accommodate communications technologies, networks and architectures beyond traditional voice-centric devices," and to "explore how public expectations may evolve in terms of the communications platforms the public would rely upon to request emergency services."[22]

10. In September 2010, addressing the National Broadband Plan recommendation with respect to location accuracy, we adopted a *Further Notice of Proposed Rulemaking and Notice of Inquiry* in our E911 Location Accuracy proceeding, in which we sought comment on a number of issues pertaining to the Commission's location accuracy rules, including the impact of NG911 deployments on location

---

[16] NET 911 Act.

[17] ICO, A National Plan for Migrating to IP-Enabled 9-1-1 Systems, 1-3 (ICO Plan).

[18] NATIONAL EMERGENCY NUMBER ASSOCIATION, NEXT GENERATION 9-1-1 TRANSITION POLICY IMPLEMENTATION HANDBOOK, A GUIDE FOR IDENTIFYING AND IMPLEMENTING POLICIES TO ENABLE NG9-1-1, at 1 ¶ 2 (Mar. 2010) <http://www.nena.org/sites/default/files/NG911%20Transition%20Policy%20Implementation%20Handbook_FINAL.pdf> (NENA NG9-1-1 Transition Handbook).

[19] *Id.* at 12.

[20] Federal Communications Commission, *Connecting America: The National Broadband Plan*, Chapter 16, "Public Safety," Section 16.3, "Leveraging Broadband Technologies to Enhance Communications with the Public," at 325-326 (rel. Mar. 16, 2010)(National Broadband Plan or NBP), available at <http://download.broadband.gov/plan/national-broadband-plan.pdf> (last visited Oct. 13, 2010).

[21] *Id.* at 325.

[22] *Id.* The National Broadband Plan also noted that limited information has been developed regarding the potential costs of NG911 implementation, and recommended that Congress provide funding to NHTSA to prepare a report by December 1, 2011 to identify the costs of deploying a nationwide NG911 system. *Id.* at 325. Accordingly, we do not address NG911 funding issues in this Notice.

accuracy and Automatic Location Identification (ALI).[23] In the *Location Accuracy FNPRM/NOI*, we limited the scope of our NG911 inquiry to location issues in the provision of voice-based services. In this Notice of Inquiry, we initiate the broader proceeding recommended in the National Broadband Plan concerning the migration to NG911.

11. Most recently, on October 8, 2010, the Twenty-First Century Communications and Video Accessibility Act of 2010 (Twenty-First Century Act) was signed into law.[24] The Twenty-First Century Act directs the Chairman of the Commission to establish an advisory committee, to be known as the Emergency Access Advisory Committee (EAAC), for the purpose of achieving equal access to emergency services by individuals with disabilities as part of our nation's migration to NG911.[25] The Twenty-First Century Act also directs the EAAC to conduct a national survey with people with disabilities and make recommendations on the most effective and efficient technologies and methods to enable NG91 1 access.[26] The EAAC will be composed generally of state and local government representatives responsible for emergency management and emergency responder representatives, national organizations representing people with disabilities and senior citizens, communications equipment manufacturers, service providers, and subject matter experts.[27]

III. TECHNICAL COMPARISON OF LEGACY 911 AND NEXT GENERATION 911

12. In order to understand the opportunities and challenges involved with deploying an NG911 system across the country, it is instructive to first briefly review how, as a technical matter, the current 911 system operates for wireline, wireless and interconnected VoIP 911 calls, and how NG911 will differ from legacy 911 in its applications and network architecture. For brevity, the discussion simplifies some of the technical details of both legacy and NG911 systems.

A. Legacy 911

13. In the United States, legacy 911 service generally falls into two categories – basic and enhanced. Basic 911 service transmits 911 calls from the service provider's switch to a single geographically appropriate Public Safety Answering Point (PSAP) or public safety agency, usually over dedicated emergency trunks. Basic 911 networks are not capable of taking into account the caller's location, but simply forward all 911 calls from a particular PSTN switch to the appropriate PSAP or public safety

[23] In the Matter of Wireless E911 Location Accuracy Requirements; E911 Requirements for IP-Enabled Service Providers, PS Docket No. 07-114, WC Docket No. 05-196, *Further Notice of Proposed Rulemaking and Notice of Inquiry*, __ FCC Rcd __, ¶ 33 (2010) (*Location Accuracy FNPRM/NOI*).

[24] PL 111-260.

[25] PL 111-260, § 106. *See* FCC Requests Nominations for Membership on the Emergency Access Advisory Committee in Accordance with the Twenty-First Century Communications and Video Accessibility Act of 2010, *Public Notice*, DA 10-2001 (Oct. 19, 2010).

[26] PL 111-260, § 106(c). The Twenty-First Century Act further provides that "[t]he Commission shall have the authority to promulgate regulations to implement the recommendations proposed by the [EAAC], as well as any other regulations, technical standards, protocols, and procedures as are necessary to achieve reliable, interoperable communication that ensures access by individuals with disabilities to an Internet protocol-enabled emergency network, where achievable and technically feasible." *Id.* § 106(g).

[27] Consumer & Governmental Affairs Bureau and Wireless Telecommunications Bureau Seek Comment on Advanced Communications Provisions of the Twenty-First Century Communications and Video Accessibility Act of 2010, CG Docket No. 10-213, *Public Notice*, DA 10-2029 (rel. Oct. 21, 2010) (*CGB EEAC Public Notice*).

agency.[28] E911 service expands basic 911 service by not only delivering 911 calls to the appropriate PSAP or agency, but also providing the call taker with the caller's call back number, referred to as Automatic Numbering Information (ANI), and location information – a capability referred to as Automatic Location Identification (ALI).[29] Most areas of the country have now implemented E911 service.[30]

14. *Wireline E911.* In wireline E911, PSAPs are connected to telephone switches by dedicated trunk lines.[31] Wireline E911 networks generally have been implemented, operated, and maintained by a subset of incumbent LECs, and are largely paid for by PSAPs through tariffs.[32] Network implementation varies from carrier to carrier and jurisdiction to jurisdiction, but usually is based on traditional circuit-switched architecture and implemented with legacy components that place significant limitations on the functions that can be performed over the network.[33] Typically, a wireline E911 network utilizes a selective router, which receives 911 calls from competitive and incumbent LEC central offices over dedicated trunks.[34] The selective router then queries an incumbent LEC-maintained selective router database (SRDB) to determine which PSAP serves the caller's geographic area.[35] The selective router will then forward the call, along with the caller's phone number (*i.e.*, ANI) to the PSAP that has been designated to serve the caller's area. The PSAP then forwards the caller's ANI to an incumbent LEC-maintained Automatic Location Identification database (ALI database).[36] The ALI database returns to the PSAP the caller's physical address (that has previously been verified by comparison to the MSAG).[37]

---

[28] This limitation of basic 911 service can be problematic when a single end office serves a geographic area that encompasses multiple political jurisdictions; call takers not only must determine the caller's location but also determine which jurisdiction's first responders should be dispatched.

[29] *See VoIP 911 Order and VoIP 911 NPRM*, 20 FCC Rcd at 10251 ¶ 13.

[30] *See* NENA 9-1-1 Statistics.

[31] *See VoIP 911 Order and VoIP 911 NPRM*, 20 FCC Rcd at 10251 ¶ 14. Our description of the Wireline E911 Network is intended to be illustrative, not definitive. As the Commission has noted previously, there are a variety of situations existing in the more than 6,100 PSAPs across the nation, including differences in state laws and regulations governing the provision of 911 services, the configuration of wireless systems, the technical sophistication of existing 911 network components, and existing agreements between carriers and PSAPs.

[32] *See id.*

[33] *See id.* at 10252 ¶ 14.

[34] *See id.* at 10252 ¶ 15 n.37.

[35] Specifically, the SRDB identifies the Emergency Service Number (ESN) that corresponds to the caller's location. ESNs are typically three to five digit numbers that represent a unique combination of emergency service agencies (Law Enforcement, Fire, and Emergency Medical Service) designated to serve a specific range of addresses within a particular geographical area, called an Emergency Service Zone (ESZ). The ESN itself is derived from the Master Street Address Guide (MSAG), which is a separate database of street addresses and corresponding ESNs. Some PSAPs require the use of ESNs to facilitate selective routing and selective transfer to the appropriate PSAP. Thus, the ESN essentially is a standardized identifier for the PSAP serving a specific area.

[36] *See VoIP 911 Order and VoIP 911 NPRM*, 20 FCC Rcd at 10252 ¶ 15; see also Implementation of the NET 911 Improvement Act of 2008, WC Docket No. 08-171, *Report and Order*, 23 FCC Rcd 15884, 15888 ¶ 8 (2008) (*NET 911 Improvement Act Report and Order*). The SRDB and the ALI Database may be the same database.

[37] The ALI Database may also return additional information, such as the name of the individual who is billed for telephone service at that address.

Wireline E911 networks also include a Database Management System (DBMS), which provides a method for competitive and incumbent LECs to enter customer data into both the SRDB and the ALI Database.[38]

15. *Wireless E911.* Under the Commission's wireless E911 rules, wireless carriers are obligated to provide the telephone number of the originator of a 911 call (*i.e.*, ANI) and information regarding the caller's location (*i.e.*, ALI) to any PSAP that has requested that such information be delivered with 911 calls.[39] As explained in the *VoIP 911 Order and VoIP 911 NPRM*, the mobile nature of wireless technology and other IP-enabled services presents significant obstacles to making E911 effective – in particular the provision to PSAPs of accurate ALI.[40] Specifically, the mobility of wireless service renders the use of permanent street addresses as a location indicator useless, and often requires the provision of real-time location updates to the PSAP. In addition, the caller's phone number (*i.e.*, the ANI information) may not be usable by the selective router for PSAP routing purposes within the specific geographic region in which the mobile 911 call was placed. To overcome this mobility problem, wireless carriers have developed various techniques to provision ANI and ALI to the PSAP that involve enhancements or "add-ons" to existing Wireline E911 networks.[41]

16. *Interconnected VoIP E911.* Under the Commission's rules, interconnected VoIP providers must provide E911 service to their customers.[42] As with wireless service, the mobile nature of interconnected VoIP service presents challenges in making E911 effective. Since an emergency call may be placed from outside the caller's home area code, completing the call may require the use of "pseudo-ANI" (p-ANI).[43] The most difficult challenge, however, is the inability of the VoIP device or service provider to determine the current geographic location of the caller. As a result, the Commission requires interconnected VoIP providers to obtain location information, called "Registered Location," from their subscribers,[44] which is

[38] The DBMS is typically under the control of the Emergency Services Network Provider, which is often but not always the incumbent LEC.

[39] *See id.* at 10252, at ¶ 16; 47 C.F.R. § 20.18(d)-(h). The Commission's wireless E911 requirements are comprised of two phases. Pursuant to the Phase I rules, wireless carriers are required to provide a call back number for the handset placing the 911 call and report the location of the cell site or base station that received the call. *See* 47 C.F.R. § 20.18(d). Under the Phase II rules, wireless carriers are required to provide more accurate 911 call location information that includes longitude and latitude. *See* 47 C.F.R. § 20.18(e). The degree of location accuracy required under the Phase II rules varies, depending on whether the carrier utilizes a network-based or handset-based solution. *See* 47 C.F.R. § 20.18(h). For a PSAP request to be valid, the PSAP must be "capable of receiving and utilizing the data elements associated with" either E911 Phase I or Phase II service. *See* 47 C.F.R. § 20.18(j).

[40] *See VoIP 911 Order and VoIP 911 NPRM*, 20 FCC Rcd at 10252 ¶ 17.

[41] *See id.*

[42] *See* 47 C.F.R. §§ 9.1 *et seq.* We note that an interconnected VoIP provider need only provide such call back and location information as a PSAP, designated statewide default answering point, or appropriate local emergency authority is capable of receiving and utilizing. 47 C.F.R. § 9.5(c). Even where the PSAP is not capable of receiving and utilizing this information, interconnected VoIP providers must transmit all 911 calls to the appropriate PSAP via the Wireline E911 Network. *Id.*; *VoIP 911 Order and VoIP 911 NPRM*, 20 FCC Rcd at 10269-70 ¶ 42.

[43] p-ANI is a "number consisting of the same number of digits as ANI, that is not a North American Numbering Plan telephone directory number and may be used in place of ANI to convey special meaning" to the Selective Router, PSAP, and other elements of the 911 system. *See* 47 C.F.R. § 20.3; *see also VoIP 911 Order and VoIP 911 NPRM*, 20 FCC Rcd at 10252 ¶ 17.

[44] *VoIP 911 Order and VoIP 911 NPRM*, 20 FCC Rcd at 10271 ¶ 46 (stating that "providers of interconnected VoIP services that can be utilized from more than one physical location must provide their end users one or more methods of updating information regarding their user's physical location."); *see* 47 C.F.R. § 9.5(d)(1)-(2). In the Location (continued....)

either entered manually or based on the subscriber's billing record. Under this approach, if a VoIP subscriber does not update his or her location, the subscriber's 911 call may be routed to the wrong PSAP, which may delay the emergency response.

17. Beyond the basic functionality above, the Commission imposes additional obligations on interconnected VoIP service providers. Under the Commission's rules, interconnected VoIP providers must forward all 911 calls made over their interconnected VoIP service, as well as a call back number and the caller's Registered Location for each call, to the appropriate PSAP.[45] These calls must be routed through the use of ANI and, if necessary, and similar to wireless carriers, p-ANI, via the dedicated wireline E911 network, and the caller's Registered Location must be available from or through the ALI Database.[46] Additionally, interconnected VoIP providers must comply with several customer notification requirements that include apprising their subscribers of any limitations in providing E911 service.[47]

B. Next Generation 911

18. Next Generation 911 relies on IP-based architecture rather than the PSTN-based architecture of legacy 911 to provide an expanded array of emergency communications services that encompasses both the core functionalities of legacy E911 and additional functionalities that take advantage of the enhanced capabilities of IP-based devices and networks. NENA defines NG911 as "a system comprised of hardware, software, data and operational policies and procedures ..., to: provide standardized interfaces from call and message services; process all types of emergency calls including non-voice (multi-media) messages; acquire and integrate additional data useful to call routing and handling; deliver the calls/messages and data to the appropriate PSAPs and other appropriate emergency entities; support data and communications needs for coordinated incident response and management provide a secure environment for emergency communications."[48]

19. In an NG911 environment, IP-based technologies and applications are used to provide call identification, location determination, call routing, and call signaling for emergency calls. Call identification determines that a call (which may be a voice call or some other form of communication) is indeed an emergency call, mapping a user-visible identifier (such as the digits 911 or 112) to a network-standard uniform emergency call identifier, such as an emergency service Uniform Resource Name (URN).[49] Location determination provides the civic or geospatial location of the caller to the initiating

(Continued from previous page)
Accuracy FNPRM/NOI, the Commission sought comment on whether there may be ways for portable interconnected VoIP service providers to automatically identify the geographic location of a customer without the customer's active cooperation. *See Location Accuracy FNPRM/NOI*, __ FCC Rcd at ____ ¶¶ 27-32.

[45] *See* 47 C.F.R. § 9.5(b)(2); *see also VoIP 911 Order and VoIP 911 NPRM*, 20 FCC Rcd at 10266 ¶ 37.

[46] *See* VoIP *911 Order and VoIP 911 NPRM*, 20 FCC Rcd at 10266 ¶ 37.

[47] *See* 47 C.F.R. § 9.5(e)(1)-(3). Such limitations "may include, but are not limited to relocations of the end users IP-compatible CPE, use by the end user of a non-native telephone number, broadband connection failure, loss of electrical power, and delays . . . in making a Registered Location available in or through the ALI database." *Id.* at § 9.5(e)(1).

[48] *See* National Emergency Number Association, *What is NG9-1-1*, available at http://www.nena.org/sites/default/files/NG9-1-1%20Definition%20Final%201.1.pdf (last visited Nov. 30, 2010).

[49] *See* H. Schulzrinne, Internet Engineering Task Force, *A Uniform Resource Name (URN) for Emergency and Other Well-Known Services,* RFC 5031, Jan. 2008.

call router,[50] which will then use the emergency call identifier and the location information, along with other information, to route the call to the nearest IP-enabled PSAP.[51]

20. The NG911 architecture also redefines the functions and capabilities of PSAPs, who receive and process emergency calls by means of Emergency Services IP Networks (ESInets). An ESInet is an IP-based network used by the PSAP and other agencies that may be involved in responding to an emergency.[52] Emergency calls can be delivered to an ESInet from several types of originating networks, including both NG911 networks and legacy 911 networks.[53] The ESInet, in turn, completes the call to the appropriate PSAP. The call signaling uses the same standard protocols as non-emergency calls, but user devices may use other protocols via gateways.[54]

21. The nature of NG911 technology and architecture leads to certain key differences when compared to legacy 911, as detailed in the paragraphs below:

- NG911 networks can be accessed by a wide variety of end users and devices, many of which will have identifiers other than telephone numbers.
- NG911 networks are capable of supporting multiple voice and non-voice services, whereas legacy 911 supports voice only.
- In NG911, the difference between mobile, nomadic,[55] and fixed services is blurred, because a single device may operate in mobile, nomadic, and fixed configurations at different times and locations.

---

[50] The call router may be the calling end system, such as a smartphone, PC, or a VoIP call router server (proxy).

[51] We briefly describe the technical details in more depth. The end system, such as an IP-enabled phone, contacts a local directory server using the LoST (Location-to-Service Translation) protocol. The server maps the caller's civic or geospatial coordinates and the emergency service identifier to the SIP URL of a PSAP or emergency services routing proxy (ESRP), using an internal database that contains the service regions of each ESRP or PSAP. The database may be derived from a geographic information system (GIS). The call is routed to the ESRP thus identified, which may in turn use the location information, again using Lost, to find another proxy closer to the PSAP serving the caller's location. This process repeats until the caller signaling request reaches the correct PSAP. LoST also provides the end system with information on the emergency services and dial strings, such as 911 or 112, available at its current location. *See* T. Hardie et al., Internet Engineering Task Force, *LoST: A Location-to-Service Translation Protocol*, RFC 5222 (Aug. 2008) (describing the LoST protocol).

[52] ESInets are defined in NENA Functional and Interface Standards for Next Generation 9-1-1 Version 1.0 (i3). ESINets may be established at the statewide or regional level to serve multiple PSAPs.

[53] Thus, some states have already begun to deploy ESINet architecture, although it will primarily be used for receipt of traditional telephone-based 911 calls in the near term.

[54] While the basic components of identification, location lookup, and call routing are present in all NG911 proposals, there have been at least three different proposed approaches for how to implement these elements in specific networks. These proposals also offer varying models for a transition architecture from the current PSTN-based system to an all-IP system. Proposals include those by ATIS "Considerations for an Emergency Services Next Generation Network (ES-NGN)," the NENA architecture based on Internet Engineering Task Force (IETF) protocols, "NENA Functional and Interface Standards for Next Generation 9-1-1 Version 1.0 (i3)," and the 3rd Generation Partnership Project architecture, "IP Multimedia Subsystem (IMS) Emergency Sessions."

[55] "A nomadic user agent is connected to the network temporarily, for relatively short durations, but does not move significantly during the emergency call. Examples include a laptop using an IEEE 802.11 hotspot or a desk IP (continued....)

- In NG911, network access and communications service may be provided by separate entities rather than the same entity.

- NG911 network services can be provided by servers largely independent of location.

22. As pointed out by the Internet Engineering Task Force, Emergency Context Resolution with Internet Technologies (IETF-ECRIT) working group,[56] the use of the Internet rather than circuit-switched networks changes the requirements and operating conditions of IP-based emergency calling. For example, in an NG911 call scenario, the caller's provider of Internet access services may not be the same entity that provides voice calling services, *i.e.*, that routes calls and bridges them to the PSTN when needed. Moreover, the voice service provider may be located far away from the caller, possibly in another country, while the Internet access provider remains, by physical necessity, local to the caller. The voice service provider may also not be a traditional telecommunications provider, particularly as the need to interconnect with the PSTN diminishes.

23. Unlike communications systems that interconnect with the PSTN, IP-based communication systems are media-neutral, *i.e.*, they can transport any digital information, regardless of content, and are not limited to voice or voice-band data (TTY). As a result, a wide variety of voice and non-voice services can share the same Internet infrastructure. Moreover, while wireless or wireline E911 network users need no special capabilities to dial 911, current standards-based architectures for NG911 envision a more active role for end-user devices and systems in identifying emergency calls and acquiring the caller's location information. This makes it easier for NG911 networks to add media beyond voice, although it also creates additional challenges such as security.

24. NG911 will also require a new and more multi-faceted approach to caller identification. In legacy E911 networks, all callers have telephone numbers as identifiers, most of which are domestic (+1) numbers. Initially, most users of IP-based systems (e.g., interconnected VoIP) will also have telephone numbers, but an increasing percentage of these users are likely to have international rather than domestic numbers. Moreover, in the longer term, as IP-based networks support an increasing diversity of non-interconnected and non-voice services, potential NG911 end users and devices are less likely to have any type of telephone number and more likely to have identifiers such as email addresses, Session Initiation Protocol (SIP) URLs or service-specific "handles."

25. In contrast to the device-specific connection protocols in legacy 911 networks for wireline, wireless, and interconnected VoIP phones, NG911 will need to provide IP-enabled devices with multiple means of accessing the NG911 network, resulting in a blurring of the difference between stationary, nomadic and mobile devices. For example, an IP-enabled mobile device may be capable of accessing the Internet via a Wi-Fi hotspot, a cable modem, or a 4G wireless broadband network. NG911 networks will need mechanisms to recognize which form of access the device is using when an emergency call is made and to provide the appropriate caller identification, location determination, call routing, and call signaling in each case.

26. NG911 also provides far more flexibility to provide network services that are not constrained by the location of the caller or the nearest PSAP to the caller. In circuit-switched networks, the location of

(Continued from previous page)
phone that is moved occasionally from one cubicle to another." *See* http://datatracker.ietf.org/doc/draft-ietf-ecrit-framework.

[56] *Id.*

many types of network services is constrained by the network topology. For example, a selective router has to be relatively close to the PSAPs it serves. For NG911, since call routing and media transport are completely disjoint, almost any network server can be located and replicated anywhere. As an example, a SIP proxy that routes call can be in a different part of the country, incurring only a few milliseconds of additional packet propagation delays.

IV. DISCUSSION

27. While, as detailed above, the 911 system has been adapted to accommodate wireless and interconnected VoIP services, the success of the 911 system, combined with the antiquated aspects of today's 911 infrastructure and the development of advanced IP-based devices and applications in the telecommunications industry overall, creates a gulf between consumer assumptions about the system's robust capabilities and its actual limitations. Indeed, there is widespread concurrence among academics, industry experts, and politicians that "the current communications landscape is a far cry from the one for which the current 9-1-1 system was engineered" and, furthermore, that "our emergency communications networks are unable to accommodate what is increasingly viewed as basic functionality inherent in many of today's technologies."[57] In short, because 911 service was designed to succeed in the legacy wireline telephone environment, there are unmet consumer expectations concerning emergency service capability and reliability across new communications technologies (such as text messaging requests for help, sending IP-based information, including medical data, photos, videos, car collision telemetry, environmental sensors, gun shot sensors, etc. via smartphones, and delivering precise location information from behind MLTS systems).

28. The deployment of and transition to NG911 presents multiple opportunities for the benefit of public safety and homeland security. First, replacing today's system with a broadband-enabled, IP-based 911 network will offer far more flexibility, resilience, functionality, innovation potential, and competitive opportunities than is presently possible. NG911 holds the promise to bridge the gap between traditional means of voice-based communications and the advanced capabilities already in widespread use by consumers using smartphones, netbooks, and advanced wireless 4G. In particular these digital devices have powerful processor and storage capabilities and are capable of transmitting not only voice communications, but also text, data, telemetry, image, and video signals, which have benefits to particular communities such as persons with disabilities. Unlike the circuit-switched technology that lies at the heart of the legacy 911 system, today's wireless networks increasingly use all-digital packet switched technology based upon the Internet Protocol suite.[58] Thus, while these networks are capable of conveying text, data, image, and video in addition to voice, the legacy 911 systems are not capable of receiving or processing these communications, and will not be until NG911 is deployed across the country.

29. The adoption of broadband IP-based technology also creates the potential for our 911 system to accommodate a full range of specialized devices and functionalities tailored to particular emergency response scenarios. For example, NG911 could permit the simultaneous transmission of critical health data along with a 911 call for help, both from the "caller" seeking assistance to a dispatcher, and back out from a dispatcher to a first responder arriving on scene or to an emergency room receiving the patient. Likewise, a vehicle's Automatic Collision Notification System could automatically call for help while conveying other relevant information such as the vehicle's location and the severity of the crash. NG911 will also enable 911 call routing based on caller characteristics, not just the location of the call. For

[57] *See* 9-1-1 Industry Alliance, *Health of the US 9-1-1 System*, at 6, (9IA Report) http://www.911alliance.org/9IA_Health_of_US_911%20_2_.pdf (last visited Oct. 15, 2010).

[58] *Id.* at 30.

example, a 911 call might be made via a video-enabled device by a deaf caller whose native language is American Sign Language. In this situation, rather than routing the call to the "geographically appropriate" PSAP, it may be preferable to enable the 911 system to route the 911 call to a PSAP that is video-enabled and has a 911 call taker prepared to respond to the caller using the caller's native sign language. NG911 will permit this to happen. NG911 will also create the ability to utilize a "virtual PSAP." Today's 911 system generally requires a call taker to answer a 911 call from within the walls of a physical PSAP. In a NG911 network, however, a call taker will be able to answer a 911 call from virtually any location. This capability will be particularly advantageous during disasters and high call volume situations. NG911 will also complement the deployment of related next generation emergency communications networks, such as next generation alerting systems and advanced public safety broadband networks.

30. In this proceeding, we seek to gain a general understanding of NG911 and the applications that it supports. We examine and seek comment about how the applications and architecture of NG911 will affect the interface with the general public, the internal workings of PSAPs, and the interface with Emergency Medical Services (EMS)[59] and other first responder organizations, including dispatch and database access. We then look at issues associated with implementing NG911 and how the transition from legacy 911 will impact the current architecture, structure, and costs of today's PSAPs over time. Finally, we seek comment on the proper roles of the FCC, other federal agencies, and state, Tribal, and local governments in developing NG911 elements and facilitating the transition to NG911 over time.

A. NG911 Capabilities and Applications

31. In this section, we review the potential capabilities that the deployment of NG911 systems will provide to the public, and the likely architecture of NG911 networks. We seek comment on each of these elements as a component of NG911. Are there core elements that should be part of every NG911 system and standardized across all NG911 deployments? Are there non-core elements that could be part of NG911 but are optional or can be varied locally? How will these elements (both core and non-core) be affected by future technological change?

1. Potential Media Types in an NG911 Environment

32. Because NG911 architecture is IP-based, NG11 networks have the potential to support a variety of non-voice communications applications or "media types."[60] There is broad consensus in the public safety community that NG911 should include some combination of non-voice media types, and to this end, NENA, the IETF, and others have been actively engaged in developing and harmonizing technical standards to support such IP-based NG911 solutions.[61] In addition, the U.S. Department of

[59] Emergency Medical Services (EMS) refers to a system of coordinated response and emergency medical care. It encompasses the personnel, vehicles, equipment, and facilities used to deliver immediate pre-hospital medical care to those injured or ill, and continued care once transferred to an emergency facility. It is comprised of agencies and organizations (both private and public), communications and transportations networks, trauma systems, hospitals, trauma centers, and specialty care centers, rehabilitation facilities, and professionals (pre-hospital personnel, physicians, nurses, administrators and government officials). *See* National Highway Traffic Safety Administration, *What is EMS*, available at http://www.ems.gov/emssystem/whatisems.html.

[60] *See* Internet Assigned Numbers Authority, *MIME Media Types*, available at http://www.iana.org/assignments/media-types/index.html.

[61] In its Media 0100-0100 requirements, NENA notes that "PSAPs shall accept voice, video and text media streams on RTP transport." *See* National Emergency Number Association (NENA) VoIP/Packet Technical Committee Long Term Definition Working Group, NENA i3 Technical Requirements Document, NENA 08-751, Issue 1, at 13 September 28, 2006, available at http://www.nena.org/sites/default/files/08-751_20060928.pdf (defining (continued....)

Transportation and other federal agencies have engaged in the development of standards in this area.[62] We identify and discuss the most likely media types below, and seek comment on the potential for each of the media types to be supported in the development and deployment of NG911 networks. We also seek comment on whether there are any additional media types that we should consider for inclusion in NG911.

33. *Message-Based Text.* When using message-based text, two or more parties have the ability to send complete, typically short, text messages to each other. Examples include Short Message Service ("SMS"), instant messaging ("chat") sessions, or web-based tools. To send a message-based text, a user must make an explicit action, such as hitting an SMS send key, or the return key on a keyboard. Chat sessions are bidirectional through their protocol definition. While services such as SMS consist of independent messages, they may be presented to the user as a thread of back-and-forth messages.

34. *Real-Time Text.* "Real-Time Text (RTT) is conversational text that is generally sent and received on a character-by-character basis. The characters are sent immediately (in a fraction of a second) once they are typed and are also displayed immediately to the receiving person(s). This functionality allows text to be used in the same conversational mode as voice."[63] RTT is viewed by many in the disability community as a replacement for the dated TTY technology and preferable, from a human interface perspective, to message-based text, as it more closely approximates the speed and flow of human voice conversation.[64] RTT also prevents messages from crossing each other during a call, and for this reason may be preferred over SMS as a means of facilitating the exchange of information between the caller and the PSAP dispatcher.

35. *Still Images (Photos).* Still images are captured by a digital camera, typically encoded into a compressed file format, such as JPEG, and made available as a single data object (file). Still images may help 911 call takers and first responders assess the severity of an incident or apprehend a criminal suspect.

36. *Real-Time Video.* Real-time (live) video may be captured by a webcam, a camera built into a mobile phone, a networked security camera, or another video-capable device. The live nature of real-time video distinguishes it from streaming video, which is typically used for watching entertainment content. Real-time video will help first responders better gauge the scope and nature of an incident and will also help determine a caller's precise location.

(Continued from previous page)
requirements intended to be used by standards development organizations in developing solutions). NENA's general work on interface standards for NG911 also describes the relationship between NENA's i3 NG911 work and the diverse protocols and approaches under the purview of the IETF. *See* NENA Functional and Interface Standards for Next Generation 9-1-1 Version 1.0 (i3) NENA 08-002 Version 1.0, at 28 (December 18, 2007), available at http://www.nena.org/sites/default/files/08-002%20V1%2020071218.pdf.

[62] *See* generally U.S. Dept. of Transportation, Research and Innovative Technology Administration, Intelligent Transportation Systems, available at http://www.its.dot.gov/ng911/ (describing various research, testing, and documentation of DOT's program completed September 2009).

[63] *See* Real-Time Text Task Force, available at http://www.realtimetext.org (last visited Oct. 27, 2010).

[64] Individuals with disabilities who can benefit from real-time text include people who are deaf, hard of hearing, deaf-blind, and speech impaired. Members of these population groups largely rely on text, rather than voice, to communicate in the event of an emergency. *See* N. Charlton, et al., Internet Engineering Task Force, *User Requirements for the Session Initiation Protocol (SIP) in Support of Deaf, Hard of Hearing and Speech-impaired Individuals*, Aug. 2002.

37. *Telemetry Data.* Telemetry data includes all sensor measurements that quantify physical, chemical, or biological phenomena. Examples include vehicular information (such as current speed and crash-related data), biological and environmental sensors that measure wind and temperature, and physiometric sensors that measure human pulse rates.

38. *Auxiliary Medical and other Personal Data.* Auxiliary data would include relevant information about the caller's medical conditions and particular treatment needs, as well as information related to those categories. Such information could be provided on a prior-consent basis to the PSAP for forwarding to EMS personnel or other first responders.

2. Primary vs. Secondary Usage of Media Types

39. We also seek comment on the degree to which each of the media types discussed above will be used as a primary versus a secondary form of communication on NG911 networks. By "primary" media, we refer to media that provide the basic communications link between the 911 caller and the PSAP during the emergency call. By "secondary" media, we refer to media that may convey additional information between the caller (or the device used by the caller) and the PSAP to augment the primary communication. Primary media will likely include voice, RTT, and text-based messaging (SMS, instant messaging), because to differing degrees, all of these media types will permit live conversations between the 911 caller and the PSAP. Thus, primary media can also be considered "conversational media." Primary media will likely be used to convey the nature and location of an emergency to a PSAP. In some cases, primary media may not be available to a 911 caller (*e.g.*, due to network congestion or end system limitations). In these cases, we seek comment on whether e-mail or social network status pages could possibly be used as the primary means of contacting a PSAP. Secondary media will likely include transmission of photos, live video, and sensor data (e.g., data acquired from sensors commonly found in mobile devices, vehicles, and medical monitoring systems). We envision a PSAP most frequently using secondary media to acquire supplemental information from a 911 caller or the caller's device.

40. The Commission seeks comment on what primary and secondary media types PSAPs and service providers will likely support. Should individual PSAPs be able to choose the media types that they will support, or should all PSAPs be expected or required to support a specific set of media types?[65] Should different standards or requirements apply to primary conversational media as opposed to secondary non-conversational media? If secondary non-conversational media include the capability to transmit sensitive personal data, what privacy protection concerns are raised and how should they be addressed? Would changes in current laws, regulations, tariffs, and overall policies be needed to enable NG911 to support these media types and system features?

3. SMS for Emergency Communications

41. In light of the popularity and ubiquity of SMS, many consumers may assume that they are or will soon be able to text to 911. Indeed, consumer use of SMS has exploded in the past decade and

[65] We note that the IETF standard suggests that RTT should be considered as a potential fallback media type when audio communications cannot be supported. *See* RFC 5194 5.2.1 ("R5: If the user requests simultaneous use of real-time text and audio, and this is not possible because of constraints in the network, the system SHOULD try to establish text-only communication if that is what the user has specified as his/her preference.") (emphasis added); *see also id.* at 6.2.5 ("When converting between simultaneous voice and text on the IP side, and alternating voice and text on the other side of a gateway, a conflict can occur if the IP user transmits both audio and text at the same time. In such situations, text transmission SHOULD have precedence, so that while text is transmitted, audio is lost.") (emphasis added). A. van Wijk & G. Gybels, Internet Engineering Task Force, *Framework for Real-Time Text over IP Using the Session Initiation Protocol (SIP)*, June 2008.

billions of SMS messages are sent each day.[66] Also, unlike some of the other media types discussed above, SMS is readily available on most mobile phones, and thus its implementation into the NG911 network may be one of the first steps in moving beyond a voice-only emergency calling framework. SMS, however, has limitations that will need to be addressed if it is to become a reliable means for emergency communications.[67] For example, a recent study noted that SMS is an asynchronous messaging service that does not provide a means for the sender to know whether and when the message has reached its destination.[68] In addition, the study noted that because each SMS is independent of its predecessors, it is difficult to ensure that messages within the same logical conversation are routed to the same destination.[69]

42. Given these limitations, we seek comment on how the increasing use of SMS may impact emergency communications and whether NG911 networks should be configured to support SMS emergency communications. For example, are there any proposed technical standards or approaches[70] that would sufficiently address routing and location concerns? Further, will it be possible to use the existing short code system to reach PSAPs? Are there measurement results for mobile-to-fixed messaging that indicate the reliability and delay of SMS delivery under specified circumstances? Would it be possible to add location information to SMS messages to help in routing such messages and, if so, how? Would it be possible to maintain session continuity across messages, e.g., at the gateway between the cellular network and the IP network? Can end-system SMS applications address some of the location-related issues, e.g., waiting to send an emergency SMS until location information has been acquired? Have there been trials or operational experiences using SMS within the NG911 architecture? Should SMS be considered primarily as a fall-back mechanism when voice communications are difficult or impossible to transmit? As wireless systems evolve to IP based 4G architectures, can the reliability and features of SMS messaging be improved for the purposes of emergency communications and if so, how?

43. We also seek comment on existing and future public expectations related to the use of SMS for emergency communications. Do consumers understand that currently available SMS generally does not support sending text messages to 911? Could the implementation of NG911 lead to changes in consumer expectations and public misunderstandings about SMS capabilities? Is there a need for programs to educate the public about the limitations of SMS for emergency communications, and if so, what entity should be responsible for developing such programs? Are there liability issues that could arise if consumers unsuccessfully attempt to use SMS for emergency communications?

4. NG911 Applications for Persons with Disabilities and Special Needs

44. According to the ICO Plan, "[t]he biggest gap between the technologies used for daily communication and those that can access 9-1-1 services is that for the deaf and people with hearing or

---

[66] According to CTIA, there were 173.2 billion SMS text messages sent in June of 2010. *See* CTIA The Wireless Association, *Wireless Quick Facts*, available at http://www.ctia.org/advocacy/research/index.cfm/aid/10323 (last visited Nov. 16, 2010).

[67] *See generally* https://www.nc911.nc.gov/pdf/911StudyGroup_Worsleyforecast.pdf (visited Dec. 14, 2010).

[68] *See* 4G AMERICAS TEXTING TO 9-1-1, EXAMINING THE DESIGN AND LIMITATIONS OF SMS (Oct. 2010) < http://www.4gamericas.org/documents/SMS%20to%20911%20White%20Paper%20Final%20October%202010.pdf > (4G Americas Texting to 9-1-1 White Paper).

[69] *See id.* at 5 ¶ 3; *see also id.* at 14 ¶ 2 and at 26-27.

[70] For example, a proposal such as draft-kim-ecrit-text-00. *See Using IM and SMS for Emergency Text Communications*, available at http://iptcomm.org/iptcomm2009papers/1569204635.pdf (last visited Nov. 16, 2010).

speech impairments."[71] As noted in paragraph 11, *supra*, the Twenty-First Century Act directs the Commission to form the EAAC with the purpose of determining the most effective and efficient technologies and methods by which to enable access to NG911 emergency services by individuals with disabilities.[72] Moreover, the Twenty-First Century Act provides that "[t]he Commission shall have the authority to promulgate regulations to implement the recommendations proposed by the [EAAC], as well as any other regulations, technical standards, protocols, and procedures as are necessary to achieve reliable, interoperable communication that ensures access by individuals with disabilities to an Internet protocol-enabled emergency network, where achievable and technically feasible."[73] In addition, the National Broadband Plan recommended that NHTSA include "an analysis of the needs of persons with disabilities and should identify standards and protocols for NG911 and for incorporating VoIP and "Real Time Text" standards."[74] ICO has noted that when it analyzed trial deployments of IP-enabled emergency networks, texting access through various IP-devices, RTT, and third-party conferencing was successfully demonstrated. Additionally, streaming video and SMS were successfully demonstrated, but with key shortcomings.[75]

45. The Commission seeks comment on what media types and devices (e.g., text, video) persons with disabilities will likely use to make an emergency call in an NG911 environment? We understand that some people with hearing and speech disabilities make emergency calls directly; others use telecommunications relay services (TRS), a more indirect method to make these calls. How can the Commission ensure that persons with disabilities receive the appropriate benefits from the NG911 system? What, if any, technical or accessibility requirements should be imposed to ensure that persons with disabilities have the necessary access to the NG911 system? To what extent can real-time text, which permits the live exchange of information with a PSAP during a call, assist individuals with hearing or speech disabilities who wish to call 911 directly? Finally, the Commission requires IP-based text and video relay providers to ensure the prompt and automatic call handling of emergency calls.[76] What considerations are necessary to ensure effective access to NG911 services for callers who continue to rely on IP-based relay services for their 911 calls? Are there different considerations for individuals who continue to use PSTN-based relay services?

46. The Commission recognizes the significant public safety interest in ensuring that non-English speakers have access to emergency services. We seek comment on what media types non-English speakers likely will use to make an emergency call in an NG911 environment. What types of devices may non-English speakers use to make an emergency call in an NG911 environment? How can the Commission ensure that non-English speakers receive the appropriate benefits from the NG911 system?

---

[71] ICO Plan at 6-6.

[72] *See* PL 111-260 § 106(c).

[73] *Id.* § 106(g).

[74] National Broadband Plan at 325.

[75] *See* ICO Plan at 6-6.

[76] *See* Telecommunications Relay Services and Speech-to-Speech Services for Individuals with Hearing and Speech Disabilities, E911 Requirements for IP-Enabled Service Providers, *Report and Order and Further Notice of Proposed Rulemaking*, 23 FCC Rcd 11591 (2008) (adopting ten-digit numbering and E911 requirements for VRS and IP Relay services); *see also Telecommunications Relay Services and Speech-to-Speech Services for Individuals with Hearing and Speech Disabilities, E911 Requirements for IP-Enabled Service Providers*, Second Report and Order and Order on Reconsideration, 24 FCC Rcd 791 (2008).

47. The ability to share information – including medical information – could be of particular value to EMS and other first responders. Should such information be provided in the ordinary course to EMS and other first responders in a manner similar to the provision of medical condition information described in paragraph 37, *supra*? Since privacy protection concerns would seemingly be implicated in this case, as in the case of transmitted medical information, how should such concerns be addressed?[77]

48. Independently of the Commission's efforts in connection with the EAAC, we seek comment on whether the Commission should conduct a separate rulemaking to ensure that individuals with disabilities have access to an Internet protocol-enabled emergency network, where achievable and technically feasible.

B. NG911 Network Architecture

1. Transport Mechanisms in an NG911 Environment

49. In this section, we seek comment on the mechanisms that will be used to transport digital content across NG911 networks. In an IP-based NG911 architecture, unlike a circuit-switched architecture, a variety of protocols can be used to transport media types across the network from the 911 caller to the PSAP. For example, still images can be carried: (1) as Multimedia Messaging Services (MMS) sent by mobile devices, (2) as attachments to Internet e-mail, (3) within instant images and uploaded to social network services, or (4) on other web services. We note that a diverse mix of physical infrastructures, networking protocols, applications, and devices may facilitate the carriage of potential NG911 media types from a 911 caller to a NG911-enabled PSAP. For example, some carriage scenarios may rely solely on "pure" IP-based solutions, some may rely heavily on existing legacy infrastructure, and some may rely on gateway packet-based communications between callers and PSAPs. We seek comment on each of these technical approaches and request that commenters discuss operational, business, and other policy strengths and weaknesses of each approach. For example, while application of IP-based approaches has generally led to robust and unexpected innovations in communications technologies, PSAPs could face operational and funding burdens from supporting a large number of IP-based NG911 architectures, and resources could be diverted from technical solutions that incorporate standardized features and implementation approaches. Similarly, introduction of operational requirements such as reliability, scalability, and standardized technology could result in tradeoffs between various legacy, proprietary, end-to-end open-standard, or other approaches for IP-based NG911 systems. We request that commenters identify these tradeoffs, or other relevant tradeoffs, and discuss the relative strengths and weaknesses of these technical approaches.

2. NG911 Participants

50. In the traditional 911 system, only a small number of entities participated in the provisioning of emergency calling services because an E911 call would originate from an end user device that was in practice tightly-coupled, both technically and administratively, with the service provider's transport network. Examples include a conventional wireline phone, a mobile phone, and an interconnected VoIP phone.

51. In a NG911 environment, however, end user devices are far more likely to be liberated from a particular transport network. This treatment acknowledges important industry trends, such as the

[77] *Id.*

increasing portability of devices among service providers,[78] open access possibilities, and the increasing use of user-selected IP-based devices that may exploit widely-available sources of Internet access. As such, the number of participants in an NG911 environment will increase dramatically. The table below lists the potential NG911 participants and their possible roles in an NG911 environment.

Participant / affected by	Media transport and encodings	Call/message identification	Location provisioning	Call/message routing
PSAPs	X	X	X	X
VSP and application service providers		X		X
Residential ISP			X	
Non-traditional ISP (hotels, coffee shops, community networks, etc.)			X	
Enterprise IP-PBX	X	X	X	X
UE vendors	X	X	X	X
Communication software developers	X	X	X	X
Home gateway manufacturers			X	

52. Currently, only devices that provide telephone services are capable of transmitting 911 calls. In the future, however, most electronic devices will have communication capabilities, ranging from televisions, in-car systems, portable music players, tablet computers, and game consoles. We seek comment on what devices can usefully provide emergency calling services. Should every consumer device with Internet or cellular connectivity and a suitable user interface have the ability to request emergency assistance? Should such devices be certified and labeled as 911-capable? How will a user of a device or software be able to tell whether a device or communication software is capable of placing 911 calls? If this capability is conditional, e.g., on properly-configured network connectivity, can the user or device test 911 reachability?

53. In the *E911 Scope Order*, the Commission established the following four criteria for determining which licensees should be subject to the wireless enhanced 911 obligations: Those licensees that (1) offer real-time, two-way switched voice service, interconnected with the PSTN, either on a stand-alone basis or packaged with other telecommunications services; (2) whose customers clearly expected access to 911 and E911; (3) that competed with analog and broadband PCS providers; and (4) where it is technically and operationally feasible to provide enhanced 911 service.[79] Should the Commission consider

[78] For example, Video Relay Service (VRS) providers used to be permitted to provide their users with terminals that could only be used with the VRS of the provider distributing that equipment. However, the Commission now requires VRS providers to make their end user equipment interoperable.

[79] *See E911 Scope Order*, 18 FCC Rcd at 25347.

expanding or modifying the four criteria from the *E911 911 Scope Order* to apply to additional NG911 participants? For example, should hot-spot providers that are not traditional communications providers, such as coffee shops, hotels, bus lines, and public parks be expected to play a role in the deployment of NG911?

3. Interoperability and Standards

54. Many potential NG911 media types permit a range of encoding and performance parameters. For example, photos are typically compressed using the JPEG standard, but may also use other formats. Photos may also include meta data (EXIF), ranging from camera settings to embedded geographic location. Further, camera images can range from low-resolution web cam photos with less than one megapixel to professional-quality images with more than 15 megapixels and several megabytes in size. For text, accented and foreign language characters can be represented in a range of character encodings with Unicode in its UTF-8 encoding among the most popular. While a wide variety of digital formats are potentially available for encoding such information, NG911 will require use of compatible formats across the network, so that PSAPs can receive and process the text, photos, and other digital information that are sent by the public. We seek comment on how best to ensure such compatibility in the formatting and coding of text, photos, and other digital information. Should there be standards for media encodings? Should we specify minimal performance ranges, e.g., minimum file sizes for digital images, that NG911 networks must support and PSAPs be able to accept?

55. If there is a need to develop standards for digital information transported on NG911 networks, what entity should set and update these standards, or assist in their coordination? Should the standards be national or international? Are there standards efforts currently under way that could form the basis for future evolution in this regard? Should specific technical standards or architectures be mandated? How can the interoperability of end user devices and PSAP devices be ensured (e.g., through interoperability testing)? Should there be a certification process that indicates whether a device or downloadable software application is compliant with certain standards? If so, what form of certification seems to be the most suitable, e.g., self-certification or approved certification organizations? Should all devices of a certain class be required to meet the certification criteria? As more people – especially within the disability community – begin to make video-based telephone calls, are there steps needed to ensure that NG911 networks interoperate seamlessly with the video software and applications being utilized in smart phones, tablets, computers and other devices? Similarly, are there steps needed to ensure interoperability with the video communication services provided by all video relay service providers?

4. PSAP Functions in an NG911 Environment

56. As noted earlier, IP-based technology removes many of the location constraints of traditional circuit-switched technology. In particular, a PSAP no longer has to be in a single building at a fixed location. Call takers that are organizationally part of a single PSAP can be located virtually anywhere an Internet connection can be found, and a single call taker could be supporting multiple PSAPs. Such "virtual PSAP" arrangements may allow more flexible and efficient staffing and may allow PSAPs to better recover from major disasters by temporarily relocating operations. We seek comment on the potential for development of virtual PSAPs as part of the transition from legacy 911 to NG911. Are current technologies sufficient to support virtual PSAPs? Are there regulatory or legal barriers changes that are necessary to facilitate the development and operation of virtual PSAPs? Are there current PSAP databases that would need to be standardized to support a remote "virtual PSAP"? How could local data that is contained in current Computer Aided Dispatch Data Bases, MSAGs, and other repositories that are necessary for an efficient response by emergency personnel be distributed on a timely and reliable basis for use by non-local PSAPs?

57. While emergency service networks and PSAPs will continue to be operated and managed regionally, the deployment of NG911 may require a set of national infrastructure components. Based on the current NENA NG911 architecture, these may include: (1) a national PSAP and ESInet lookup directory, called the LoST "forest guide"; (2) a public-key cryptography certificate to ensure that other NG911 entities can authenticate PSAPs and to ensure that PSAPs are capable of receiving access to sensitive information; and (3) interconnection to an IP-based national network to ensure that emergency calls can be routed amongst PSAPs without PSAPs losing information. The Commission seeks comment on whether it is necessary to establish a national set of infrastructure components to ensure the deployment of NG911. If it is necessary, what entity should operate this national set of infrastructure components?

C. Other Specialized NG911 Applications

58. *Device-Initiated Services for Emergency Communications.* In an IP-based network architecture, emergency calls can be placed not only by human beings, but by a variety of automatically triggered devices. Examples of such devices include environmental sensors capable of detecting chemicals, highway cameras, security cameras, alarms, personal medical devices, telematics, and consumer electronics in automobiles. We seek comment on how the deployment of NG911 will facilitate the ability of device-initiated emergency services to reach PSAPs. What steps are needed to facilitate such deployment? Is there a need to modify existing laws, regulations, or tariffs to ensure that device-initiated emergency services have access to the NG911 network?

59. *Social Media for Emergency Communications.* How have consumers used social media to report an emergency or contact public safety during an emergency? How will consumers expect to use social media for emergency purposes in the future? To what extent might state and local public safety jurisdictions employ social media tools as a way to interact with the public? How will these tools impact the deployment of NG911?

60. *N11 Numbers and Other Services for Emergency Communications.*[80] The basic functionality of NG911 is similar to many other location-based information and assistance services, such as 211 (community information and referral), 311 (non-emergency city services), 511 (traffic information), poison control, call-before-you-dig, and other similar services. Since these services share much of the same technical functionality, it may be possible to reduce cost and improve service by integrating some of these services to use a common technology platform. Further, callers may need to be transferred from one service to another, e.g., from 911 to 311 or 211. Can such coordination and integration be helpful and cut costs? How will the deployment of NG911 address N11 numbers, including N11 services such as 311, which is designated for non-emergencies? How will the deployment of NG911 impact other emergency services, such as poison control centers using 800 services? How will the deployment of NG911 affect TRS that use 711?

61. *Auxiliary Data.* NG911 offers the opportunity to provide additional data to PSAPs and first responders, such as the caller's medical history, a description of the caller's residence or business location, and related data, including building floor plans, information about hazardous materials, and building occupants with special needs. This data will often be maintained and provided by third parties, such as health care organizations that maintain electronic medical records or commercial landlords that

[80] "N11 codes" are 3-digit telephone numbers of which the first digit may be any digit other than 0 or 1, and the last two digits are both 1. Under the North American Numbering Plan, N11 Codes are known as service codes. *See The Use of N11 Codes and Other Abbreviated Dialing Arrangements*, CC Docket No. 92-105, Notice of Proposed Rulemaking, 7 FCC Rcd 3004 (1992).

maintain floor plans. How should the PSAP be informed about the availability of this data? What entity should associate this information with the call or message, such as the application service provider or a third party? Is there a need for regulations that require an application service provider to supply these services, e.g., by providing the appropriate call signaling or lookup functionality? Is there a need for standards to ensure that PSAPs and first responders receive access to this data without every PSAP having to make individual arrangements with each data source? Since this auxiliary data may be considered part of the 911 call record and therefore subject to public disclosure, is there a need to protect the privacy of this data differently than the remainder of the call information?

62. *Disaster Planning and Recovery.* How will NG911 facilitate disaster planning and recovery? How will NG911 interact with existing and future public alerting systems? Can national security be enhanced by the consistent implementation of interoperable NG911 systems across the nation? What key NG911 elements should be the focus for consistent implementation and interoperability?

63. *MLTS for Emergency Communications in an NG911 Environment.* Currently, MLTS operators are not subject to the FCC's E911 regulations. In 2003, the Commission found that economic and competitive factors existed that rendered it impracticable to adopt E911 requirements for MLTS.[81] The Commission, however, sought comment on its "jurisdiction over MLTS operators, in light of the Commission's earlier interpretations of its section 4(i) authority and its prior statement that 'the reliability of 911 service is integrally related to our responsibilities under section 1 of the Act.'"[82] In light of NG911's potential impact on MLTS, we seek comment on whether the Commission has the jurisdiction to regulate MLTS operators. How will the deployment of NG911 improve emergency services for MLTS users? Will MLTS operators be able to provide improved location information in an NG911 environment?

D. Issues Related to NG911 Implementation/Transition

64. We seek comment on the potential operational, technical, and other challenges associated with the transition to NG911. As both the ICO Plan and the National Broadband Plan highlight, the transition to NG911 will be an evolutionary process, involving technological, economic, and institutional challenges.[83] The ICO Plan also noted that "a timetable for national deployment of NG9-1-1 is difficult to estimate due to the lack of:

- Consistent funding for planning, training, deployment and implementation;
- Complete set of standards and time required to develop them; and

[81] *See E911 Scope Order*, 18 FCC Rcd at 25361 ¶50 (finding that "national rules governing MLTS E911 compatibility would impose unnecessary regulatory burdens inconsistent with the pro-competitive, deregulatory goals of the Telecommunications Act of 1996."). The Commission found that "state and local governments are in a better position to devise rules to ensure that E911 is effectively deployed over MLTS in their jurisdictions" and "technical requirements on carriers, MLTS manufacturers, and MLTS operators could stifle technological innovation[.]" *Id.*

[82] *Id.* at 25386 ¶116 (quoting Amendment of Part 63 of the Commission's Rules to Provide for Notification by Common Carriers of Service Disruptions, CC Docket No. 91-273, *Second Report and Order*, 9 FCC Rcd 3911, 3925 ¶35 (1994)).

[83] *See* ICO Plan at 3-1 ("As with any transition, there will be challenges as the nation moves from a circuit switched network to IP-based technologies. The schedules for delivering IP-enabled 911 services to the public will depend on how local, regional, and state jurisdictions plan to coordinate, deploy, and operate their NG911 systems.")

- Coordinated planning and implementation efforts by stakeholders at all levels (e.g., government, industry, OSPs, standards organizations)."[84]

65. In light of these challenges, what actions should the Commission take to encourage the deployment of NG911? Have there been any recent developments that provide additional details on a potential timeline for NG911 deployment? Have there been any coordinated management efforts by state, Tribal, or local governments? Should there be a national set of milestones that provide a planning horizon? If so, what entity or entities should set those milestones, measure progress, and disseminate the measurement results? What are the milestones that will be useful to accelerate and measure NG911 deployment? What changes will need to take place in the emergency communications governance structures, at both the federal and non-federal levels, to facilitate NG911 planning and implementation? What policies can be established to enable and instigate the development and deployment of shared state-wide ESInet, and related cooperative working agreements between federal, state, Tribal, and local agencies, as a fundamental 911 and emergency communications policy objective? Will waivers of certain rules and regulations be necessary during the transition to NG911? Should the FCC provide certain criteria for consideration of waiver grants?

1. Disparate PSAP Capabilities in an NG911 Environment

66. Because the transition to NG911 is likely to be gradual rather than a large scale "flash cut," what can be done to ensure that NG911 networks interoperate seamlessly with legacy networks? PSAPs will likely offer different capabilities for both primary and secondary media types during the transition to NG911; however, consumers in need of emergency services will also expect a uniform experience. For example, it may confuse consumers if they can use IP-based devices and applications to reach a PSAP in one county, but cannot use them to reach a PSAP in a neighboring county. Will the deployment of NG911 permit statewide or nationwide PSAPs to uniformly support new emergency communication capabilities? We seek comment on whether a timetable or deadline should be established for all PSAPs to support a minimal set of NG911 capabilities. Should we implement a timetable or deadline to ensure that all primary media types can be used to contact 911? Should certain media types, such as message-based text, only be permitted for emergency purposes when a threshold percentage of PSAPs across the country can accept these media types? Is fallback routing acceptable, where larger regional entities handle media types, such as SMS, when the local PSAP cannot? If this is not the best path forward, how should consumers determine what media types they can use to reach emergency services in their locality? Should NG911-enabled devices be able to automatically discover the local NG911 capabilities?

2. 911 Competition

67. In the current 911 system, incumbent local exchange carriers are the primary 911 System Service Providers (SSPs); however, in the NG911 environment, there are likely to be multiple SSPs offering a variety of service capabilities and options. Thus, NG911 systems will provide the opportunity for competitive services to emerge in the 911 marketplace. However, as NENA has pointed out, there are many state, local, and federal regulations that may inadvertently inhibit the transition to NG911.[85] We seek comment on both the potential benefits and potential drawbacks of competition in the 911

[84] *Id.* at 5-15; *see also* National Broadband Plan at 325.

[85] *See* NENA Comments to NBP Public Notice # 8 in GN Docket No. 09-47, GN Docket No. 09-51, GN Docket No. 09-137 at 18-19 (filed Nov. 12, 2009) (NENA Comments to NPB Public Notice #8). For example, certain regulations "specifically reference older technologies or system capabilities" and could therefore "be interpreted to prohibit the implementation or funding of IP-based 911 systems." *Id.* at 18.

marketplace. If competition does provide a benefit, what steps should be taken at both the federal and non-federal level to enable competition for the delivery of NG911 services?

68. Since many 911 laws and regulations were written in an era where the technological capabilities of NG911 did not exist, we seek comment on how legislative and regulatory bodies can modify their laws and regulations to ensure that they keep pace with the rapidly changing public safety marketplace.[86] As NENA noted, "[d]uring the transition to NG9-1-1...rights and obligations are unclear for those companies that are providers of IP services and seek to provide complete systems or components of 9-1-1 systems...[thus]...a clarification of rules impacting the delivery of 9-1-1 and emergency services is needed in the near term."[87] Given these new opportunities, what regulations should the Commission implement, or clarify, to facilitate an open and competitive NG911 environment?

69. How competitive is today's 911 system in terms of call routing, switching, transport, and database management services? Are there current laws and regulations that would inhibit an interoperable environment for NG911? Can these laws and regulations be modified to enable the IP-based, software, and database controlled structure of NG911? How do state laws and local ordinances that currently exclude non-voice based communications, automated 911 access, and sensors affect the deployment of NG911? Are disparate cost recovery mechanisms for originating 911 traffic and data costs and varying interconnection requirements impeding the transition to NG911? Do incumbent 911 system service providers have sufficient incentives to upgrade their technology absent regulatory change? Specifically, will NG911 architecture encourage more competition in the provision of 911 services? Should the FCC encourage such competition, and if so, how? What actions are necessary to optimize 911 governing authority choices for competitive NG911 SSPs, including the ability of governing authorities to act directly as SSPs? Should existing regulations, laws, or tariffs be modified to ensure that 911 governing authorities or new 911 SSPs are entitled to receive relevant routing, location, and other related 911 information at reasonable rates and terms? Should laws, regulations, and tariffs be modified to account for the responsibility of cost distribution for the decreasing use of shared legacy resources, such as legacy selective routers?

70. NENA has also recommended that the Commission examine its use of the term "wireline E9-1-1 network" as defined in section 9.3 of the Commission's rules.[88] According to NENA, "[i]t could be argued that this definition would not allow for the routing of 9-1-1 calls via an IP-based NG9-1-1 system."[89] The Commission seeks comment on NENA's recommendation. What other regulations need to be modified or expanded to enable data based services and other NG911 capabilities, including the expansion of call routing from a location-only basis to more effective forms, such as caller characteristics or needs (e.g., hearing or speech impaired, preferred language, etc.)?

3. Liability Concerns

71. NG911 will promote a more complex service delivery environment, with more types of services able to connect to NG911 systems, more external data sources available to PSAPs, and increased information-sharing options among emergency response agencies. While this flexibility promises to

[86] *See* NENA Comments to NBP Public Notice # 8 at 18; Intrado Inc. and Intrado Communications Inc. Comments to NBP Public Notice # 8 at 5, 20-21 (filed Nov. 12, 2009).

[87] NENA Comments to NBP Public Notice # 8 at 18-19.

[88] *See id.* at 21.

[89] *Id.*

provide benefits to the public and PSAPS, it is also likely to create more complex liability issues and may require new forms of liability protection for providers of NG911-related services.

72. Liability concerns may arise in a variety of contexts, based on the variability and complexity of NG911 services. For example, PSAPs may face differing liability scenarios depending on whether they choose to receive all possible information from all devices or to limit their systems to receipt of certain information or devices. Moreover, because NG911 can provide far more detailed information in real time than legacy 911, new liability issues may arise if errors occur in the transition of such data. For example, a 911 call could arrive at a PSAP from a telematics-equipped vehicle with information on the severity of a crash along with information from the vehicle occupants' electronic health records. Based on this information, algorithms may be able to predict the probability of severe injury and suggest a certain type of response. These capabilities are intended to result in the appropriate level of care quickly being sent to victims in need of assistance; however, they may also result in unintentional errors and liability exposure. Liability issues may also arise from the transfer of emergency calls and data outside the NG911 system, such as among multiple national N11/800 numbers (e.g., 211, 311, 811, 911, suicide hotline, poison control centers). The current ability to transfer calls and data among the multiple N11 entities is limited, but will not be as NG911 systems are deployed and N11 calls are able to be routed over shared networks. As a result, these entities may be exposed to liability.

73. These examples illustrate that NG911 may raise liability concerns both for PSAPs and for commercial providers of NG911-related services, and that liability protections may therefore need to be modified in an NG911 environment. Some of the new communication services that have been proposed for inclusion in the NG911 ecosystem may offer benefits to the intended user. However, in their present implementation, these services may not provide the reliability and quality of service that is associated with an emergency service. We seek comment on whether and how liability protections should be modified to ensure that NG911 service providers and PSAPs are adequately protected in an NG911 environment. How should the benefits of these new modes of communication be balanced against the potential liabilities they may introduce? Are there actions that the FCC can take, consistent with its statutory authority, in regard to modifying liability protections? Should liability protection extend to all forms of information pushed to a PSAP or pulled from external sources by a PSAP, regardless of the platform over which information travels? Should liability protection extend beyond the PSAP to all entities appropriately involved in the emergency response? Should the FCC review its requirement that all 911 calls be routed to the "geographically appropriate" PSAP to ensure that 911 calls are not prevented from being intelligently routed to the appropriate PSAP, even if it is not the geographically closest PSAP? Does the possibility of 911 calls being answered by a "virtual" PSAP give rise to liability concerns that would need to be addressed?

4. Confidentiality and Privacy Concerns

74. The legacy 911 system is a dedicated, closed, single-purpose system. Since information associated with a 911 call in today's system is generally stored in a single restricted location, preserving the confidentiality of the information and retaining appropriate records as required by law is relatively straightforward. Conversely, NG911 systems will be shared systems comprised of multiple entities. Indeed, the NG911 network may be only one part of a much larger system that will be shared with government, private sector, and other public safety entities. As previously noted, the number of media types that may be received by PSAPs and shared with emergency response agencies will greatly surpass that of current E911 systems.

75. In light of the shared nature of NG911 architecture, we seek comment on whether privacy laws or regulations will need to be modified to adapt to the NG911 environment. What privacy concerns will be introduced with the deployment of NG911? What existing or new regulations might be necessary to

ensure appropriate privacy controls? Will the definition of a "911 call" need to be modified in certain statutes and rules? How should we address concerns regarding private personal information that may be transmitted as part of an NG911 communication, for example, personal medical information that NG911 can provide to PSAPs and other third parties? How can 911 call takers at virtual PSAPs legally access 911 call data when necessary, while requiring adherence to appropriate confidentiality, disclosure, and retention statutes and rules?

5. Location Capabilities

76. As noted in the ICO Plan, new location-based technologies and applications have generated an increased demand for location services, yet the decoupling of originating service providers from network operators will make the delivery of real-time, automatic location information more challenging.[90] To what degree should federal regulations require that access providers provide call location data to end systems and/or voice service providers on reasonable and non-discriminatory terms, using standard protocol interfaces? How can stationary, nomadic, and mobile end systems in wireline and non-cellular wireless networks (including Wi-Fi) reliably discover their location information to ensure call routing and dispatch? What, if any, obligations need to be imposed on Internet service providers, residential and enterprise equipment vendors, and other parties to ensure that location information can be discovered, conveyed, and validated? Is there a need for a national or regional certification entity that will allow a provider of location information to cryptographically sign the location information?

6. Network and Data Security Concerns

77. The IP-based nature of NG911 architecture, and its complex relationship with other systems, gives rise to concerns about maintaining the security, integrity, and reliability of NG911 networks and information. We seek comment on how to address these concerns. Will the deployment of NG911 allow increased security of information through role-based access control and data rights management that limits access to information only to authorized entities? What additional security concerns will be implicated by the transition to NG911 as compared to the legacy 911 security functionality? How can the NG911 network be protected against viruses, cyber attacks, fraudulent or harassing transmissions, and other unwarranted intrusions and interruptions?

7. Education

78. What role will public information campaigns play in the transition to NG911? How can the Commission ensure that public safety personnel, consumers, and carriers are aware of NG911 deployments? What entities should lead and contribute to consumer education? Should the Commission foster common terms and terminology to facilitate the deployment of NG911? How can we ensure that other relevant organizations are aware of NG911's benefits, such as mobile health and telemedicine? Beyond the EAAC, how can we ensure that the disability community is involved with and aware of the transition to NG911?

8. Unidentified Caller Access to NG911

79. Given the proliferation of services and devices that will be able to initiate emergency calls in an NG911 environment, there will likely be many more ways for callers to contact a PSAP, including those callers that do not have an active subscription with an application (voice) service provider, or do not have access privileges for the wireless network available at their current location.

[90] *See* ICO Plan at 6-11.