Notice of Inquiry
National Telecommunications and Information Administration
Docket No: 120928505-2505-01, **RIN:** 0660-XC002
Development of the Nationwide Interoperable Public Safety Broadband Network

Response of RCC Consultants, Inc.

Introduction

On September 28, 2012, the National Telecommunications and Information Administration, U.S. Department of Commerce ("NTIA"), issued a Notice of Inquiry (the "NoI"), on behalf of the First Responder Network Authority ("FirstNet") in order to (a) to seek comments on the conceptual network architecture presentation made at the FirstNet Board of Directors' meeting of September 25, 2012, (b) to invite input on other network design and business plan considerations, and (c) to seek comments on the general concept of how to develop applications for public safety users as discussed at the FirstNet Board meeting. The NoI indicates that "FirstNet intends to use the input received from this process to shape its efforts to establish the interoperable public safety broadband network based on a single, nationwide network architecture (the "PSBN") called for under the Middle Class Tax Relief and Job Creation Act of 2012 (the "Act"). RCC Consultants, Inc., by the RCC Public Safety Broadband Group ("RCC"), hereby respectfully responds to certain aspects of the NoI by submitting this ***Response of RCC Consultants, Inc.*** (the "RCC Response"), by which RCC hopes to make a positive contribution to the important deliberations of FirstNet.

The Central Focus of the RCC Response

Central to the NoI is the presentation delivered by a FirstNet Board member, F. Craig Farrill, of a possible framework for designing the public safety network architecture in a manner that leverages existing resources and infrastructure, as is contemplated in the Act (the "Presentation").[1] The concept

[1] The NoI also notes that FirstNet Board Chairman, Sam Ginn, "discussed a general concept for developing applications designed specifically for public safety users. Under this general concept, FirstNet would seek to understand what applications federal, state, local, and tribal public safety users would like to see developed. FirstNet would define interface and certification requirements for FirstNet applications, and would call on innovators to develop applications for public safety to use to do its job better and more safely. The public safety

developed in the Presentation for designing and developing the public safety network architecture (the "FirstNet Network Concept" or FNNC") is the central focus of the RCC Response.[2]

The design and development of a nationwide public safety wireless broadband network is a complex, monumental undertaking. It was critical that a first effort to set forth an approach to the sign and development of the PSBN be made in order to initiate consideration of the pending challenges, and Mr. Farrill has served the PSBN well by making that first effort. While RCC believes that the FNNC, as described in the Presentation, needs further consideration and development in order to determine whether the FNNC can provide a sound basis for the implementation of the PSBN, RCC believes that the Presentation and the FNNC are very useful because they represent the first effort to illuminate a possible path to the design and successful development of the PSBN. RCC appreciates Mr. Farrill's courage in placing his concept before the public for review and for Mr. Farrill's good intentions in seeking an approach to the implementation of the PSBN that meets the objectives of the Act. RCC's observations, suggestions, and, in some cases, concerns are intended, to assist FirstNet by indicating issues that may require further consideration in relation to the FNNC as requested by the NoI. RCC hopes that its observations, suggestions, and concerns will, in fact, assist FirstNet in the evolution of its approach to the development of the PSBN.

The Basis for Examining the Presentation and the FNNC

In addition to requesting comments on the FNNC, the NoI invites the presentation of "other options that the FirstNet Board should consider in meeting the Act's requirements to deploy the PSBN based on a single, nationwide network architecture that evolves with technological advancements." The NoI sets forth two sets of criteria/requirements that are to be applied to and met by any such other options or proposals: (i) a set of substantive criteria and (ii) a set of disclosure requirements.[3]

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community could download these applications, thus enabling public safety users nationwide to benefit from individual innovations."

[2] The RCC Response does not address the matter of applications referred to in the previous footnote.

[3] With regard to substantive criteria, the NoI declares that it is necessary that each such other option:

- Meets public safety's requirements for priority, quality of service, and preemption features;

The central focus of the RCC Response is to test the question whether the Presentation and the FNNC meet the substantive criteria made applicable by the NoI to and the disclosure requirements for proposals of alternatives to the FNNC. RCC believes that those criteria and requirements provide a useful basis for the evaluation of the FNNC.

After careful review, RCC has concluded that the FNNC does not entirely meet the substantive criteria or the disclosure requirements made applicable by the NoI to proposals of alternatives to the FNNC. Accordingly, to provide the feedback requested by the NTIA needed to facilitate the evolution of the FNNC, RCC's conclusions and recommendations for further consideration of and improvements to the FNNC and closely related matters have been outlined in the balance of this Response of RCC. RCC's comments are not intended to communicate that the Presentation and the FNNC are not useful or without merit, and, in fact, the view of RCC is quite to the contrary. RCC believes that the central merit of the Presentation is its candid recognition that the funds available under the Act for the development of the PSBN may not be adequate to support the development of a stand-alone PSBN. That candid recognition of resource constraints is a key condition to any serious consideration of the development of the PSBN and is more fully addressed below. RCC further believes that an additional merit of the Farrill Presentation is its focus upon the speed of network deployment. That focus is a condition to any serious consideration of the timely and useful deployment of the PSBN, but, in the view of RCC, the speed of network deployment must be secondary to meeting the operational needs of public safety as understood

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- Uses, to the extent possible, existing radio access network and core network infrastructure installed by commercial mobile operators in order to maximize the coverage and performance delivered to public safety while minimizing the capital expenditures;
- Reaches operational capability as quickly as possible; and
- Enables voice services (cellular telephony and push-to-talk ("PTT")) both within the FirstNet network as well as to/from other commercial networks, including the public switched telephone network (the "PSTN").

With respect to disclosure requirements, the NOI declares that each proposal of any such other option should:

- Describe all of the assumptions necessary for the proposal to succeed;
- Identify the specific opportunities or benefits the proposal provides in meeting the Act's objectives and the criteria enumerated above;
- Discuss any existing challenges or obstacles that must be overcome to realize the proposal; and
- Specify any areas in need of further research and development to ensure the success of the proposal.

and expressed by public safety pursuant to the consultation process mandated by the Act.

Any first effort to explain a possible approach to a nationwide undertaking of the magnitude and complexity of developing the PSBN must be expected to raise questions and require further consideration and possible modification. Following review of the provided information, RCC believes that the analysis of the Presentation and the FNNC utilizing the criteria/requirements of the NoI reveals a need for further development and evolution of the FNNC in certain respects and for the further review and consideration of certain of the assumptions implicitly and explicitly made in the Farrill Presentation. The limitations of and questions raised by an initial effort to address a complex issue, as the Presentation seeks to do, are not unusual or fatal. The discussion of the development of the PSBN is at an early stage. RCC applauds Mr. Farrill's effort to provide a starting place for that discussion and NTIA's placing the Presentation and the FNNC before the public for review for consideration and comment.

RCC believes that the Presentation and the FNNC provide a useful point of departure for discussion of the proper framework for designing the PSBN, but RCC also believes that certain changes to the FNNC and to the direction of NTIA's grant program must be made if the criteria/requirements of the NoI are to be met by the FNNC and, more basically, if the PSBN implemented pursuant to the FNNC is to meet the needs and expectations of the public safety community.

Additional Concerns of RCC

RCC believes that certain principles should guide the development of the PSBN and that consideration of those principles and their application to the FNNC is a useful means of analysis for the purpose of assessing the utility of the FNNC. In RCC's view, the principles that are entitled to the greatness dignity when considering a plan for the development of the PSBN are the following:

The First Principle Applicable to the Development of the PSBN: **The PSBN, though national in scope, will be used principally by state and local public safety agencies within the state and local geographic areas. Those agencies know those areas well and operate around the clock, every day, throughout the year using mission-critical communications systems that they designed, built, operate, and maintain and that meet their needs. In consequence, *the principal inputs for the***

detailed design of the PSBN within the state and local geographic areas must come, as the Act itself expressly provides, from state and local public safety agencies.

The Second Principle Applicable to the Development of the PSBN: **The surest way to a failed public safety communications project is to spend billions of dollars developing a new system that does not meet the operational needs of the public safety agencies it supports. That type of failure would be catastrophic in too many ways to count. History is replete with failed systems that did not properly address user requirements. Because the principal inputs for the detailed design of the PSBN within the state and local geographic areas must come from state and local public safety agencies, *the assessment by those agencies of their needs in relation to the PSBN and the expression of those needs (and related design implications) to FirstNet must be undertaken urgently and cannot be deferred without postponing the implementation of the PSBN or improperly and unwisely proceeding with the implementation of the PSBN without that critical assessment and expression of state and local public safety needs and related design requirements*.**

The Third Principle Applicable to the Development of the PSBN: ***Ideas designed to accelerate PSBN availability, to use available funds efficiently and effectively, to leverage commercial wireless infrastructures, or to achieve related goals and objectives must be subordinated to the mandate of Congress under the Act to ensure reliable, high priority communications that will be used by and are useful for first responders. That mandate cannot be met unless and until state and local public safety agencies express their state and local needs and related design requirements for the PSBN. Prior to the release of system RFPs, those agencies must learn from FirstNet the information necessary for those agencies to assess the extent to which the PSBN well serve their needs from a technical and financial standpoint, including the design of the PSBN within the state and local geographic areas of concern and the cost and affordability of the use of the PSBN.***

The Fourth Principle Applicable to the Development of the PSBN: **In today's financial environment, and with a system of this nature, leveraging appropriate available system assets is crucial. That said, *when and only when the PSBN has been designed from input from state and local***

public safety agencies, attention should turn to leveraging the assets and capabilities of state/local government and the private sector to implement that PSBN design based upon state and local inputs.

***The Fifth Principle Applicable to the Development of the PSBN: The implementation of the PSBN should be pursued pursuant to a program that assures competition and choice*, and, therefore, that program must take into account (i) encompassing all potential contributors from the private sector, including, but not limited to commercial wireless carriers and public utilities, (ii) addressing the needs of both public and private sector partners, and (iii) considering undertaking the request for proposal process contemplated by the Act on a state-by-state basis to ensure that potential private sector members of a public/private partnership are not excluded because their activities are not national in scope.**

***The Sixth Principle Applicable to the Development of the PSBN: The implementation of the PSBN should be pursued pursuant to a program that prioritizes that implementation to make the best use of the funds available under the Act and to reflect the timing of funds' availability* by (i) first implementing the PSBN in those state and local geographies where public safety needs are greatest, (ii) using the success of the first implementation to validate the value of the PSBN and providing the basis for further funding if required, and (iii) developing and following a business model that maximizes financial efficiency consistent with satisfying state and local needs and provides the basis for confidence that available funds have produced very good value for money.**

The Seventh Principle Applicable to the Development of the PSBN: The approach to the implementation of the PSBN must in no event or in any manner increase the vulnerability of the PSBN to a cyber-attack.

Summary of the Conclusions of RCC Respecting the Presentation and the FNNC

RCC respectfully submits that:

At this early stage of development, the Presentation and the FNNC do not yet entirely reflect the seven above-stated principles applicable to the development of the PSBN, for example;

- The Presentation does not establish that the PSBN implemented pursuant to the FNNC would

serve the needs of public safety assessed by public safety itself rather than as public safety needs are assumed in the Presentation or assumed in the Presentation to be understood by FirstNet;

- The Presentation appears to view public safety needs on a national scale and offers the FNNC as a national concept for the PSBN whereas the Act requires the assessment and expression of public safety needs to FirstNet, not on a national basis, but rather on a state, county, local, and tribal basis, and, in accordance with the Act, those needs are to be related, not to national design considerations, but rather to detailed elements of PSBN design down to, for example, the site location level;

- The Presentation does not take exception to the multi-year deferral of any public safety needs assessment work explicit in NTIA's approach to grant funding under the Act. The approach of NTIA appears to be either inconsistent with the Act's requirement for detailed consultation between public safety and FirstNet regarding the development of the PSBN (if the PSBN is implemented pursuant to the FNNC before the required consultation) or inconsistent with the claims of accelerated availability made in the Presentation for the FNNC (if the implementation of the PSBN pursuant to the FNNC is to be deferred until years from now the consultation required under the Act finally occurs under the plan of NTIA);

- The Presentation does not currently address the wide range of challenges and obstacles to the realization of the FNNC, including, but not limited to, the fact that the FNNC never mentioned infrastructure security that will be needed to reduce the vulnerability of the PSBN to a cyber-attack and is inconsistent with the expectations of public safety grounded in the Act;

- The Presentation raises questions regarding whether the FNNC would provide that interoperability which is the fundamental objective of the Act;

- The Presentation does not acknowledge that the FNNC's embracing of commercial wireless carriers imports very tricky cost allocation issues and the possibility of the subsidization of commercial wireless carriers with funds intended for the building of the PSBN; and

- Serious questions regarding the compliance of the FNNC with certain provisions of the Act are

apparent from the Presentation and, as part of the project evolution, should require further consideration.

The purpose of the foregoing conclusions is to assist FirstNet to focus promptly upon the need for program improvements that will help shape the on-going development and evolution of the FNNC. RCC hopes that the Response of RCC will provide FirstNet with useful grounds for its giving further consideration to the FNNC and possible grounds for FirstNet's making such modifications to the FNNC as FirstNet deems to be useful and proper.

Analysis Supporting the Conclusions of RCC

A. First, Respecting the Substantive Criteria Established in the NoI

1. There is no basis now for the conclusion that the FNNC meets public safety's requirements for priority, quality of service, and preemption features.

The Presentation and the FNNC rely very heavily upon public safety use of commercial carrier networks. The Presentation assumes such public safety usage despite the fact that public safety agencies have placed relatively little reliance upon public commercial wireless networks for mission-critical communications, particularly voice communications. In fact, the public safety community has recently invested significantly in technologies, including P25, with system lifecycles expected to extend for a decade or more from now. Commercial wireless networks have been available for 25 years. Recent decisions to adopt P25 technology as a public safety standard for voice communications are not evidence of public safety confidence in commercial wireless networks. The Presentation does not address the basis for its confidence in the wide acceptability of the use of commercial wireless networks to public safety users and makes no specific mention of how the FNNC will account for interoperability P25 or other non-commercial standards in wide and or widening use by public safety.

The Presentation does not address the extent to which the PSBN is technically and financially useable by public safety given the material commitments that have been made and continue to be made to myriad public safety specific, mission critical and highly effective technologies and further given the financial constraints operating upon many state and local public safety agencies. Moreover, the FNNC does not appear to recognize the challenges associated with any integration of the PSBN with these

existing public safety technologies and capabilities or migration or transition of these technologies to the PSBN and does not appear to consider whether any such integration, migration, or transition is technically and financially feasible.

The Act wisely seeks to draw public safety completely into the design of the PSBN and, by so doing, ensures that FirstNet's following the assessed and expressed needs of public safety and public safety's view of PSBN design will carry with it the confidence of public safety in the PSBN. The confidence of public safety in commercial wireless networks, particularly for voice communications, will be far more difficult to establish and should not be assumed.

The Act makes indelibly clear that the PSBN is not to be designed or developed or invested in before FirstNet's consultation "with regional, State, tribal, and local jurisdictions regarding the distribution and expenditure of any amounts required to carry out the policies established under paragraph (1), including with regard to the — (i) construction of a core network and any radio access network build out; (ii) placement of towers; (iii) coverage areas of the network, whether at the regional, State, tribal, or local level; (iv) adequacy of hardening, security, reliability, and resiliency requirements; (v) assignment of priority to local users; (vi) assignment of priority and selection of entities seeking access to or use of the nationwide public safety interoperable broadband network established under subsection (b); and (vii) training needs of local users."[4] The Act wisely recognizes that public safety activity is substantially local, that local needs cannot be assumed to be uniform across the nation and that actually assessed and expressed local needs are more valuable to the design of the PSBN than are generalizations about public safety needs offered from a national perspective. The Act provides a process well designed to create commitment to the PSBN by public safety. No such process is applicable, from a public safety standpoint, to the design of commercial carrier networks, and history has shown that it would be unwise to assume any easily available commitment of public safety to be forthcoming.

The Presentation and the FNNC do not start with the required state and local consultation process and appear to contemplate the making of decisions respecting the very items that are to be the subject of

[4] Section 6206(c)(2)(A) of the Act.

the required consultation before that consultation takes place. Moreover, under NTIA's approach to grant funding, the required user consultation /needs assessment will not take place for years,[5] and, during that period, the accelerated availability of the PSBN claimed to be a virtue of the FNNC will require decisions to be made that may preempt and materially limit the utility and effectiveness of the user consultation required by the Act.

2. The FNNC clearly contemplates using existing radio access networks and core network infrastructures installed by commercial mobile operators in order to minimize capital expenditures, but it is much less clear whether the use of existing radio access networks and core network infrastructures installed by commercial mobile operators as contemplated by the FNNC to supplement and maximize the coverage and performance needs of public safety agencies will result in the PSBN's being the principal LTE system relied upon by public safety.

The Presentation and the FNNC appear to assume without examination that public safety users are willing and able to pay subscriber or roaming fees to up to six commercial wireless carriers for the use of their networks, to one or more satellite service providers for the use of their systems, and to FirstNet for the use of the PSBN. Public safety agencies are generally subject to all of the budgetary constraints affecting state and local governments, and the assumption of willingness and ability to pay may be or is likely quite optimistic and will probably remain so for quite some time. The inability of public safety to bear the costs of utilizing all networks comprehended by the FNNC will result in choices respecting network access that may undermine the concept of the FNNC of a network-of-networks because all networks will not be used and that may not favor the PSBN.

[5] In this regard, see: August 21, 2012, notice entitled "Development of Programmatic Requirements for the State and Local Implementation Grant Program to Assist in Planning for the Nationwide Public Safety Broadband Network" (the "Notice"). The Notice establishes that: (i) NTIA has no sense of urgency in relation to getting on with the required consultation, (ii) NTIA is more concerned with non-substantive procedural matters than with matters of substance like public safety requirements for or the design of the PSBN within the borders of a state; (iii) outreach, education, governance, attending meetings, updating plans, and training are, in the contemplation of NTIA, more important that whether the radio access network within the borders of a state provides adequate coverage, capacity, and reliability for public safety; and (iv) rural coverage will get more attention than basic required public safety coverage for prime target areas and urban areas of high crime.

3. The FNNC does seek to reach operational capability as quickly as possible, but whether the operational capabilities thereby reached insure the survival of the PSBN and meet the requirements of public safety is not clear.

Section 6302(e) of the Act provides each of the states and territories with the right to choose to "conduct its own deployment of a radio access network" within the borders of the state or territory. The Presentation does not address that right and does not explain whether and, if so, how that right will be affected by the FNNC. One of the stated virtues of the FNNC is that it promotes accelerated availability by "implementation in 2013 to 2014 timeframe." However, under NTIA's plans for grants in support of the PSBN, neither the consultations between public safety and FirstNet with respect to public safety needs nor the decisions of states and territories with respect to whether to build their own RANs will be made until quite some time after the proposed implementation of the FNNC. Therefore, based on the information provided, it seems clear that, under the FNNC, either (i) funds will flow from FirstNet to wireless carriers for development of FirstNet RANs, and FirstNet RANs will be developed in states or territories, all before those states and territories have defined their requirements and determined whether to exercise the right to opt out of the FirstNet-provided RAN, or (ii) the claim of "implementation in 2013 to 2014 timeframe" refers only to carriers' implementation of their commercial LTE networks. If that is the case, the FNNC is illusory in its claim of accelerated availability <u>of the PSBN</u> because that claim of accelerated availability refers not to the PSBN, but, rather, to commercial carriers' networks. FirstNet has no responsibility for the deployment of those networks, and the assistance of FirstNet is not required for the use of those networks by public safety agencies, which can subscribe to those networks as users in their own right should they choose to.

If investment is made by FirstNet in PSBN infrastructure before states and territories have determined whether to exercise the right to opt out of the FirstNet-provided RAN, then the right of each of the states and territories to choose to "conduct its own deployment of a radio access network" is effectively undermined in violation of the Act for the practical reasons more fully discussed below in section C.1.

If no investment is made by FirstNet in PSBN infrastructure before states and territories have determined whether to exercise the right to opt out of the FirstNet-provided RAN, then the FNNC's claim that it assures accelerated availability of the PSBN is illusory, and, by claiming the virtues and wisdom of public safety reliance upon commercial carrier networks, the FNNC is encouraging public safety agencies to use those networks for years before there is any significant PSBN for public safety to use.

If the public carrier networks are satisfactory to public safety as the FNNC implies, then why will public safety users migrate their usage to the PSBN when the PSBN is available? If they do not migrate their usage, and the wireless carriers will use their best efforts, including pricing, to discourage such migration, the PSBN could be in serious financial trouble from the standpoint of the self-funding mechanism applicable to FirstNet under the Act,[6] particularly because of the inevitably smaller subscriber base of the PSBN compared to that of the public carrier networks and its consequences in terms of the setting of subscriber fees. If the public carrier networks are not satisfactory to public safety contrary to the implications of the FNNC, then the entire basis for the FNNC is undermined before FirstNet has an opportunity to implement the PSBN.

In the case of no investment's being made by FirstNet in PSBN infrastructure before states and territories have determined whether to exercise the right to opt out of the FirstNet-provided RAN, the FNNC may contain the seeds of its own destruction.

In the case of either investment's being made or not being made by FirstNet in PSBN infrastructure before states and territories have determined their needs/requirements and whether to exercise the right to opt out of the FirstNet-provided RAN, the adoption of the PSBN could be limited, and the effect of such limited adoption may be the development of scattered islands of interoperability rather than a national interoperable network as mandated by the Act.

[6] See, in this respect, Section 6206(b) of the Act.

B. Second, respecting the disclosure requirements established in the NOI

1. The Presentation does not describe all of the assumptions necessary for the FNNC to succeed.

Assumptions Respecting Knowledge of Public Safety Needs and Public Safety Contributions

The Presentation proceeds upon the assumption that it is possible to consider and proceed with the FNNC without first having undertaken the consultation process with public safety required by the Act. The validity of that assumption is both hereinabove and hereinafter questioned. Moreover, that assumption has been shown to be impermissible under the Act, which requires the assessment and expression of public safety needs before proceeding with any implementation of or investment in the PSBN.

Assumption Respecting Redundancy and Subscriber Equipment

The Presentation asserts that the FNNC achieves redundancy and will lower the cost of user devices. These claims are both related and questionable. The claims of redundancy depend upon user devices' incorporating access to all networks that provide the basis for redundancy and to the PSBN. However, not every commercial frequency band and technology can be easily or cost effectively included in every device, and the number of bands supported will significantly impact the size, cost, and battery life of the device. The integration of access through subscriber devices to existing public safety communications systems as well will add further technical, performance, and cost issues. Therefore, the redundancy claims of the Presentation depend upon assumed, but unproven and possibly unrealistic, expectations for user devices. Moreover, while "commercial grade" user devices may meet the requirements of some public safety users under certain circumstances, history has shown that they are unlikely to meet the requirements of other such users. User devices for public safety will not reflect or only partially reflect the cost benefits of the extremely high production levels of commercial user devices, and it cannot reasonably be expected that user devices suitable for public safety will have costs as low or nearly as low as those for widely available commercial devices.

Moreover, and perhaps even more fundamentally, there is a serious question whether the

redundancy of the FNNC, which is essentially "borrowed" redundancy, should provide much comfort. The poor performance of certain commercial carrier networks during catastrophic events such as the terrorist attacks of 9/11, hurricane Katrina, and the bombing of the Murrah Federal Building in Oklahoma City suggest that borrowed redundancy may be no meaningful redundancy at all.

2. The Presentation does identify specific opportunities or benefits claimed to flow from the implementation of the FNNC, but securing those opportunities and benefits is not shown in the Presentation to be assured, and the FNNC does not, in all instances, serve to meet the Act's objectives and the NoI's substantive criteria.

For the financial, technical, and other reasons hereinabove and hereinafter provided, it is not apparent that as a practical matter the FNNC serves to meet the Act's objectives and the NoI's substantive criteria.

3. The Presentation does not identify or discuss any existing challenges or obstacles that must be overcome to realize the FNNC.

The FNNC and the Risk of a Cyber-Attack

The vulnerability of US infrastructure, including, but not limited to, the electricity transmission grid and distribution systems, transportation facilities, financial networks, government networks, and telecommunications systems to cyber-attacks is an issue of the greatest national concern and has been highlighted recently by a speech by the secretary of Defence, Leon E. Panetta, who warned that the United States was facing the possibility of a "cyber-Pearl Harbor."[7] Under no circumstances can the vulnerability of the country to such an attack be increased by the approach to the design of the critical PSBN. The present state of thinking in relation to the FNNC does not consider protecting the PSBN from cyber-attack and other security breaches. The FNNC relies upon connections between and among (i) critical public safety facilities, (ii) public safety users, (iii) the PSBN, and (iv) as many as six commercial wireless carriers and satellite service providers. Those connections could provide cyber-attack pathways that may enable the penetration of any interconnected network or facility to expand to a penetration of

[7] See report of Secretary Panetta's speech in the *New York Times*, October 12, 2012. See also the report respecting a particular cyber-attack in the *Wall Street Journa*l, October 13, 2012.

some or all of those interconnected networks and facilities, including the PSBN and critical public safety facilities.

Neither the Presentation nor the FNNC addresses the increased vulnerability of the PSBN and critical connected public safety facilities that could result from a design, like the FNNC, involving multiple interconnected networks. The practical advantages of avoiding the deployment of a stand-alone PSBN may be overbalanced if the multiple integrated networks model of the FNNC imports an increased risk of the vulnerability of the PSBN to cyber-attack. More work needs to be done if the multiple integrated networks model of the FNNC is to overcome the challenge of avoiding increased vulnerability of the PSBN to cyber-attack.

Conflict with Well-Founded Expectations

Another fundamental obstacle to the realization of the FNNC is that the FNNC may conflict materially with certain expectations in relation to the PSBN that were created in the public safety community by the Act. The following expectations were, RCC believes, widely held in the public safety community:

First Expectation: Under the Act, there would be developed a separate and distinct PSBN designed and intended principally, if not exclusively, for public safety use;

Second Expectation: The PSBN would be a network by itself and not a network of networks and certainly not a network of networks that included public carrier networks; and

Third Expectation: The PSBN would be designed with input, the principal sources of which were actual working public safety agencies at the state, territory, county, municipal, and tribal levels.

Those expectations have a substantial basis in the Act.[8]

[8] The statutory bases for those expectations are considered below.

Section 6001 (21) of the Act provides the following definition: "NATIONWIDE PUBLIC SAFETY BROADBAND NETWORK.—The term "nationwide public safety broadband network" means the nationwide, interoperable public safety broadband network described in section 6202." Section 6202 requires the First Responder Network Authority to "ensure the establishment of a nationwide, interoperable public safety broadband network." Section 6202 defines the network components of the nationwide, interoperable public safety broadband network as initially consisting of: (1) a core network that— (A) consists of national and regional data centers, and other elements and functions that may be distributed geographically, all of which shall be based on commercial

The Presentation takes the position that a stand-alone PSBN, as anticipated by the Second Expectation is unworkable because of, among other reasons, the funding constraints of the Act. That

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standards; and (B) provides the connectivity between— (i) the radio access network; and (ii) the public Internet or the public switched network, or both; and (2) a radio access network that— (A) consists of all cell site equipment, antennas, and backhaul equipment, based on commercial standards, that are required to enable wireless communications with devices using the public safety broadband spectrum; and (B) shall be developed, constructed, managed, maintained, and operated taking into account the plans developed in the State, local, and tribal planning and implementation grant program under section 6302(a). Section 6202 may clearly be read as providing for a single, stand-alone network with its own core and its own RANs. Put differently, the Act provides that the PSBN shall have its OWN core and its OWN RANs. This conclusion is consistent with Section 6206 of the Act, which, as hereinafter discussed, cannot properly be read as a statutory prohibition of a standalone PSBN or a statutory authorization of a network-of-networks approach to the PSBN. Moreover, the PSBN must, under Section 6202 of the Act, be "developed, constructed, managed, maintained, and operated taking into account the plans developed in the State, local, and tribal planning and implementation grant program under section 6302(a)." Following entirely or substantially the plans developed by public carriers for the development of public LTE networks does not meet the statutory requirements.

Section 6001 (8), (9), and (27) distinguishes among "COMMERCIAL MOBILE DATA SERVICE" [any mobile service (as defined in section 3 of the Communications Act of 1934 (47 U.S.C. 153)) that is— (A) a data service; (B) provided for profit; and (C) available to the public or such classes of eligible users as to be effectively available to a substantial portion of the public, as specified by regulation by the Commission], "COMMERCIAL MOBILE SERVICE" " has the meaning given such term in section 332 of the Communications Act of 1934 (47 U.S.C. 332)], and "(27) PUBLIC SAFETY SERVICES" ["(A) has the meaning given the term in section 337(f) of the Communications Act of 1934 (47 U.S.C. 337(f)); and (B) includes services provided by emergency response providers, as that term is defined in section 2 of the Homeland Security Act of 2002 (6 U.S.C. 101). There is nothing in the Act to suggest that the PSBN is built upon or even includes Commercial Mobile Data Service or Commercial Mobile Service. FirstNet has no authority to provide or even offer Commercial Mobile Data Service or Commercial Mobile Service. The obligation of FirstNet to build the PSBN cannot be satisfied by arranging for Commercial Mobile Data Service or Commercial Mobile Service to be offered as Public Safety Services.

Section 6201 of the Act provides that there shall be a single public safety wireless network licensee for the "700 MHz D block spectrum and existing public safety broadband spectrum" and that the single licensee shall be FirstNet. Section 6202 of the Act also requires the FirstNet to "ensure the establishment of a nationwide, interoperable public safety broadband network." [Note "a" network]

Subtitle C of Title VI of the Act sets forth the decisions to be made by state governors in relation to the PSBN and the process leading to that decision and provides that, once the request for proposal process conducted by the First Responder Network Authority for the construction, operation, maintenance, and improvement of the nationwide public safety broadband network is completed, the First Responder Network Authority shall provide to the Governor of each State, or his designee (A) notice of the completion of the request for proposal process; (B) details of the proposed plan for build-out of the nationwide, interoperable broadband network in such State; and (C) the funding level for the State as determined by the NTIA. The only build-out for which FirstNet has any authority is the build-out of the PSBN, and, therefore, FirstNet must disclose the details of the network that FirstNet proposes to build within the state. There is no language in the Act to enable FirstNet to rely upon a public carrier's building an LTE network on public carrier channels.

Section 6206 of the Act provides that FirstNet shall have responsibility to "take all actions necessary to ensure the building, deployment, and operation of the nationwide public safety broadband network, in consultation with Federal, State, tribal, and local public safety entities, the Director of NIST, the Commission, and the public safety advisory committee established in section 6205(a)." Section 6206 of the Act refers to a single network's comprising the PSBN (not a network of networks), defines the PSBN as the network arising from consultation with public safety entities (not a network designed by carriers or NTIA).

The consultation responsibility cannot be met by wholesale adoption of public carrier networks or their designs.

position requires further analysis because the Presentation does not take into account the maximization of the use of existing public safety and public utility infrastructure and other resources and the potential financial benefits of that use in relation to the development of the PSBN. While the use of commercial wireless carrier infrastructure by FirstNet will almost certainly have to be paid for with funds provided to FirstNet under the Act, it is far less clear that the use of existing public safety and public utility infrastructure and other resources would have to be paid for with those funds. Unlike commercial wireless carriers, safety and public utilities have a direct interest in the PSBN as potential users thereof.[9] Public safety and public utilities may be willing to contribute (as opposed to leasing for a fee) access to existing public safety and public utility infrastructure and to provide other resources if the PSBN is designed with the assessed and expressed needs of those users in the forefront of design considerations. Careful and sensitive negotiations between FirstNet and both public safety and public utilities could have a material beneficial financial impact upon the PSBN and have other closely related material benefits, including, but not limited to:

- Lower implementation costs;
- Lower annual operating costs;
- Decreased infrastructure construction;
- Shorter construction period;
- Greater commitment of users to the PSBN;
- Protection of the potential revenue base of the PSBN from erosion due to use of commercial carrier networks; and
- Strengthening the ability to meet the self-financing requirements of the Act without self-defeating high PSBN subscriber costs.

[9] For the interest of public utilities, see the following white paper: Utilities Telecom Council , *Sharing 700 MHz Public Safety Broadband Spectrum With Utilities: A Proposal* (October 2012)

For these reasons, the Second Expectation, *i.e.*, for a stand-alone PSBN, may not be unrealistic and may, in fact, be satisfied with an overall material favorable impact upon the PSBN in both the short and long terms from multiple standpoints, including potentially addressing resource constraints more effectively than do other approaches to the implementation of the PSBN.

Doubtful Statutory Authority

A further obstacle, not identified in the Presentation, which must be overcome to realize the FNNC, is the assumption underlying the Presentation that a stand-alone PSBN is "Inconsistent with the Legislation" and that the network-of-networks approach of the FNNC is authorized under the Act. The correctness of those assumptions is subject to reasonable questions.

Those assumptions appear to rest upon a particular provision of Section 6202 of the Act, but that provision does not appear to preclude a stand-alone PSBN and does not necessarily support a network-of-networks PSBN. Section 6206 does require FirstNet's "encouraging that such requests [for proposals for the building, operating, and maintaining of the PSBN] leverage, to the maximum extent economically desirable, existing commercial wireless infrastructure to speed deployment of the network." Leveraging existing commercial wireless infrastructure to speed deployment of the network is not the same as integrating and interconnecting the PSBN with commercial wireless networks. The use of common sites, where appropriate, and the sharing of other elements of "infrastructure" is clearly authorized and encouraged by Section 6202, but it is far from clear that that may be read as a statutory prohibition of a stand-alone PSBN or a statutory authorization of a network-of-networks approach to the PSBN.

It may be that a network-of-networks approach to the PSBN has material benefits and would be wise, but more work must be done both to establish that FirstNet has the power to proceed with a network-of-networks approach to the PSBN, to overcome the well-founded expectations of public safety users that the PSBN would be a stand-alone network, and to make legitimate under the Act a network-of-networks approach to the PSBN.

Unresolved Financial Issues

A further obstacle, which is not identified in the Presentation, but which must be overcome to

realize the FNNC, is the opportunity for funds allocated to the PSBN under the Act effectively to subsidize the building of commercial LTE networks. The Presentation recognizes the attractiveness of the FNNC to wireless operators, which will "have the opportunity to … increase their subscribers, usage, and commercial coverage." The Presentation does not, however, recognize that the indicated opportunity will in some degree be funded with moneys appropriated solely for the development of the PSBN. The Presentation does not suggest the financial principles upon which the cooperation between wireless operators and FirstNet is to proceed. The presentation does not, because the FNNC is so all-embracing, contemplate a competitive process that would discipline proposals from wireless operators competing for a limited opportunity for a public/private partnership with FirstNet. The presentation does not acknowledge the challenge of allocating costs between wireless operators and FirstNet for the development and use of common infrastructure or for the network interconnections that must be necessary if true interoperability is to be established. The presentation does not acknowledge that the increase in wireless operators' subscribers must come at the expense of FirstNet and its collection of usage fees from subscribers to the PSBN.

4. The Presentation does not specify any areas in need of further research and development to ensure the success of the FNNC.

The Presentation assumes that interoperability, the hallmark of the PSBN as defined in the Act, is achieved by the FNNC. That assumption requires careful examination. The Presentation offers the FNNC without any explanation of how interoperability is established, maintained, and made operationally effective. LTE is a relatively new technology and network interconnections issues necessary to the establishment of interoperability between and among multiple LTE networks have not been demonstrated.

There are unanswered questions regarding whether and, if so, how interoperability can be established between fixed public safety facilities (*e.g.*, dispatch centers/public safety answering points where FirstNet is obligated under Section 6206(b)(2)(C) of the Act, to promote the integration of those facilities with the PSBN not with public carrier networks) with fixed connections to the PSBN's core and

public safety users that are operating on multiple public carrier RANs. The questions extend to the possible need for gateways or other network interconnection means and to the thereby implicated questions of operational effectiveness and security.

The Presentation assumes that interoperability is achieved by the FNNC and does not flag that issue as a matter requiring further research and development. In RCC's view the matter of interoperability in the context of the FNNC is an issue as to which research and development is required.

C. Third, respecting compliance of the Presentation and the FNNC with the Act

1. The Presentation does not address or consider the right of states and territories under the Act to opt out of FirstNet-proposed RANs and build their own RANs.

As previously noted, Section 6302(e) of the Act provides each of the states and territories with the right to choose to "conduct its own deployment of a radio access network" within the borders of the state or territory, and the Presentation does not recognize that right and does not explain whether and, if so, how that right will be affected by the FNNC. If, under the FNNC, funds will flow from FirstNet to wireless carriers for development of FirstNet RANs, and FirstNet RANs will be developed in states or territories, all before those states and territories have determined whether to exercise the right to opt out of the FirstNet-provided RAN, very serious problems are implicated.

First, the development of FirstNet RANs before states and territories have determined whether to exercise the right to opt out of the FirstNet-provided RAN seems to violate the Act.[10] The flow of funds from FirstNet to wireless carriers for development of FirstNet RANs in states and territories that have not determined whether to exercise the right to opt out of the FirstNet-provided RANs also seems to violate the Act and would seem necessarily to decrease the funds available to a state or territory which would also seem to violate the Act. In those circumstances, the FNNC may unintentionally undermine the right of states and territories to develop their own RANs with the funds that FirstNet would otherwise have

[10] Section 6206(b) (1) of the Act empowers FirstNet to "take all actions necessary to ensure the building, deployment, and operation of the nationwide public safety broadband network, in consultation with Federal, State, tribal, and local public safety entities, the Director of NIST, the Commission, and the public safety advisory committee established in section 6205(a) … ." Investing in and proceeding to develop the PSBN before the required consultations is beyond the authority if FirstNet.

expended on the FirstNet RANs within the states and territories.

Second, the development of FirstNet RANs in states or territories that ultimately choose to exercise the right to opt out of the FirstNet-provided RAN will or may result in the stranding the assets of the prematurely developed FirstNet RANs and, therefore, the wasting of the funds provided for the development of the PSBN under the Act. Moreover, the FNNC may run afoul of the stranding of assets and waste of funds concerns that recently led NTIA and the Department of Commerce to withdraw grant support for several well established broadband projects previously underway and the associated grant funding.[11]

2. The Presentation has as its foundation roaming agreements between the PSBN and the networks of commercial carriers, but that presentation makes no reference to public safety users of the PSBN gaining priority in times of an emergency over commercial network users when the public safety users roam onto commercial networks despite the fact that the Act does not give authority to FirstNet to negotiate roaming agreements unless such a priority is included therein.

Section 6206(c)(2)(A) includes among the duties and responsibilities of FirstNet the negotiation and entry into, "as it determines appropriate, roaming agreements with commercial network providers to allow public safety users on the nationwide public safety broadband network to roam onto commercial networks and gain prioritization of public safety communications over such networks in times of an emergency." That provision provides authority to FirstNet to enter roaming agreements if and only if PSBN users gain a priority in times of emergency when those users are roaming on a public carrier's network. The FNNC appears to rest essentially entirely upon a multiplicity of some form of roaming

[11] In this regard, see: Adams County Communications Center, Inc. http://www2.ntia.doc.gov/files/grantees/20120511095538760.pdf ;

City of Charlotte http://www2.ntia.doc.gov/files/grantees/20120511095904533.pdf ;

Executive Office of the State of Mississippi http://www2.ntia.doc.gov/files/grantees/20120511095932888.pdf ;

Los Angeles Regional Interoperable Communications System Authority http://www2.ntia.doc.gov/files/grantees/20120511094609720.pdf ;

Motorola Solutions, Inc. http://www2.ntia.doc.gov/files/grantees/20120511095833401.pdf ;

New Jersey Department of Treasury http://www2.ntia.doc.gov/files/grantees/20120511095756744.pdf ; and

New Mexico Department of Information Technology http://www2.ntia.doc.gov/files/grantees/20120511095259281.pdf.

agreements without which the FNNC is meaningless, but the Presentation makes no reference to the need for FirstNet to negotiate priority for public safety users while roaming and does not provide any information that suggests that roaming agreements providing for such priority can be negotiated with all the public wireless carriers that the Presentation envisions as a part of the FNNC. While some commercial wireless carriers are considering affording a priority to public safety, it is not clear that others are taking the same approach, and, in any event, the requisite roaming agreements are not yet negotiated, and the adequacy of the terms and conditions thereof relating to priority is unproven at present. The fact that the Presentation does not address this issue is rather fundamental given that all or substantially all of the benefits of the FNNC, including, but not limited to coverage, reliability, redundancy, interoperability, and accelerated availability, derive from or depend upon roaming agreements.

If it is intended that the FNNC be implemented without roaming agreements that provide for the required public safety priority, then it would seem that the Act will be violated. If it is intended that the FNNC be implemented only with roaming agreements that provide for the required public safety priority, then the comprehensiveness (and related claimed redundancy) of the FNNC will be limited by commercial carriers' willingness to provide the needed priority to public safety. Moreover, it seems likely that something much more complex than a roaming agreement, which is essentially a financial accommodation, will be required to establish the interoperability contemplated by the Act. If it is intended that the FNNC rely upon public safety users' subscribing to some or all commercial carrier networks in their own right, the FNNC is not truly operative and does not shape the development of the PSBN and does not assure the effectiveness of interoperability.

Recommendations of RCC

The following are the recommendations of RCC in relation to the FNNC:

- Consider the FNNC as a point of departure for the discussion of the implementation of the PSBN;
- Conform the FNNC to the seven above-stated principles applicable to the development of the PSBN;

- Alter the allocation of grant focus from years of governance and outreach work to the critical needs assessments and work on designs for RANs and recognize that many states and territories are presently ready or could soon be ready to proceed with thorough needs assessments and that without proper needs assessments and work on designs for RANs, there will be no need for years of governance and outreach work;
- Recognize that NTIA's intended years of focus upon governance and outreach work is inconsistent with NTIA's requirement that any alternative to the Farrill Presentation should reach operational capability as quickly as possible unless the governance and outreach work and the long deferred needs assessment work is irrelevant to the design and implementation of the PSBN;
- Require needs assessments to be sufficiently detailed that with respect to coverage, capacity, and reliability or order that they drive designs for RANs such that designs for RANs map to all sites and site separations one-to-one in accordance with assessed needs, and do not permit designs for RANs to proceed without specific support from needs assessment;
- Protect the right of states and territories to opt out of the FirstNet-proposed RANs;
- Explore the possible contribution of public utilities to the development of the PSBN, do not permit a unitary focus upon public wireless carriers for support of the development of the PSBN, and otherwise incorporate a greater measure of the competition into the FNNC in relation to the development of the PSBN;
- Recognize and address the expectations of public safety with respect to the PSBN that are grounded in the Act and avoid the appearance of or an actual takeover of the PSBN by the public wireless carriers;
- Recognize the financial complexity of the FNNC and the associated need for clarification of the financial principles upon which its rests and the need to provide for fair cost allocations and the avoidance of FirstNet's subsidizing wireless carriers;

- Protect the PSBN against the diversion of revenue from the PSBN to the commercial wireless networks;
- Explore the utilization of public safety and public utility infrastructure and other resources to implement the PSBN without necessarily incurring costs that will require the expenditure of FirstNet's scarce resources and the potential benefits of that approach;
- Undertake the research and development necessary to validate the FNNC from a technical standpoint, including, but not limited to, assuring security against cyber-attacks and assuring the effectiveness of interoperability, and from a financial standpoint, including, but not limited to, assuring the reasonableness and acceptability of overall subscriber costs; and
- Reject the FNNC if and only if (a) the FNNC cannot be shown to serve public safety effectively at a reasonable cost to subscribers, (b) the FNNC cannot be shown to enable compliance with the self-funding requirements of the Act, or (c) another solution proves to be superior to the FNNC in the foregoing respects.

RCC believes that the Presentation's exposure of the FNNC is a real contribution to the design and development of the PSBN. RCC believes that it was inevitable that the first exposure of the FNNC would, upon review, lead to suggestions for the further review and reworking or refinement of the FNNC. Notwithstanding RCC's suggestions in relation to the FNNC, RCC is convinced that the Presentation and the FNNC have materially advanced the process of designing and developing the PSBN.

The development of a nationwide wireless broadband system is a task that has huge inertia, and getting the process underway and on the right track requires the collective effort of many talented and dedicated people. Making sure that the system development is on the right track from the beginning is crucial or that same project inertia will make it immensely difficult to change the project direction down the road. The Presentation and the FNNC serve well to overcome project inertia, and the FNNC, as it finally emerges from the review process, will have a good chance of maintaining inertia on a path toward project success.

The concerns and suggestions made in this RCC Response are intended to provide the requested feedback in response to the NoI and to help FirstNet refine the PSBN development currently underway.

The Presentation and the FNNC should provide a continuing basis for the constructive discussion of the development of the PSBN, and RCC hopes that this Response of RCC is also a material and useful contribution to consideration of the development of the PSBN.

Respectfully submitted,

The Public Safety Broadband Working Group of RCC Consultants, Inc.

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