Before the
National Telecommunications and Information Administration
Washington, DC 20230

In the Matter of	)	
	)	
Notice of Inquiry on Development of the	)	Docket No. 120928505-2505-01
Nationwide Interoperable Public Safety	)	
Broadband Network	)	

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EXECUTIVE SUMMARY

Oceus Networks Inc. ("Oceus Networks") submits the following comments in response to the National Telecommunications and Information Administration's (NTIA's) Notice of Inquiry (NOI) on the Development of the Nationwide Interoperable Public Safety Broadband Network. The FirstNet Nationwide Network (FNN) Proposal, presented to the First Responder Network Authority (FirstNet) board at its first meeting, advances the goal for a nationwide public safety network by leveraging existing commercial carrier network investment and expertise. Partnering with multiple commercial carriers maximizes the limited amount of funding for the nationwide public safety broadband network (NPSBN) and will help lay the foundation for its construction.

Oceus Networks is a Reston, Va.-based provider of 4G, LTE wireless broadband solutions for Federal military and security customers and for public safety. Our partnership with Ericsson and extensive R&D investment has produced highly portable, resilient LTE network equipment, ideally suited to solving public safety rapid response and broadband interoperability challenges.

The Middle Class Tax Relief and Job Creation Act ("Spectrum Act") directed FirstNet to consult with Federal, State, local, and tribal public safety entities to ensure that their views were incorporated into the construction and operation of the network, for which they are the core users. Oceus Networks offers limited enhancements to the FNN Proposal that will help achieve the following three objectives to serve these users:

•   Increasing network resilience by disaggregating key components closer to public safety users;

•   Promoting the use and adoption of the network by state and local public safety entities through more local autonomous control; and

•   Encouraging more widespread use of the network, specifically by federal public safety users and secondary users.

Increasing network resilience

Disaggregation of Core Elements - Limited flexibility increases to the proposed public safety architecture will provide greater network resilience in the event of a cataclysmic outage caused by extreme weather conditions or terrorist attack. The reliability and availability of the network for public safety users would be better served by placing many core capabilities as close to cell-sites as possible. Disaggregating public safety core elements will promote self-healing and stand alone cell operation. Failure of local equipment, backhaul connection or a centralized network component (such as an Enhanced Packet Core (EPC) or Service Delivery Platform (SDP)) could disrupt communications at the edge precisely when they are needed most. Hurricane Sandy

knocked out or damaged over 25% of cell sites in the core area affected by the storm across 10 Eastern states, from Virginia to Massachusetts. In such scenarios, as well as during more common equipment failures, a disaggregated core network implementation that places a public safety local core and SDP at cell sites provides more resilient, continued communications and access to applications around the coverage area of the cell sites for operations and recovery efforts.

Disaggregation of key network elements could also generate greater state and local participation in the network. Smaller network components could be funded by state or local public safety agencies that may not immediately be covered by the initial public safety network build-out.

Use of Small Cell and Deployable Systems– Commercial carriers increasingly rely on heterogenous networks that include both macro and small cells to provide additional capacity and coverage. FirstNet should encourage leveraging carrier small cell sites to provide similar benefits. In urban markets, the use of small cells will help with in-building coverage to provide highly accurate in-building location data and the ability to provide key situational awareness video and data where needed.

FNN proposes the use of deployable systems to extend coverage of the NPSBN. Oceus Networks experience with deployable systems shows that these can help provide cost-effective coverage to infrastructure poor areas and underserved markets.

Promoting the use and adoption of the network

Greater Jurisdictional Level Control – The vast majority of emergency communications needs are driven at the local level. States may decide to opt-out of part of the FirstNet construction plan if it does not sufficiently meet their requirements. The Spectrum Act also does not require a state or local public safety entity to subscribe to the network.

To promote greater buy-in at both the state and local levels, FirstNet should give entities control of their jurisdiction's local network use with complete reachback connectivity to the entire FirstNet architecture. Providing public safety agencies visibility into network operations and offering provisioning controls such as usage levels and applications permissions are some ways that FirstNet could enhance jurisdictional control, thereby increasing goodwill, resiliency, and the desire for more users to subscribe to the network.

Support Flexible Architectures for Rural and Small Markets – Some markets may not have sufficient 4G LTE commercial infrastructure available, which may include underserved areas of certain rural and smaller markets, to leverage for the NPSBN. These markets need to be able to deploy fill-in network components that are more flexible than that of a traditional fixed terrestrial system. Oceus Networks recommends design guidelines, such as greater distribution of core

elements and increased flexibility for deployable system use, that give state or local public safety agencies more flexibility in building infrastructure to meet their unique network needs and increase the overall resiliency of the network.

Encouraging more widespread use of the network

Accommodating Federal Public Safety and Secondary Uses - Encouraging more subscribers that are appropriate to operate on the network will fund further construction and will cover operational expenses for the NPSBN. Federal public safety users and secondary users are two user groups that should be targeted. As evidenced during Hurricane Sandy, Federal public safety users have a key role in large-scale recovery efforts and need to interoperate with their state and local public safety counterparts. Secondary users, which could include the critical infrastructure industry, could help pay for network access. These users could efficiently use excess capacity when not needed by public safety. Therefore, the FirstNet architecture should accommodate these uses of the network.

I. INTRODUCTION

Oceus Networks Inc. ("Oceus Networks") submits these comments in response to the National Telecommunications and Information Administration's (NTIA's) Notice of Inquiry (NOI) on the Development of the Nationwide Interoperable Public Safety Broadband Network.[1] Oceus Networks requests that the NTIA consider its comments in the above-referenced docket to increase the resiliency of the network, promote a meaningful degree of self-management by state and local public safety users when consistent with the overall architecture, and leverage commercial infrastructure, while maintaining local and regional flexibility to build networks where limited commercial partnerships exist.

Oceus Networks is a Reston, Va.-based provider of 4G, LTE wireless broadband solutions for Federal military and security customers and for public safety. Oceus Networks is engaged in several trials within the Department of Defense (DoD) and other federal and state entities to demonstrate the value of 4G LTE for mobile tactical users. Further, Oceus Networks is participating in an FCC-sponsored demonstration to assess the technological capabilities of deployable aerial communications architecture (DACA) platforms to support emergency communications during the first 72 hours of a disaster.[2] This DACA trial responds to an FCC Notice of Inquiry proceeding initiated earlier this year. Oceus Networks' work with DACA, DoD, and other federal and state entities provide unique perspectives on how to maintain highly survivable networks through flexible communication architectures for public safety. When

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[1] NTIA Notice of Inquiry on behalf of FirstNet to seek public comment on the conceptual network architecture presentation made at the FirstNet Board of Directors' meeting held on September 25, 2012, released Oct. 4, 2012, Docket No. 120928505-2505-01.

[2] Oceus Networks Press Release, "Oceus Networks to Demonstrate Rapidly Deployable Networks for Public Safety," May 24, 2012.

flexibility is built in upfront to the FirstNet network architecture, the network can achieve an even wider range of public safety communication requirements and objectives.

Oceus Networks applauds the First Responder Network Authority (FirstNet) and the NTIA, through this NOI, for launching the process to realize the national goal of developing a nationwide interoperable network that meets the modern communications needs of the public safety community. It has been eleven years since the 9/11 attacks tragically highlighted severe inadequacies in the nation's public safety communications infrastructure. Hurricane Katrina in 2005, the Tennessee floods in 2010, and Hurricane Sandy[3] this past week, have demonstrated not only the need for robust and reliable communications, but how far the U.S. must progress before the network operates to this high performing level. However, recent policy steps provide encouragement that the U.S. is poised to move forward addressing these gaps in meeting first responder needs nationwide.   In the Middle Class Tax Relief and Job Creation Act of 2012 ("Spectrum Act")[4], Congress established FirstNet and set forth criteria for FirstNet to develop the nationwide public safety broadband network (NPSBN). The Spectrum Act also gave NTIA a key role in carrying out the responsibility for developing the framework for the NPSBN.

Oceus Networks congratulates NTIA for being entrusted by Congress with this weighty responsibility. The selection of the FirstNet board was another critical step. NTIA has chosen highly accomplished individuals with deep experience in public safety to serve as members.

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[3] Josh Smith, Sandy Takes Out Phone Networks, National Journal, October 30, 2012, http://techdailydose.nationaljournal.com/2012/10/sandy-takes-out-phone-networks.php.

[4] Middle Class Tax Relief and Job Creation Act of 2012 ("Spectrum Act"), enacted February 22, 2012.

Their leadership and integrity will be called upon as they address the long-awaited need for a network.

The FirstNet Nationwide Network (FNN) Proposal ("FNN Proposal")[5] presented to FirstNet affirms Congress's trust in NTIA by recognizing the need to leverage the vast sums that carriers have invested in commercial networks. Further, reusing commercial investment will help maximize the $7 billion the Spectrum Act provides for the public safety network and that must continue to be spent as technology progresses at a rapid pace. The FNN Proposal supports strong relations with carriers that will prove crucial to laying the foundation for the NPSBN. Aligning the NPSBN with carrier networks will facilitate faster network upgrades as the NPSBN can benefit from site infrastructure and radio access upgrades such as LTE-Advanced and beyond.

The FNN Proposal offers a good starting point to meet Spectrum Act requirements. While the Spectrum Act set forth the broad parameters for architecting the network[6], it charged FirstNet to consult with Federal, State, local, and tribal public safety entities, in taking all steps to construct, deploy, and operate the network.[7] Oceus Networks makes its comments to build upon the FNN Proposal to refine critical needs of these public safety entities, and to future proof the network by accommodating current public safety requirements with the ability to handle future needs, including those in less developed wireless markets. These comments recommend a limited increase in flexibility to achieve three main objectives: 1) providing greater resilience to

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[5] F. Craig Farrill, FirstNet Nationwide Network (FNN) Proposal, Presentation to the Board, September 25, 2012.

[6] Sec. 6202 (b), *Spectrum Act*.

[7] Sec. 6206.

prevent communications loss in the event of a cataclysmic outage; 2) fostering more enthusiastic support – at state and local levels – to attract more funds, a necessity in a constrained budgetary environment; and 3) promoting more widespread adoption and use of the network.   Oceus Networks looks forward to participating in an ongoing dialogue with key stakeholders to offer its views on how to accomplish these key objectives.

II.   DISCUSSION

Limited Increases in Flexibility to Architecture to Promote Greater Resiliency

a. **Facilitate Distribution of Core Elements to Achieve Greater Resiliency (Self-healing) and Allow State/Local Public Safety to Build and Fund Interoperable Networks**

The Spectrum Act requires that FirstNet base the NPSBN on a single, network architecture that initially consists of a core network and a radio access network[8]. The core network may consist of "national and regional data centers, and other elements and functions that may be distributed geographically."[9] Oceus Networks recommends that the NPSBN architecture allow for the core capabilities to be distributed geographically to increase the reliability of the network. State and local public safety agencies that understand the local needs of the coverage area should be provided appropriate flexibility to supplement the commercial core with dedicated public safety core elements. This will also facilitate stand alone cell (or cell cluster) operation in the event of a regional core network failure or backhaul failure from one or more sites. The reliability and availability of the network for public safety users would be better served by placing many core capabilities as close to cell-sites as possible. This architecture builds

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[8] Sec. 6202, *Spectrum Act*.

[9] Sec. 6202 (b)(1), *Spectrum Act*.

resiliency into the system by enabling continuous operation if access to the FirstNet core is disabled, as could be the case in a natural disaster or terrorist attack.   In addition, disaggregating the network, as described below, can generate more support, use, and investment, by state and local entities.

i. Greater resilience in event of cataclysmic outage

Distributing network elements where possible will provide greater availability. Public safety core elements that are geographically closer to the end user should also be required to promote self-healing. This self-healing will enable autonomous operation if links are severed during an event.

Thus, relying solely on the use of the core of a commercial carrier, as depicted in Slide 19, of the FNN Proposal, could make the availability of the network excessively susceptible to outages. Recent high-profile nationwide outages by commercial LTE carriers[10] have significant impact to wireless customers who rely on their wireless service and may encounter an emergency situation. Hurricane Sandy illustrates this risk. Nearly a quarter of cell sites were damaged or off-line in

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[10] FCC requires carriers report outages in its Network Outage Reporting System (NORS). Outage data is considered confidential and only available to DHS via a reporting tool. https://www.fcc.gov/nors/outage/StartUp.cfm. Hence, public news reports on outages present an imperfect perspective on these outages.

But press reports do highlight certain serious problems. Kevin Fitchard, Verizon explains its string of LTE outages, GigaOM, December 29, 2011; Kevin Fitchard, Verizon's LTE outage problems just won't stop, GigaOM, February 22, 2012, http://gigaom.com/mobile/verizons-lte-outage-problems-just-wont-stop/ ; Nathan Ingraham, Verizon's LTE network experiencing sporadic outages, yet again, The Verge, March 13, 2012, http://www.theverge.com/2012/3/13/2867569/verizon-lte-network-outages-march; Dwight Silverman, AT&T's LTE network in Houston is having connection problems [Updated], Houston Chronicle TechBlog, Thursday, September 13, 2012.

the wake of the October 2012 storm.[11] The impact of an outage, either isolated or nationwide, is even greater for public safety users whose primary communications purpose is to fulfill their public safety mission. By promoting a network design that enables state and local entities to flexibly build the network to their unique geographical and public safety requirements, that, in turn, tie into the FirstNet NPSBN, NTIA will give these entities more incentive to adopt and use the network. These public safety entities will need to follow design guidelines set by NTIA to ensure interoperability. As a result, the soundness of the overall FNN proposal architecture would be enhanced, not diminished.

This flexibility could also help to expedite the availability of the network to certain underserved markets that may not be served, or are underserved, by commercial carriers in terms of network capacity and coverage. Giving local entities the ability to build FirstNet core-compatible core elements as close to the public safety user as possible will help promote use of the network and serve to meet the needs of many different public safety markets.

Placing core elements that provide the most critical switching functions of LTE within the local jurisdictions facilitates a "fail soft"[12] approach allowing stand alone cell operation. This autonomous operation approach could be a single cell, or a cluster of cells. Failure of a backhaul connection, or a critical core network component (such as an Enhanced Packet Core (EPC) or Service Delivery Platform (SDP)), which are shared across hundreds or thousands of cells,

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[11] Sinead Carew, Hurricane Sandy disrupts Northeast U.S. telecom networks, Reuters, October 30, 2012, http://www.reuters.com/article/2012/10/30/us-storm-sandy-telecommunications-idUSBRE89T0YU20121030.

[12] Fail-soft operation is a characteristic of computing that refers to the ability of a system to fail in such a way as to preserve as much capability and data as possible. - Stallings, W (2009): Operating Systems. Internals and Design Principles, sixth edition

should not disrupt critical local communications. To summarize, placing smaller EPCs and SDPs within state and local public safety markets allows for uninterrupted operation should long-haul backhaul connections to the national network fail.

ii. Disaggregated Network Fosters More Investment, Support, and Use

Disaggregating the network would allow smaller network builds that could generate greater state and local participation. Smaller network components could be funded by state or local public safety agencies that would not immediately be covered by the initial public safety network build-out. These smaller networks would be required to interoperate in conjunction with the larger regional or national NPSBN network components. Synchronization of subscriber databases would be mandatory. In the event of a cell failure, these subscribers covered by the small cell would still be able to transmit data within their network and access applications if the connection to a regional or national FirstNet core is severed. These subscribers would be provisioned on a local Home Subscriber Server (HSS) in the EPC and SDP. This architecture should allow local public safety agencies to provision and authorize roamer operation for adjacent public safety officers providing mutual aid. A variety of "local services" that are provided using locally operated SDP application servers could provide critical applications to all users of the autonomous cell. All cells within the network should be able to deliver service and select critical applications at all times.
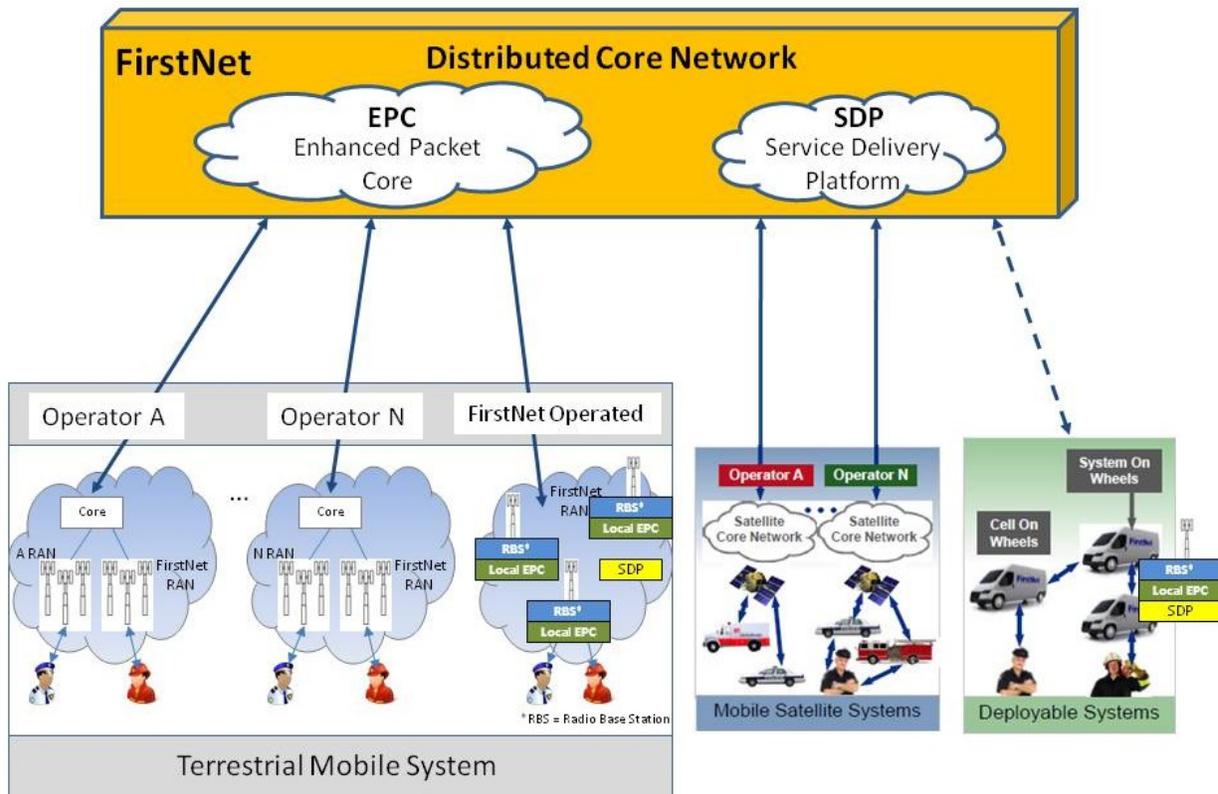
Figure A: An Updated FNN Slide 19 Diagram Illustrating Recommended Changes
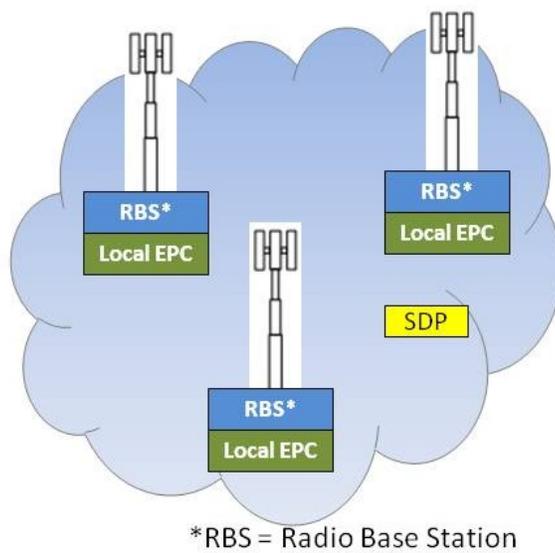

Figure B: Enlarged View of FirstNet Operated Recommended Alternative Architecture

Outtake Box: An Illustrative Example Of Local Core Implementation During Disaster

Figure A above could be a county or city anywhere within the United States. This area would employ a number of cells within its jurisdiction with localized core components. The "Local Core" places a fully functional Evolved Packet Core (EPC) and Home Subscriber Server (HSS) at each site. These local components provide full functionality and must comply with 3GPP and standards established by NTIA's Public Safety Communications Research (PSCR) program standards. Connection between LTE sites could be by fiber or microwave, although connectivity from the local network to the NBPSN core equipment would likely be fiber.

Local Core components can be implemented at significantly reduced cost since they are scaled to provide sufficient parallel capacity or processing to support the local market. Subscribers would be provisioned on the "National NBPSN HSS," as well as each Local Core HSS. Operation and maintenance (O&M) functions operating within the local market will provide automatic synchronization across the local and national HSS databases.

Each cell would be capable of operating at full functionality as part of the NBPSN, or "fail soft" operation as a standalone cell. Only a failure of a non-redundant component (e.g., a Radio Base Station (RBS) transmitter, coaxial cable, antenna, or similar item) would remove the cell from service. In the event of a non-redundant and non-distributed failure (e.g., a radio component), a Cell on Wheels or System on Wheels could easily be deployed. Automatic interconnection with the network is maintained since Local Core equipment is also installed in the Network on Wheels.

Services and applications can be supported from the national SDP, as well as from one or more smaller locally owned and operated SDP servers. Should a backhaul trunk to the national SDP fail, the system could recover and deliver select services from the local SDP servers. First Responders from adjacent jurisdictions providing mutual aid could be provisioned on the local SDP to maintain interoperability.

b. Promote Use of Small Cell Deployments

The FirstNet future vision, as depicted on Slide 19 of the FNN Proposal, should be extended to ensure greater use of small cell deployments. Small cell deployments are increasingly being used by commercial providers to meet capacity requirements. Leveraging these investments could similarly provide greater capacity and coverage for the nation's first responders. Small cells will help provide communications during large events and are well suited for providing in-building coverage, especially for urban areas with skyscrapers and dense populations. A heterogenous network environment, which commercial LTE operators already are using to expand capacity and provide better in-building coverage, should be extended to meet requirements of public safety broadband users, as well.

Greater in-building coverage, enabled by small cells, provides first responders with highly accurate in-building location data and the ability to provide key situational awareness video and data where it is needed. As the public safety community develops new applications and FirstNet establishes additional specifications for network capacity and coverage, incorporating and promoting small cell use in the FirstNet architecture will help ensure current and future requirements are better met. Thus, FirstNet should ensure that to the extent practicable its network features small cells in the NPSBN architecture. These small cells (including in-building systems) should also support autonomous operation as previously described. A failed microwave or cut fiber should not sever public safety from critical communication capabilities when operating in buildings.

c.   Extend Use of Deployable Systems to Rural and Infrastructure Poor Areas

Oceus Networks applauds the FNN proposal's recognition of the need to include the use of cell on wheels (COWS) or cell on light trucks (COLTS) configurations. Oceus Networks develops mobile tactical 4G LTE systems for government applications and is currently in several trials.[13] These systems are battlefield tested. They feature applications beyond the incident-response scenario as depicted on slide 19 and discussed at the FirstNet board meeting held September 25, 2012[14]. These types of systems may be a way of extending the network's coverage cost-effectively to infrastructure poor areas and underserved markets.

In addition to military trials, Oceus Networks is working with several partners and in conjunction with the Public Safety Communications Research Program in the Department of Commerce, Boulder Labs to test the ability of DACA architecture to provide coverage within the first 72 hours of a disaster without causing harmful interference to still functioning terrestrial networks. DACA could be used to augment or provide primary communication capabilities in the event that the terrestrial NPSBN is down or unavailable.

Policies To Promote State and Local Public Safety User Adoption and Extend Coverage to Rural and Infrastructure Poor Markets

d.   Promoting Buy-in Both by States and Localities as Well as Public Safety Professionals by Providing Greater Jurisdictional Level Control

The Spectrum Act recognizes that FirstNet should account for all public safety users that need to be served on the network. FirstNet is not only mandated to consult with public safety

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[13] Oceus Networks Press Release, "First U.S. DoD Operational Deployment of 4G LTE with Navy Pilot of Oceus Networks' Xiphos Solution," March 29, 2012.

[14] Meeting Of The First Responder Network Authority (FirstNet), Transcript, p 48 (September 25, 2012). http://www.ntia.doc.gov/files/ntia/publications/firstnet_board_9-25-2012_transcript.pdf

users (Federal, State, local, tribal), but Congress has given states the option to opt-out of FirstNet's proposed network plan for the Radio Access Network if FirstNet fails to do so to the states' satisfaction. The possibility of a state "opt-out" creates risk for the overall success of the NPSBN.

A state's likelihood to opt-out of FirstNet's plan will be discouraged by ensuring that user needs are met. Emergency communications are largely driven by jurisdictional needs. To the extent that FirstNet can offer jurisdictional level control, it could help eliminate the possibility of a state opt-out. More importantly, ensuring jurisdictional level control will foster greater use and adoption of the network. Some ways that this jurisdictional level control can be provided is by increasing visibility into network operations and offering provisioning controls.

Provision should be made to allow public safety agencies to view network operational status, and readily identify reduced or failed network coverage or services. Furthermore, commanders or supervisors should be allowed to view officer usage of the network and modify privileges and priority as necessary. These modifications could include limiting select officers' bandwidth during times of high usage or severe emergency, or removing privileges to control subscription costs. In order to ensure interoperability mandates, local commanders should also be able to quickly add responders from adjacent communities by providing access to the applications and services deemed appropriate.

e. Leverage Commercial Infrastructure While Maintaining Flexibility for Areas that May Need New Network Infrastructure Build-Out

Leveraging the existing commercial infrastructure, where feasible and when available, will speed the construction of the NPSBN. Reuse of towers, backhaul, and radio access network

layer equipment should be pursued wherever possible. However, some markets may not have sufficient commercial infrastructure available to comprehensively and cost-effectively leverage for the NPSBN. These areas, which may include underserved areas of certain rural and smaller markets that are not otherwise served with 4G LTE by existing carriers, may need special allowances and rules to help them achieve FirstNet operational capabilities. To achieve operational capability as quickly as possible, these markets require the ability to deploy fill-in network components that are more flexible than that of a traditional fixed terrestrial system. Waiting for an operator to build the commercial LTE infrastructure to then reuse may impose unreasonable delay. There may also be areas where public safety requires different coverage or capacity than commercial networks. Oceus Networks recommends design guidelines, such as greater distribution of core elements, that would allow state or local public safety agencies to contribute to the construction of the overall network.

Federal Public Safety and Secondary Uses

f. Accommodate Federal Public Safety User Access

The Spectrum Act requires that FirstNet consider the needs of Federal public safety users and any unique national security needs. According to an NTIA study, "nearly every major Federal department or agency includes a Federal public safety function, with the Departments of Justice, Treasury, Agriculture, Interior, Federal Emergency Management Agency and Energy having particular important roles as a result of their mandated missions."[15] As evidenced in recent large-scale disasters such as Hurricane Katrina and the Tennessee Floods in 2010, Department of

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[15] NTIA, ASSESSMENT OF ELECTROMAGNETIC SPECTRUM REALLOCATION:Response to Title X of the National Defense Authorization Act for Fiscal Year 2000, NTIA Special Publication 01-44, January 2001.

Defense (DoD), FEMA, National Guard, Department of Energy (DoE), and Department of

Transportation all became involved in assisting with recovery efforts.[16] Federal users, and DoD,

in particular, will be called into service to assist in future large scale, destructive natural

disasters. Thus, the needs of Federal public safety users cannot be overlooked as FirstNet

architects the NPSBN.

The Spectrum Act did not provide federal agencies direct representation on the FirstNet

Board. While federal public safety users were excluded, the definition for public safety services

does reference the Homeland Security Act of 2002 (6 U.S.C. 101), which highlights services

provided by federal users.[17] To fully achieve the ultimate goal of FirstNet, and provide all

emergency first responders a robust, interoperable nationwide network, no artificial or

counterproductive barriers to the network should be imposed that could hinder federal public

safety access to the network.

Sound public policy should attract wide participation in the network, including for federal

public safety users. For example, DoD is a logical user of the network in certain circumstances.

It has many bases and military installations in remote parts of the country. DoD access to the

public safety network (spectrum access and architecture) on its military bases could facilitate

interoperability with state, local, and tribal public safety users when disaster strikes.

Establishing rules that allow for DoD access in these remote locations would foster greater

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[16] The Federal Response To Hurricane Katrina: Lessons Learned, February 2006.

[17] Sec. 6001. *Spectrum Act.* "(27) PUBLIC SAFETY SERVICES.—The term ''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)."

participation in the network. It brings additional funds for network construction and extends coverage to these largely remote locations. The recent trend in FCC commercial wireless license build-out regulation excludes Federal land when calculating the service area that a licensee is required to cover.[18] Thus, many of these areas may not have commercial networks to leverage for FirstNet buildout. Other federal agencies may have similar needs that could help extend coverage to federal lands.

The events of the past week on the East Coast during and after Hurricane Sandy that devastated parts of New York City and New Jersey saw a great deal of federal agency participation that would have benefited from the ability to interoperate with state and local counterparts. FEMA, DoD, National Guard, Navy, among other federal agencies were mobilized in the aftermath of Hurricane Sandy.[19]

To summarize, facilitating federal public safety user participation is required to ensure that all of our nation's first responder can communicate seamlessly once the NPSBN is in place. Federal agencies can better participate in disaster recovery efforts with state and local partners, when called upon, and also provide crucial funding for extension of the overall NPSBN network to certain areas of the country that would not otherwise have a terrestrial commercial network to leverage.

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[18] 47 CFR § 27.14 (g).

[19] Mike Mount, Navy moving helicopter carriers to New York and New Jersey coasts, CNN Blog Post, October 31st, 2012, http://security.blogs.cnn.com/2012/10/31/navy-moving-helicopter-carriers-to-new-york-and-new-jersey-coasts/; John Presta, President Obama directs FEMA to mobilize Hurricane Sandy federal resources, Examiner, October 29, 2012, http://www.examiner.com/article/president-obama-directs-fema-to-mobilize-hurricane-sandy-federal-resources.

g. Facilitate Secondary Spectrum Use

Oceus Networks applauds FirstNet for proposing an architecture that could facilitate secondary users. The FNN Proposal provides for 20 MHz of broadband public safety spectrum that serves the needs of public safety users with enough capacity to accommodate secondary users without risk to primary public safety communication. By leveraging commercial networks, the vision of a public-private network is realized. Specifications in LTE will further ensure that secondary users are deprioritized in the event of an emergency or in a situation where public safety's communication needs require full use of the 10x10 MHz LTE network. For most normal public safety communication there will be enough capacity to meet day to day public safety data needs. FirstNet should utilize its FNN Proposal architecture to accommodate these secondary uses. The Spectrum Act provided FirstNet this flexibility and FirstNet should take advantage of it to maximize the efficient use of the spectrum while generating fees from secondary use that could support the ongoing construction and operation of the network.

III. CONCLUSION

Oceus Networks applauds NTIA and the FirstNet Board proposal for in laying out a sound architectural structure to underpin the nationwide public safety network. We recommend practical steps to ensure an even more resilient network. Oceus Networks looks forward to working with the FirstNet Board and NTIA to ensure its success to benefit first responders, and the nation.