Next Generation 9-1-1

Cooperative Governance

Offered by Intrado Inc.

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Introduction

What is the appropriate governance model for Next Generation 9-1-1? Because 9-1-1 is integral to the nation's communications infrastructure, technological advances and market liberalization, coupled with the evolving role of federal, state and local governments, has caused public and private sector actors to grapple with this question for more than a decade. In the meantime, the increasing prevalence of next generation technology in commercial and consumer markets has revealed the lack of a coherent national governance model that has hindered the development of and transition to Next Generation 9-1-1. On March 16, 2010, the Federal Communications Commission released the National Broadband Plan to Congress which at once elevated this important policy issue to a national priority and provided a preview of a governance model in the form of interrelated recommendations. This paper, as its starting point, takes those recommendations and seeks to engage the private sector and policymakers at all levels of government in the dialog necessary to turn the promise of words -- that all Americans are able to request emergency help irrespective of the location of the networked device employed or the technology deployed to deliver it – into a reality. Unlike consumer and commercial markets, where the legal/regulatory framework is increasingly focused on federal jurisdiction, emergency services by their local nature require that federal, state and local oversight is recalibrated into a cooperative model of governance.

Executive Summary

Intrado is a leading private sector company involved in the design and delivery of legacy 9-1-1 infrastructure and services. Intrado is also pioneering the modernization of those public safety networks which necessitates an evolution of public policy at all levels of government.[1] The Company has consistently supported the notions that: (a) clear leadership, vision and funding at the federal level is necessary to move the legacy 9-1-1 system to a Next Generation 9-1-1 (NextGen9-1-1) architecture; (b) there should be no disruption of current funding at the state level, and states must become more effective in providing logistical support and evolving funding mechanisms; and (c) localities should remain responsible for responding to emergencies but must be supported by higher levels of government and industry to exercise that responsibility.

On March 16, 2010, the Federal Communications Commission (FCC) released the National Broadband Plan (NBP) to Congress. The NBP includes a chapter devoted to Public Safety, but more specifically, it contains three recommendations (NBP16.13, 16.14 and 16.15) that provide the contours of a cooperative governance model for the transition to NextGen9-1-1. The purpose of this paper, therefore, is to suggest to federal and state policymakers the appropriate scope of federal, state and local authority and

[1] The Legacy 9-1-1 systems designed to carry wireline voice calls are: 1) Basic 9-1-1 that allows use of the universal dialing digits 9-1-1 and 2) Enhanced 9-1-1 (E-911) that incorporates the selective routing and Automatic Location Indicator (ALI) functions. NextGen9-1-1, by comparison, is a network architecture that allows for the transmission of voice, data, and multi-media information to public safety answering points and onto First Responder networks.

attendant responsibility to align with the governance framework implicated by the NBP. To be clear however, this paper should not be confused with the current debate surrounding the D-Block spectrum and its relationship to the proposed nationwide, radio interoperability network for first responders. For purposes of this paper, NextGen9-1-1 is a separate public safety 9-1-1 service and call delivery network. Thus, this paper is organized as follows:

Section I describes the mechanics of NBP Recommendations 16.13, 16.14 and 16.15 and how those Recommendations are intended to converge into federal legislation targeted primarily at the removal of legal/regulatory barriers impeding the transition to NextGen9-1-1 nationally. At the same time however, the Recommendations underscore that the direction of change is well-known, i.e., transition from legacy to NextGen9-1-1 is not controversial, and that states are not precluded from removing -- nor should they delay or otherwise wait for a federal mandate to remove -- impediments to this transition at the state level. More specifically:

- Under the NBP, federal oversight is targeted at the development of and transition to NextGen9-1-1 *networks*, while state authority is to be preserved for oversight of 9-1-1 and NextGen9-1-1 *services*;
- It is well-understood that the transition to NextGen9-1-1 significantly lags the transition to next generation networks in the commercial environment;
- Current state and local government initiatives designed to transition to NextGen9-1-1 are, by definition, removing legal/regulatory barriers;
- It is in the public interest that state and local progress should not be delayed by the promise of future federal action.

Section II suggests that effective legislation could be structured under a form of cooperative federalism whereby Congress would establish certain federal laws related to NextGen9-1-1 to include objectives on which states would be encouraged, through federal funding, to act.

Section III traces the scope of federal oversight as envisioned by Intrado with particular emphasis on network and infrastructure reforms: first, for each network segment that comprises the NextGen9-1-1 system, i.e., originating, 9-1-1 service, and public safety answering point (PSAP) networks; and second, for the system overall, including:

- Technical standards
- Traffic prioritization
- Outage reporting, and
- Liability protection

This section concludes with the legal mechanisms required to ensure appropriate, efficient and accurate transmission of NextGen9-1-1 caller information as envisioned by federal legislation under NBP 16.14.

NBP 16.14 calls for the preservation of state authority over 9-1-1 services including NextGen9-1-1 services. Accordingly, Section IV addresses the areas in which federal legislation should defer to state authority and should prescribe incentives to achieve consistent state action to remove barriers to NextGen9-1-1. Such federal legislation should include the guiding principles suggested below, which a state may elect to not follow, and should provide clarity with respect to oversight responsibility for states and PSAPs, including:

- State level: certification of 9-1-1 service providers, obligations of originating networks to deliver 9-1-1 traffic, end-to-end oversight of a Request For Assistance (RFA)[2] 9-1-1 service quality standards, data accuracy, and call routing standards.
- PSAP level: scope of planning activities, response to RFAs, choice of 9-1-1 service provider, reporting obligations, and the general management of call centers.

Finally, because federal legislation is predicated on the development of a long-term funding program (NBP 16.13), Section V provides high level principles for federal and state oversight of funding mechanisms but does not attempt to unravel this overarching, vexing problem with precision at this time.

I. The NBP Provides a Preview of NextGen9-1-1 Governance that Does Not Disrupt or Delay State and Local Progress

There is broad consensus on the need to modernize the nation's emergency communications system to accommodate consumers' expectation that they can reach the 9-1-1 system regardless of the device or technology utilized. As a result, the technological direction of change is clear, and the NBP acknowledges that "the transition from the legacy 9-1-1 system to NG911 has begun."[3] But, at the same time, outdated jurisdictional, legal and regulatory regimes that focus on legacy 9-1-1 systems are working at cross purposes.[4] The NBP, therefore, seeks to remedy this conundrum with three inextricably-linked recommendations culminating in a reformed legal/regulatory framework created through federal legislation (presumably) in 2012 and FCC rules that implement it sometime thereafter.

[2] RFA includes not only dialed 9-1-1 calls but more broadly describes any request for assistance sent from any device, regardless of whether initiated by a human, using any technology.

[3] Connecting America: The National Broadband Plan (NBP), 325 (March 16, 2010), *available at* http://www.broadband.gov/plan/; *see also* Comments of Intrado and Intrado Communications Inc., PN#8 (Intrado PN#8 Comments), 7-11 (November 12, 2009) (errata version filed January 4, 2010).

[4] NBP, 326.

Such federal framework is to be predicated on a long-term federal funding mechanism for the development and transition to NextGen9-1-1 networks and where current and future state funding programs may be determined to be insufficient.[5] Meanwhile states—today *and* under the legal regulatory framework contemplated by the NBP—retain explicit authority for 9-1-1 services inclusive of 9-1-1, E9-1-1 and NextGen9-1-1.

Logically, the promise of NextGen9-1-1, that *all* Americans are able to request emergency help irrespective of the technology or device employed to initiate or deliver such requests, demands a coherent legal/regulatory framework.[6] Because the relationship between a person who initiates an emergency call and the first responder is inherently "local," and because the requisite federal legislation is not anticipated before 2012 (with the need to do so being urgent), and because it is obvious the nation is moving to NextGen9-1-1, *state and local governments should continue with the transition to NextGen9-1-1 systems across all dimensions in need of reform.* This is true whether it is statutory, regulatory, deployment, service provisioning or the addition of new capabilities and/or applications.

The remainder of this section describes the interplay between and among the three NBP Recommendations pertaining to NextGen9-1-1 and, in doing so, posits a cooperative federal and state governance model for NextGen9-1-1.

NBP Recommendation 16.14 calls on Congress to enact and the FCC to implement a federal NextGen9-1-1 regulatory framework that roughly confers federal jurisdiction and oversight for the "development and transition to NG911 networks" while preserving "existing state authority for 9-1-1 services."[7] Additionally, the federal framework should ensure: (a) preservation and extension of the current *managed* 9-1-1 environment to the NextGen9-1-1 environment; (b) that public funding for NextGen9-1-1 is assessed and distributed in a competitively neutral manner; and (c) that any government action will encourage more private innovation and investment.[8]

NBP 16.14 neither exists in a vacuum nor does it have temporal precedence in the NBP's recommended approach. That is: Chapter 16 of the NBP sets two precursor Recommendations upon which the ability to craft the new federal legal regulatory framework depends, which are the following:

- NBP 16.13 calls for a more comprehensive National Highway Traffic Safety Administration (NHTSA) Report (Report) to guide Congressional action for

[5] NBP, 325. The transition to NextGen9-1-1 portends greater operating expense than today owing to, among other things, the necessity for a dual mode of operation (i.e., legacy and NextGen9-1-1 systems) well into the future.

[6] *See* Intrado PN#8 Comments, 1.

[7] NBP, 326.

[8] NBP, 5.

public funding and the allocation thereof—due on or before *December 1, 2011*;[9] and

- NBP 16.15: (i) seeks to extend the FCC's location accuracy proceeding (scheduled for 3Q10);[10] and (ii) calls for a new FCC inquiry to ensure that NextGen9-1-1 accommodates voice *and* non-voice requests for assistance (scheduled to begin 4Q10).[11]

Significantly, the Report, intended to help Congress develop a long-term comprehensive funding program, would likely become the defining document for the complex, adaptive system termed NextGen9-1-1. More specifically, the Report, as set forth in NBP16.13, is expected to:

1. Provide detailed costs for specific NextGen9-1-1 requirements and specifications;
2. Specify how costs would be broken out geographically and/or how costs should be allocated among PSAPs, broadband service providers and *third party providers* of NextGen9-1-1 services;
3. Identify standards and protocols for NextGen9-1-1 and for incorporating voic over Internet protocol (VoIP) and real-time text standards;
4. Include a technical analysis and cost study of different delivery platforms: wired, wireless and satellite;[12] and

[9] NHTSA published its multi-year *Next Generation 9-1-1 System Initiative* findings in March, 2009. Included in this set of documents is "Final Analysis of Cost, Value, and Risk" providing an initial estimate of the cost to deploy NextGen911 nation-wide. U.S. Department of Transportation, Intelligent Transportation Systems, *Next Generation 9-1-1 (NG91-1) System Initiative, Final Analysis of Cost, Value, and Risk*, Version 1 (March 5, 2009), *available at* http://www.its.dot.gov/ng911/pdf/USDOT_NG911_4-A2_FINAL_FinalCostValueRiskAnalysis_v1-0.pdf.

[10] *Proposed 2010 Key Broadband Action Agenda Items, Promote Strong and Secure Public Safety Networks, No. 62. Location Accuracy FNPRM* (Rec. 16.15) (PSHS, OET, WTB): "To improve location accuracy and automatic location identification requirements for next-generation 911. In 3Q 2010 adopt a Further Notice of Proposed Rulemaking to consider how NG911 – the next steps for the nation's emergency communications system, incorporating text messaging, photos and videos, and other data communications – affects location accuracy and automatic location identification requirements. The FNPRM will be followed by further proceedings in 2011 as necessary." http://www.broadband.gov/plan/broadband-action-agenda-items.html (last visited June 22, 2010).

[11] *Proposed 2010 Key Broadband Action Agenda Items, Promote Strong and Secure Public Safety Networks, No. 63. NG911 NOI* (Rec. 16.15) (PSHS, OET, WCB, WTB): "To promote the effective development of next generation 911, in Q4 2010 begin an inquiry to address how NG911 can accommodate communications technologies, networks, and architectures beyond traditional voice-centric devices, and how public expectations will evolve regarding the communications platforms the public will rely on to request emergency services. The NOI will be followed by further proceedings in 2011 as necessary." http://www.broadband.gov/plan/broadband-action-agenda-items.html (last visited June 22, 2010).

[12] Intrado assumes that the process of developing the cost study will be public and transparent to ensure that there are no significant omissions or oversights such as the inclusion of the costs of legacy compatibility.

5. Address current state of Internet protocol (IP) readiness among PSAPs and how differences in PSAP access to broadband, as well as the use of broadband across the country, may affect costs.

Logically, the Report, in concert with the FCC proceedings comprising NBP 16.15, is intended to inform the legislation proposed under NBP 16.14. Certain other initiatives, including the work of the Communications Security, Reliability and Interoperability Council (CSRIC), are also expected to provide inputs into this process.[13] Taken together, these three NBP Recommendations provide the contours of a model of cooperative governance for NextGen9-1-1. [14]

II. An Appropriate Legal Framework Will Define Areas of Federal Oversight and Provide States and Local Governments with Guiding Principles As Well As Incentives to Adopt

Presumably, the Report (or some proxy) will provide the evidentiary framework from which legislation will be crafted. From there, Congress must determine a workable legal approach that meets technical and policy objectives. Specifically, Congress must determine the proper roles of the state and federal governments necessary to transition to NextGen9-1-1. There is general consensus that the federal government must take a leadership role in advancing NextGen9-1-1. The legislative challenge is to determine what part of emergency communications must be guided by the federal government, either through specific rules and agency oversight, or through incentives under a cooperative federalism approach.

To date, Congress has judiciously exercised its Commerce Clause authority with respect to 9-1-1 communications through regulation of infrastructure and carriers, rather than over the actual service to PSAPs. So far, through the Wireless Communications and Public Safety Act of 1999 (911 Act)[15] and the New and Emerging Technologies 911 Improvement Act of 2008 (NET 911 Act),[16] Congress has mandated 9-1-1 as the national emergency number, required wireless and interconnected VoIP providers to provide access to emergency services, entitled interconnected VoIP providers access to 9-1-1 capabilities and granted liability immunity for wireless and VoIP providers providing

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[13] The Web site for CSRIC is located at www.fcc.gov/pshs/advisory/csric/.

[14] Intrado acknowledges NARUC's 2005 Legislative Task Force *Report on Federalism and Telecom* in which a functional -jurisdictional model of governance is set forth that includes, among other things, 9-1-1 (see, p. 9). And, although the NARUC Report and this paper vary in a strict legal sense, they appear to be compatible in that they share important similarities with respect to the scope of federal, state and local oversight of 9-1-1.

[15] Pub. L. No. 106-81, 113 Stat. 1286 (1999).

[16] Pub. L. No. 110-283, 122 Stat. 2633 (2008).

access to 9-1-1. Through the ENHANCE 911 Act of 2004, Congress provided resources for states to adapt to the Phase II wireless E-911 services it had imposed upon carriers.[17]

Notably, these statutes substantially limit federal invasion of state authority. The 911 Act does not require states or localities to establish emergency service, and it states that nothing in subsection 3 (establishing a national universal emergency number) "shall be construed to authorize or require the Commission to impose obligations or costs on any person."[18] The House Report further explains that the Committee recognized that "many states currently administer effective 9-1-1 systems" and "that most of the actual implementation of E9-1-1 systems will be at the local level."[19] It further specified that it was not the Committee's intent to supersede any state 9-1-1 laws; rather it was intended as encouragement for state/federal cooperation to coordinate state plans to upgrade 9-1-1 systems.[20] Additionally, the ENHANCE 911 Act offered a voluntary grant program to the states. In the NET 911 Act, Congress tasked the FCC to work collaboratively with public safety organizations, industry members and the E-9-1-1 Implementation Office to develop best practices.[21]

Cooperative federalism has been described as a regulatory structure in which a federal statute provides for state implementation of federal policy.[22] However, the Tenth Amendment to the U.S. Constitution limits the degree to which Congress can conscript the states in advancing federal legislation. "Under current doctrine, the Tenth Amendment bars the federal government from 'commandeering' state legislatures or state executive officials, though it permits, as it long has, both conditional preemption and conditional spending as a means to encourage the states to regulate pursuant to federal demands."[23]

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[17] Pub. L. No. 108-494, 118 Stat. 3987 (2004); *see generally* Linda K. Moore, *CRS Report For Congress, Emergency Communications: the Future of 911* (November 21, 2008) (March 16, 2010)(discussing 9-1-1 legislation), http://assets.opencrs.com/rpts.

[18] Pub. L. No. 106-81, 113 Stat. 1286, Section 3 (b).

[19] House Report 106-025, 2 (106th Congress 1999-2000).

[20] *Id.*

[21] Pub. L. No. 110-283, 112 Stat. 2633, Section 6 (h).

[22] *See* Philip J. Weiser, Towards A Constitutional Architecture for Cooperative Federalism, 79 N.C.L.Rev. 663, 668 (2001)("Although there is no precise definition for which regimes fit the cooperative federalism model, the Supreme Court has suggested that this term best describes those instances in which a federal statute provides for state regulation or implementation to achieve federally proscribed policy goals.")

[23] R. Seth Davis, Conditional Preemption, Commandeering, and the Values of Cooperative Federalism: An Analysis of Section 216 of EPACT, 108 Col. L. Rev. 406, 412 (2008).

At this juncture, the cooperative federalism approach appears to be reasonably aligned with the notions of federal oversight for the development and transition to NextGen9-1-1 networks while, at the same time, preserving state authority over NextGen9-1-1 services as set forth in NBP 16.14. The proposed cooperative federalism approach is consistent with jurisdictional precedent, utilizing direct federal oversight primarily to regulate carriers and their networks, yet going further to provide specific state guidelines to be incented through federal funding in order to establish a broad federal framework for NextGen9-1-1 communications. This approach avoids outright federal preemption of 9-1-1 communications, while at the same time acknowledges the Tenth Amendment limitations on the degree to which Congress can otherwise mandate state action.

- Moreover, through federal funding (NBP 16.13) designed only to assist with the transition to NextGen9-1-1 and not to substitute for current, state-centric 9-1-1 funding, states would be incented to remove regulatory roadblocks and to adopt consistent approaches of regulation over NextGen9-1-1 services. However, in light of the uncertainty created by the contingencies and extended timeframe surrounding NBP 16.13 and 16.14, this alignment remains tentative.

III. Recommended Scope of Federal Oversight for the Development of and Transition to NextGen9-1-1 Networks

Having moved irreversibly from the two-service world of analog local and long distance voice, NextGen9-1-1 may be defined as a complex adaptive system that:

(a) is robust, reliable, secure, managed, and change capable;

(b) is the successor to, yet capable of co-existence with legacy 9-1-1 systems;

(c) can accommodate a broad span of mainstream technologies, devices and applications;

(d) extends the range of participants and information involved in the request for assistance; and

(e) fundamentally exists to save lives and property.

Because NBP 16.14 contemplates federal oversight of the development and transition related to next generation infrastructure, a network-centric approach is organized into three categories for which the FCC is uniquely positioned to address. First, because recommended legislation is aimed at the removal of impediments, the discussion focuses on reforms pertaining to the three distinct and necessary segments comprising the NextGen9-1-1 network. The second pertains to NextGen9-1-1 system-wide

requirements, and the third addresses "legal mechanisms to ensure efficient and accurate transmission of 9-1-1 caller information to emergency response agencies."[24]

A. Networks / Infrastructure Reforms

1. Originating Networks

Ideally, all originating networks should be required to deliver 9-1-1-originated traffic directly, indirectly, or via a commercial third party to the appropriate 9-1-1 service network. Today, however, networks that originate RFAs are *not* similarly situated. That is: different legal/regulatory regimes apply depending on whether the originating network is wireline, wireless, or IP-enabled; whether end-user rates are subject to intrastate or interstate oversight; and whether the demarcation point between the originating network and the 9-1-1 service network is determined by the so-called King County Demarc[25] set by the FCC, or is the result of the current universal service regulations and/or the legacy Universal Emergency Service tariff system in the states.[26]

As a result, impediments to the transition to NextGen9-1-1 arise from disparate cost recovery regimes for originating 9-1-1 traffic and data costs, inefficient interconnection requirements, and a lack of consistency regarding how originating traffic and relevant subscriber information is delivered to the appropriate 9-1-1 service network.

2. 9-1-1 Service Network

As Congress looks to reform the legal/regulatory framework to accommodate NextGen9-1-1, it will be just as important to retain those elements of regulation that promote the FCC's policy goal of "promoting safety of life and property" as it will be to remove those elements that are impediments to the development and transition to NextGen9-1-1.[27] For the NextGen9-1-1 service network, that means extension of the core functionality of the legacy system to the next generation environment.

Although technically precise definitions await the Report (or its proxy), core functionality inherent in the legacy E9-1-1 system should be incorporated into the NextGen9-1-1 System. Table 1 below summarizes these core attributes.

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[24] NPB, 326.

[25] May 7, 2001, Letter from Thomas J. Sugrue, Chief, Wireless Telecommunications Bureau, to Marlys R. Davis, E911 Program Manager, Department of Information and Administrative Services, King County, Washington, C.C. Docket 94-102.

[26] *Federal-State Joint Board on Universal Service*, CC Docket No. 96-45, Report and Order, 12 FCC Rcd 8776, ¶ 72-74 (1997).

[27] 47 U.S.C. § 151.

Table 1. *Core Functionality of the Legacy 9-1-1 System*

Core Functionality	Description
System Management	The legacy 9-1-1 system is a dedicated network that is interconnected with the public switched telephone network (PSTN) and where data accuracy including caller location used for call routing and meaningful address for first responder assistance is paramount.
Diversity / Resiliency	System platforms are deployed to separate geographic locations to ensure no disruption if the system fails at one location.
Redundancy	Designed to be fault tolerant with no single point of failure having the ability to disable overall service.
Call Management	Technically feasible features and capabilities that represent current minimum standards include default and alternate call routing, selective call transfer, and wireless call processing.

Taken together, the core functionality of the legacy system is a "managed" system in the context of the traditional two-service world of local and long-distance voice calling. But, to avoid a massive, unintended shift in public policy and with it a degradation of the ability to protect the public's safety, the NextGen9-1-1 system must be able to manage each RFA end-to-end *and* be able to operate in the legacy and NextGen9-1-1 environments. End-to-end RFA management means supervision of each voice and non-voice RFA from origination to the PSAP and on to the first responder - - and possibly other entities relevant to RFA including, e.g., hospitals and poison centers.

Because there will not be a large scale "flash cut" to NextGen9-1-1, and because the overall transition will take a number of years, legacy and NextGen9-1-1 environments must operate simultaneously for the foreseeable future. Operation in both the legacy and NextGen9-1-1 environments, therefore, means that the NextGen9-1-1 service network will need to interoperate seamlessly with legacy switched networks, up to the capacity of the legacy infrastructure and legacy PSAP customer premises equipment (CPE), and will need to be capable of supporting wireline, wireless, IP-enabled and other platforms not yet identified.

Toward these goals, the NextGen9-1-1 network should be designed in accordance with the additional guiding principles set forth in Table 2 below.

Table 2. *Guiding Principles for the NextGen9-1-1 Network*

Principle	Description
Scalable	Capability of the NextGen9-1-1 system to operate under real world conditions, meet longer term needs, and support growing and evolving features. Provides a foundational path forward by possessing a high degree of flexibility, i.e., "change capacity" (system architecture must be modular, scalable, and extensible) to integrate and embrace new technologies and consumer devices capable of originating RFAs as they are introduced to the evolving system.
Robust	A fault tolerant system designed to avoid: (i) an individual component failure during RFA processing resulting in a lost call, or (ii) a major disaster results in the loss of RFA processing. Ensures peak performance of overall system and individual elements. Discrete system components are fully integrated yet operate in a standards-based, open system architecture. Assures high levels of data accuracy, voice quality and call delivery, and maintains the highest standards for system efficacy, reliability and interoperability, particularly across multiple disparate systems inherent in IP-based system.
Redundant	One or more back-up systems of the NextGen9-1-1 networks whereby duplication of components running in parallel increases reliability in the event of a primary system failure.
Interoperable	The capability for disparate legacy 9-1-1, E9-1-1 and NextGen9-1-1 systems to work together.
Secure	No loss of legacy functionality. Carry over characteristics to NextGen9-1-1 system such that it is protected against and free from viruses, cyber exploits, and other unwarranted intrusions, interruptions.
QoS	Codes and protocols in the layered packet-based (i.e., NextGen9-1-1) network that allow for the same level of quality for real time voice services typical of the circuit switched network.
Access for Disabled	Provides for disability access. Central to social regulation and fundamental to NextGen9-1-1 should be access by the disability community to 9-1-1 *natively* via text, video and IP networks/applications. Solutions should be extensible to accept and process RFAs from next generation voice and/or text (Instant Messaging) devices within the same architecture and prioritization rules**.**

Expanded System Features	Including, but not limited to, notes share, congestion control, dynamic call routing, virtual PSAP; expands system access for new authorized users; improves interoperability and operational continuity.
Standards	System designed and built in accordance with standards approved by formal standards bodies. For NextGen9-1-1, this is a system based on open standards for interfaces and broadened participation balanced with system security through reasonable control of system access. While embracing open standards and broad participation, the system prohibits unfettered access of critical system elements to illegitimate participants wishing to corrupt or disrupt the system.

Taken together, the information contained in Tables 1 and 2 will allow Congress and the FCC to begin to correctly calibrate a federal legal/regulatory framework for the provision of future emergency communications. Thus, a realistic appraisal for NextGen911 will underscore the continued need for what is generally understood to be a "managed environment." This is true because originating networks will transition to NextGen platforms unevenly and with different technological standards for different platforms. And, with the increasing functionality inherent in NextGen9-1-1, the dedicated NextGen9-1-1 network will be necessary to assimilate legacy and NextGen functionality into a single, managed, secure, IP-based system that allows for location accuracy and other data management metrics including monitoring, alarms and notification, diagnostics, records management and reporting.

3. PSAP Infrastructure

In 2008, *The 9-1-1 Industry Alliance 2008 Study on the Health of the United States 9-1-1 Emergency Network: A Call to Action on 9-1-1* reported that "based on conversations with professionals in the field, it is believed that individual PSAPs remain the single weakest link in the E9-1-1 chain and it is our understanding that individual PSAP outages are not reported in most cases."[28] The fact that PSAPs do not universally provide for backup power, trunking and/or last-mile redundancy means that the promise of end-to-end NextGen9-1-1 will not be realized, i.e., the goal should be to avoid any compromise of the integrity of the NextGen9-1-1 network at any point, including the PSAP's CPE and other support equipment located within the PSAP facility. Thus, among other things, the NextGen9-1-1 environment argues for a hosted service model that would maximize cost efficiencies and minimize the need for the PSAPs to constantly maintain, upgrade, and administer a complex hardware and software solution, which in turn would maximize the PSAP's ability to focus on public safety.

[28] 9-1-1 Industry Alliance, *Health of the US 9-1-1 System*, 33, n. 35, http://www.911alliance.org/9IA_Health_of_US_911%20_2_.pdf (last visited June 22, 2010).

Additionally, guidance from the FCC's Public Safety and Homeland Security Bureau (PSHS) provides that "route diversity" contributes directly to the fundamental public safety precepts of redundancy and resiliency and is set forth in Table 3 below.[29]

Table 3. *Diversity Principles between the PSAP and the 9-1-1 Service Network*

Principle	Description
Route Diversity	Communications routing between two points over more than one geographic or physical path with no common points.
End Point Separation	Separate and distinct entry points for each transmission means as they terminate at end points.

Notably, diversity principles are *not* satisfied if two separate systems follow a similar geographic path, nor are they satisfied when redundant paths employ the same transmission means. By providing alternative means of connectivity through diversity routing in accordance with the principles in Table 3, redundant means of connection between the PSAP and the local exchange or the 9-1-1 service network, or the next generation equivalent, are accomplished. The PSHS Bureau concludes that "[t]his is a very important capability that all PSAPs should have."[30]

Finally, at a time when natural devastations are purportedly on the rise,[31] Congress should ensure that, at a minimum, individual PSAPs and 9-1-1 authorities adhere to the same standards for diversity of service infrastructure and redundancy as are required of all other networks that comprise the end-to-end system.

B. NextGen9-1-1 System-wide Requirements

1. Technical Standards

The need for standard interfaces to ensure a seamless transition to NextGen9-1-1 cannot be overstated. Congress and the FCC should ensure that the notion of appropriate standards for the NextGen9-1-1 network (set forth in Table 2) is included, but specific standards or system architecture should not be mandated. Avoiding such mandates is necessary for many reasons, not the least of which is due to the need for flexibility on the road to NextGen9-1-1 as well as the capacity for change over the long term. There is no better example of this than how different and changing standards demand attention to three attributes – location validation, location acquisition and how location is used for

[29] Discussion informed by *Tech Topic 14: Diversity, Redundancy, and Resiliency – in that Order*, www.fcc.gov/pshs/techtopics/techtopics14.html (last visited June 22, 2010).

[30] *Id*. at 2.

[31] *See* Beverly Bell, *From the Expert: Number of Disasters Growing Across U.S.* (July-Aug 2010) http://www.esg.org/pubs/capitolideas/enews/issue52_1.aspx.

call routing. Location validation is required for accurate dispatch of the first responder; location acquisition is the capability to obtain the location to be used in call routing and in the call dispatch, and call routing is impacted by how the location is obtained in the first instance (i.e. ALI data used to formulate selective routing tables, or is it to be obtained from the originating network?).

It is important to realize that the "journey" to NextGen9-1-1 is as dependent on the completion and adoption of approved technical standards as it is on the reform of the legal/regulatory framework and development of operating practices. The current system (and corresponding expertise) that has evolved over more than four decades is steeped in the technical lessons learned and applied over time via standards. So too must new technologies which must retain core functionality and seek to emulate it within their unique characteristics.

Currently, there are three standard interfaces that are critical to the orderly development and transition to NextGen9-1-1. One standard applies to NextGen9-1-1 Emergency Messaging Interface (ESMI) and another applies to the Emergency Information Service Interface (EISI). Both of these standards have been approved by the American National Standards Institute (ANSI) and Alliance for Telecommunications Industry Solutions (ATIS). One additional standard applies to the Request for Assistance Interface (RFAI). This standard is currently approved by ATIS and is anticipated to soon become an ANSI accredited standard.[32] These three standard interfaces provide realization of initial next generation capabilities today while also enabling a path toward future functionality, all without causing any of the core functionality of the current emergency services system (i.e., location validation, location acquisition and call routing) to descend into an unworkable and life-threatening black hole.

2. Traffic Prioritization

Congress instituted the FCC for, among other things, "the purpose of promoting safety of life and property."[33] Flowing from that charge, the prioritization of emergency services traffic exists today, and there is no principled reason for it to disappear or be otherwise diluted just because the underlying technology is changing. Moreover, Congress and the FCC need to ensure that any federal statute and the rules that implement it are written in a manner that can withstand judicial review.

3. Outage Reporting

Current federal outage reporting requirements for the legacy E9-1-1 environment are sufficient for legacy originating/access networks and for 9-1-1 service networks, but as stated previously, PSAP-based outages are not routinely reported, and the integrity of the

[32] All of these interfaces have been championed by Intrado and are in the public domain and available to product manufacturers and suppliers

[33] 47 U.S.C. § 151.

end-to-end system requires that they should be. Additionally, with the development and transition to NextGen9-1-1, the reporting requirements must be administered on a technological and competitively neutral basis. As such, all originating/access service providers, including those provisioning IP-enabled services that are required to provide access to 9-1-1, must be treated the same.

4. Liability Protections

In the NextGen9-1-1 environment, the liability protections that have been afforded legacy wireline access providers, and extended to wireless and interconnected VoIP providers, must apply equally to the broader set of entities and users in the NextGen9-1-1 emergency request and response process. Accordingly, Congress should modify 47 U.S.C. § 615a to provide wide ranging liability protection subject to compliance with any NextGen9-1-1 obligations for any service provider engaged in the process of an emergency RFA, irrespective of technology used for assistance. Suggested changes are to add to subsection (a) of section 615a liability protection for carriers, or carrier-like entities, providing transmission or delivery of a 9-1-1 request for emergency service as well as any entity providing emergency response services. Additionally, subsections (b) and (c) providing for user and PSAP parity should be modified to include protection when the user is using any device capable of placing a 9-1-1 request for emergency service.

C. Legal Mechanisms to Ensure Appropriate / Efficient / Accurate Transmission of 9-1-1 Caller Information

1. Privacy Statutes

The advantages of transmitting information *in multiple media* is one of the greatest values of NextGen9-1-1. Limitations contained in 47 U.S.C. § 222 must be addressed so that the statutory provision does not impede the reasonable exchange of legitimate information between and among carriers in the RFA process. The exceptions contained in subsection (d) should be expanded to include the additional service providers, as well as the additional types and expansion of information included in an RFA.

2. NANP / pANI Normalization

Pseudo Automatic Number Identification (pseudo-ANI or p-ANI) is required to make the legacy, fixed, analog voice system "work" in an increasingly mobile environment. That is, p-ANI is used in place of telephone numbers (TNs) to establish access and the routing of an RFA by a nomadic user with a foreign telephone number to the correct PSAP. P-ANI is defined as "[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 an ANI to convey a special meaning. The *special meaning assigned to the pseudo-ANI*

is determined by agreements, as necessary, between the system originating the call, intermediate systems handling the call, and the destination system."[34]

Today, p-ANIs allocated to Commercial Radio Service Providers (CMRS), termed emergency service routing key (ESRK), are contained in each carrier's number pool. The "special meaning" conveyed by ESRKs for legacy Wireless Phase II includes latitude, longitude, and base station location. Significantly, CMRS is "telecommunications" service and hence is subject to the FCC's Title II authority, but not all mobile wireless are CMRS, and neither are they "telecommunications" services, e.g., mobile broadband Internet access is an "information" service and text messaging remains unclassified. Pseudo-ANIs allocated directly to interconnected VoIP and third party VPCs, such as Intrado, are termed emergency services query key (ESQK). The "special meaning" conveyed by ESQKs is the end user's registered location. Moreover, VoIP is not "telecommunications," and the FCC has thus far declined to define it as an information service. Finally, PSAPs are conditioned (generally) to distinguish CMRS from VoIP via NPA-511-XXXX for CMRS and NPA-211-XXXX for VoIP.

Under the *NET 911 Improvement Act of 2008* and the FCC rules that implement it, interconnected VoIP service providers are entitled to access to "capabilities," among them p-ANIs, from any entity that owns or controls such capabilities. In this context "any entity" includes LECs, PSAPs, VoIP position centers (VPCs), CMRS providers, CLECs and the routing numbering authority (RNA). Furthermore, "[t]his includes *all forms of p-ANI*, such as ESRK, ESQK, or emergency services routing digit (ESRD) … and this "requires changes to the current p-ANI administration system…" and for which "[t]he Wireline Competition Bureau will provide confirming instructions to the Interim RNA" (emphasis added).[35] To date, such instructions have not been forthcoming, but in any event, Fixed Mobile Convergence (FMC) requires that the administration of p-ANIs be uniform and not subject to the conventions established under current law through "agreements, as necessary, between the system originating the call, intermediate systems handling the call, and the destination system."[36]

For reasons mostly central to end-to-end security and integrity of the NextGen9-1-1 system and the mounting concerns about cyber-security, Congress should ensure that entities entitled to receive numbering resources, *and* IP addresses (i.e., access to the NextGen9-1-1 network) should, at a minimum, be required to register with the FCC.

[34] 47 U.S.C. § 9.3 (4) (emphasis added).

[35] *Implementation of the NET 911 Improvement Act of 2008,* 23 FCC Rcd 15884, ¶ 27, n. 84 (2008).

[36] 47 U.S.C. § 9.3 (4).

3. Database Management.

To ensure preservation of the managed 9-1-1 service environment described in Tables 1 and 2 above, critical databases, including those for automatic location information (ALI) and selective routing (SR), the Master Street Address Guide (MSAGs), and their NextGen9-1-1 functional equivalents, must be made available to the NextGen9-1-1 Service Provider.

IV. NextGen9-1-1 Services and the Preservation of State Authority within a Federal Framework

A. Enabling Legislation / State Rules

Quite apart from current debates about whether broadband will be classified as Title I, Title II service, or whether the regulatory treatment of originating networks will be unified, or whether geographic designations such as local access and transport areas (LATAs) or Major Trading Areas (MTAs) will pertain, the evolution of E9-1-1 service to NextGen9-1-1 service need not, indeed should not, be thwarted or otherwise impeded by those debates. There is nothing more "local" than a person in need of emergency assistance and the first responders dispatched to that emergency. Because that critical relationship cannot easily be federalized, states can and should proceed with the removal of legal and regulatory impediments independently and expeditiously.

Recognition of this reality appears to be contemplated in NBP 16.14 wherein it calls for states to remove regulatory barriers to the development and transition to NextGen9-1-1 while preserving state authority regarding 9-1-1 services.[37] Together, these elements call for revised state statutes and/or rules that: (a) recognize new technologies; (b) enable competitive 9-1-1 service providers; and (c) design an equitable state surcharge funding mechanism that is competitively neutral in all respects. Rather than mandate state action, Congress should provide motivation through a funding mechanism. More about funding follows in Section V, but first, further granularity for recommended oversight at the state level is summarized in Table 4 below.

[37] NBP, 326.

Table 4. *Guidance for the Development of a State Regulatory Framework*

Category	Regulatory Construct
Certification	All 9-1-1 service providers or operators of elements of the system, including government operators, obtain certification from state commissions.
Originating / Access Service Providers	All originating/access service providers with obligations to provide access to 9-1-1, deliver originating 9-1-1 traffic to the appropriate 9-1-1 service provider.
RFA Traffic Delivery	Occurs between/among originating service providers and 9-1-1 service providers consistent with federal NextGen9-1-1 network rules.
9-1-1 Service Provider / System Integrity	Maintain public safety class, understood to be 99.999 percent uptime track record in support of its customers' emergency calling needs and diversity of service infrastructure.
Data Accuracy	(i) The number of unresolved data errors shall not exceed 0.2 % of the total number of records in the subscriber records database over any given 30 day period; (ii) at least 99% of all requests for 9-1-1 caller information received from a PSAP over any given 30 day period shall result in delivery of the respective caller's telephone number and accurate location information in a time appropriate manner; (iii) to ensure a PSAPs readiness to implement NextGen9-1-1 service, the NextGen9-1-1 service provider shall not place a NextGen9-1-1 system into service unless the location validation success rate meets or exceeds 95% of the total number of subscriber records to be processed to the affected subscriber records system.
Call Routing	All wireline, wireless and IP-enabled originating service providers shall ensure that all 9-1-1 facilities and interconnections between it and the 9-1-1 service provider are engineered, installed, maintained and monitored to provide a minimum of two circuits and a grade of service that has one percent (P.01) or less blocking during the busiest hour of the busiest day.

With respect to call routing, it is important to note that NBP 16.15 (recommending that the FCC expand its on-going auto-location docket for the possible extension of ALI requirements to interconnected VoIP services) is, at this writing, planned for third quarter 2010. Whatever requirements flow from this proceeding will determine the extent to which auto-location is used to accurately route an RFA end-to-end.

B. PSAP Operations

Similarly with overall guidance regarding a state regulatory framework, Table 5 below contains recommended Congressional guidance pertaining to PSAP operations and/or 9-1-1 Authority.

Table 5. *Guidance for PSAP Operations and/or 9-1-1 Authority*

Function	Description
State-wide Planning, Coordination, and Leadership	Required to provide for improved interoperability, efficiency, and response time; may be a designated state office or a regional planning consortium.
Response to RFA / Training	The whole point of end-to-end NextGen9-1-1 is to provide increased access to emergency services (voice *and* non-voice) at the originating end of the RFA coupled with increased speed and accuracy by the PSAP and through to the First Responder. At a minimum, APCO's National Telecommunicator Training Standard should be completed by each PSAP telecommunicator.
Designation of 9-1-1 Service Provider	Public Safety agencies have a choice of 9-1-1 service provider.
Reporting	As required by a state oversight authority related to PSAP finances and operations
General Management	Day-to-day oversight of PSAP call centers.

V. Funding

Preliminarily, a coordinated and sufficient funding program would provide support for recurring (termed Operational Expenditures) as well as non-recurring capital (termed Capital Expenditures) and/or one-time funding needs. Flowing directly from this notion are broad principles for federal and state funding mechanisms.

A. Broad Principles for Federal Support Mechanisms

Grants, historically, the preferred source of federal funding, are expected to continue under several scenarios. That is, NBP 16.13 calls for NHTSA's Report to include a cost study to guide Congress in the development of long term funding for NextGen9-1-1, and NBP 16.14 calls for amending and reauthorizing the *Enhance 911 Act*, and with it, a clear definition of the responsibilities of the Implementation Coordination Office (ICO).[38] Whether recurring support mechanisms that resemble universal service support programs are adopted remains unknown, but in any event, the following should be considered:

First, in the spirit of the NBP, *any* funding mechanism should reflect the overall goal of promoting private investment and innovation. Toward this end, federal funding programs – grants, loans or universal service-like programs – should not distort market-based solutions with public subsidies that are either confined to public agencies (specifically designed for public agencies to substitute themselves for private industry) or are otherwise not competitively neutral as between those public agencies and the private entity competitors or as between private entities. Funding mechanism should not determine winners and losers in the marketplace and should strive for parity among providers using different technologies. Private companies have invested heavily, have deployed the networks, and have designed the services/applications that are driving what transition to NextGen9-1-1 actually exists today.

Second, funding should be administered by a neutral third party to ensure that the government agency that receives funding is *not* the same entity that has the oversight/audit responsibility for service delivery, thus avoiding any appearance of impropriety while also ensuring competitive neutrality. This principle should be strictly applied where government agencies seek to become a provider of NextGen9-1-1 service. Similarly, where a consultant(s) has been employed by government to help with NextGen9-1-1 procurement, transition and/or NextGen9-1-1 implementation, such consultant(s) should not be engaged - and paid using such funding - in connection with ongoing services beyond the "go live" phase of the NextGen9-1-1 project. Such a proscription will prevent manifestation of the obvious conflict of interest (i.e., presumably objective recommendations, paid for with public money, should not favor the consultant(s) beyond the role of consultant).

[38] The current draft for the reauthorization legislation, entitled the *Next Generation Preservation Act of 2010*, preceded release of the NBP and is under revision to ensure consistency with the NBP.

Third, to overcome economic and broadband-availability barriers to the network diversity requirements described in Section III (A) (3) above; efficiency and cost concerns in the geographic location of new PSAPs; and a general trend towards equitability in the distribution of funds, the statewide planning construct should recognize the need for a central repository that tracks all sources of funding within any given state.

And finally, NBP 16.13 recognizes that different delivery platforms will exhibit different cost characteristics. As the key federal funding document, the NHTSA Report must acknowledge that TNs (telephone numbers) that have historically served as a main cost indicator for legacy funding is being eroded and thus less reliable. With the eventual substitution of a public broadband telephone network for the PSTN, there is a need to identify new cost basis for NextGen9-1-1 funding where multiple technologies, infrastructure and routing methodologies are working simultaneously.

B. State Funding Authority

Recognizing that federal funding, in the form of grants supporting development and transition activities, would be insufficient to cover all NextGen-911 expense over time, the new federal legal/regulatory framework should preserve state surcharge mechanisms as the primary source of recurring funding for NextGen9-1-1. *And in the meantime, Congress should do nothing to disturb existing 9-1-1 funding* even where it may be intended to be supplemented by existing and new federal grant program funding contemplated under NBP16.13. The purpose of the state funds should be to:

(a) Enable the deployment of NextGen9-1-1 technologies;

(b) Accommodate an expanded definition of NextGen9-1-1 Service Provider while preserving high standards for service achieved over decades;

(c) Create parity between and among technologies while recognizing their differences, and

(d) Provide adequate incentives to maintain capital replacement programs.

To achieve these purposes, state funding mechanisms, similar to universal service principles, should be "specific, predictable and sufficient." [39] At the same time, and to ensure continued investment and innovation, coupled with the least amount of distortion to the pricing for all other communications products and services, economic principles should guide the design of publicly-funded programs. Specifically, any subsidy should be: (a) explicit, (b) broadly funded, (c) narrowly targeted and (d) administered by a neutral third party. Similar to other publicly funded programs, originating networks should be responsible for the collection and remittance of the end user surcharge in accordance with rules adopted by the state utility commissions.

[39] 47 U.S.C. § 254 (b) (5).

VI. Conclusion

America's current 9-1-1 system, deployed in the 1970s, remains in place for the majority of the country. This legacy system was designed to serve wireline voice calls and relies on analog signaling and circuit switched technology that are no longer in use in the majority of modern communications. Events of the past eighteen years show that continued reliance on this legacy 9-1-1 system is no longer a viable option. From the 1990s, when wireless phones began to capture America's imagination, to the terrorist attacks on September 11, 2001, and the devastation of Hurricane Katrina in the summer of 2005, both of which exposed vulnerabilities of U.S. first responder communications, to late 2008 when mobile users began relying more heavily on text messaging than on voice calling, communications devices and mission-critical networks have not kept pace with technological advancements. Yet, Americans have come to expect the high degree of redundancy, reliability and security enjoyed today with the legacy 9-1-1 system, and that expectation is expanding with the advent of NextGen9-1-1. The promise of NextGen9-1-1 is that all Americans are able to request emergency help regardless of caller location, or network device used to make that request, or the network deployed to deliver it. As the NBP demonstrates, the days when policymakers could ignore these realities are over.

Building on NBP Recommendations 16.13, 16.14 and 16.15, this paper demonstrates that NextGen9-1-1 is a journey, not a destination; and because the response to emergencies, whether individual or catastrophic, is inherently local, the local effort must be supported by higher levels of government. Thus, it is a journey that requires a cooperative approach to governance across federal, state and local jurisdictions. Moreover, because the technological direction of change is clear, the challenge—for Congress, state legislatures, the FCC, state regulators and 9-1-1 Boards—is to reform the exiting legal/regulatory framework by removing all impediments to the transition to NextGen9-1-1. The cooperative governance model contemplated by the NBP, supported by Intrado in this paper, is intended to provide Congress with elements of a workable framework to realize NextGen9-1-1 benefits and advanced capabilities - - while encouraging states to proceed expeditiously to meet the public safety needs and expectations of their citizens.