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Response of the State of Washington Interoperability Executive Committee (SIEC)

1. This is the Response of the Washington State Interoperability Executive Committee (SIEC) for [FirstNet's request for information \(RFI\)](#) seeking input from interested parties regarding approaches to, and objectives for establishing a nationwide interoperable public safety broadband network.
 - 1.1. SIEC information including this document will be found at <http://siec.wa.gov>. The State of Washington's OneNet program manages the State and Local Implementation Grant Program (SLIGP) and engages Washington's responders to work with FirstNet on design elements for the network. Washington OneNet's website is <http://onenet.wa.gov>.
 - 1.2. Point of contact for this response is Bill Schrier, Chair, Washington SIEC, bill.schrier@ocio.wa.gov.

General Themes

2. This response will reference certain key concepts and ideas for the development of FirstNet. To be more concise in this RFI response, those concepts are summarized below:
3. Public Safety
 - 3.1. As used in this response, the term "public safety" means those potential users of FirstNet in the broadest possible sense, as described by FirstNet in its document *Proposed Interpretations of Parts of the Middle Class Tax Relief and Job Creation Act of 2012*¹ published in the Federal Register on 24 September 2014. The term "first responder entities" used in this response refers to the more narrow set of users whose primary mission is law enforcement, firefighting, emergency medical services, public safety answering points (PSAPs), 9-1-1 Centers and dispatchers, which have priority under the Act². This definition explicitly includes first responders for Indian tribes and federal government entities such as the Department of Defense, National Forest Service, National Park Service and Coast Guard.

¹ Insert citation to Department of Commerce Docket Number 140821696-4696-01 here.

² "Act" refers to the Middle Class Tax Relief and Job Creation Act of 2012. Insert citation here.

4. Coverage

- 4.1. A major obstacle to adoption and use of FirstNet by public safety will be lack of coverage. Many if not most potential FirstNet-using entities already are using 4G and LTE services from commercial carriers. While FirstNet has some unique characteristics and capabilities, e.g. management of quality-of-service (QOS) and public safety priority, for most entities these unique capabilities will not be sufficient to entice a move to FirstNet from an existing commercial carrier. A number of the suggestions and comments in this response will address this issue, suggesting methods to rapidly improve FirstNet’s initial coverage footprint and also suggest other unique capabilities (see paragraph 10 below) FirstNet might build into its offering.
- 4.2. FirstNet should consider roaming agreements with one or more existing carriers in order to provide comprehensive coverage comparable to the commercial service providers already used by public safety entities.
- 4.3. FirstNet should consider “opt-in-plus” (paragraph 6 below) to allow a measure of tribal, local and state extension of its coverage as well as local control and management of the coverage footprint.

5. Geographic Scope of the RFP

- 5.1. For some services, FirstNet should allow and encourage RFP responses limited to a geographic region or State. This is especially true for the Radio Access Network (RAN). A regional response will allow companies with a regional presence or presence in a single state to respond³. Such responses could be tailored to the needs of the specific state or region. Furthermore these companies rely on an existing local customer base (including public safety entities) and have a direct interest in serving and supporting those state and regional customers and citizens. Such responses could also use land-line, fiber and other networks such as NoaNet⁴ which are geographically limited in scope.

³ One example in Washington is NoaNet, www.noanet.net, a company formed by the Public Utility Districts of Washington. NoaNet has received \$143 million in BTOP (Broadband Technology Opportunity Grants) from the federal government to expand its fiber optic network. If NoaNet infrastructure can be leveraged by respondents to a FirstNet RFP, the existing BTOP investments can be further leveraged to public benefit by FirstNet.

⁴ See previous footnote..

5.2. Allowing narrow geographic responses does represent problems for evaluation of the RFP. FirstNet staff will be challenged to compare a response for nationwide scope with a regional response limited to, say, just the geography of the State of Washington. To mitigate this problem FirstNet might consider *not* allowing responses covering a geography *smaller than* a single state, as FirstNet must prepare a State Plan for, at a minimum, each individual state or territory. This would also force responders to the RFP to partner on proposals which cover the entire geography of a state. As another potential solution, FirstNet might encourage responses from groups of offerers, each of which covers a specific state or geography, whereas the prime contractor or integrator coordinates their responses and can be held responsible by FirstNet for overall contract performance.

6. Opt-In-Plus and Partnerships

6.1. FirstNet should actively consider, when developing its RFP, the potential for a network which includes “Opt-In-Plus”. Opt-In-Plus is a situation where a State opts-in to the State Plan developed by FirstNet, but the state itself, tribes and/or local jurisdictions within the state are allowed to add their own cell sites or other infrastructure to the FirstNet network.

6.2. Under Opt-In-Plus, for example, the City of Seattle might determine FirstNet’s coverage in a particular downtown skyscraper is inadequate and represents a risk to public safety. Seattle might advocate with FirstNet, through mechanisms yet to be determined, to add coverage in that location. But the City of Seattle – or one of its private partners with whom the City has an existing sharing agreement - might have existing capabilities such as a microcell or distributed antenna system in that building which it could link to the wider FirstNet network and immediately improve coverage.

6.3. Opt-in-plus could include full cell sites, microcells or even cell sites limited to a single critical room or facility. Opt-in-plus might encompass putting deployable cell sites on firefighting apparatus owned by the State’s Department of Natural Resources (DNR) and deployed to a wildfire in a remote area. Opt-in-plus might include infrastructure other than cell sites such as the extensive fiber networks deployed and owned by cities, counties and states.

6.4. Opt-in-plus also allows rapid deployment of FirstNet capabilities during incidents and disasters. Many unpiloted aerial vehicles (UAVs or “drones”) owned and operated by a public safety entity could be equipped with Band 14 capabilities to rapidly deploy the network in a wildfire⁵ or disaster like the State Route 530 (SR530) Landslide⁶ in Snohomish County, Washington. Bomb robots and other remotely controlled vehicles could have Band 14 capabilities to rapidly deploy around a SWAT action, large-scale rail derailment, oil refinery fire⁷ and similar incidents.

6.5. Allowing opt-in-plus does complicate FirstNet’s management of the nationwide network. But it also vastly multiplies the resources and coverage available to the nationwide network, and is a powerful marketing tool encouraging entities, cities and states to actively convert to and use FirstNet. Finally, it represents a unique capability which FirstNet brings to public safety – one which no other commercial network can offer.

6.6. Opt-in-plus might be formally implemented via a partnership agreement between FirstNet and a state government.

7. Band 14 Capabilities in every consumer-and-business Cellular Device

7.1. FirstNet should consider allowing Band 14 for use in every smartphone, tablet computer and similar device which has cellular wireless capabilities. This would require FirstNet to encourage device manufacturers to include the chipsets for Band 14 in as many devices as possible, and then would need to work with carriers to allow the software on the devices to also transmit/receive on band 14 under certain circumstances.

7.2. If so implemented Band 14 would only be used in those consumer/business-owned devices under certain circumstances. Such use might occur, for example, when the user is making a 911 call to communicate with public safety entities or sending data (images, video, text) to a 911 call center when no other connectivity is available. At other times the device would use the normal spectrum licensed by the carrier for commercial purposes.

⁵ For example, the 2014 Carlton Complex Fire in Washington’s Okanogan County was the largest wildfire in state history and occurred in both populated and very rugged terrain - http://en.wikipedia.org/wiki/2014_Washington_state_wildfires

⁶ See http://en.wikipedia.org/wiki/2014_Oso_mudslide

⁷ For example, the 2010 Tesoro Refinery fire near Anacortes, Washington - <http://www.csb.gov/tesoro-refinery-fatal-explosion-and-fire/>

7.3. This proposal has a number of advantages:

- 7.3.1. Volunteer firefighters, search-and-rescue volunteers, reserve police officers and others who have a part-time or volunteer public safety position often use their personal devices when performing their paid or unpaid public safety duties⁸. This proposal allows them to be fully integrated into FirstNet when they are performing such duties.
- 7.3.2. During times when commercial networks are severely stressed, citizens could still get through to 911 to report public safety emergencies. One example is the Seattle Seahawks victory parade on February 5, 2014, when the crowds in downtown Seattle using wireless to text, post, send images and video etc. overwhelmed commercial networks⁹. This also led Seattle police to advise consumers to be careful with their smartphone use on at least two subsequent occasions.
- 7.3.3. The RFI anticipates leveraging excess capacity in Band 14 for commercial use by potential bidders on the RFP (Question 6, page 5). But such use is difficult or impossible unless consumer and business devices have Band 14 capability. Widespread use of Band 14 in consumer and business devices is the only easy path to leveraging commercial use of the spectrum as an income source for FirstNet.
- 7.3.4. Band 14 in every device would also allow FirstNet to conclude roaming agreements with multiple carriers, perhaps *every* carrier, in rural, tribal and other areas where it may be the only provider, or is perhaps one of only two providers, thereby providing an additional source of income.
- 7.3.5. Band 14 might allow a more rapid adoption of those features of Next Generation 9-1-1 which include sending images and text to 911 centers. Furthermore, citizens are increasing using social media from their mobile devices. Social media with a public safety purpose, e.g. posting images of an emerging incident to twitter or Instagram, may be expedited if Band 14 is used.
- 7.3.6. Band 14 in consumer and business devices could also be used as a channel to initiate IPAWS¹⁰ alerting to all personal devices in a dangerous area.
- 7.3.7. Licensing Band 14 in such devices is a potential revenue source for FirstNet, in that FirstNet might charge carriers a monthly fee per device for the license. Carriers would be able to market the devices as having an improved ability to contact first responders' dispatch thereby improving the personal safety for that carrier's customers.
- 7.3.8. By allowing Band 14 in hundreds of millions of devices, the cost of Band 14 chipsets could be significantly less expensive.

⁸ See Federal Register/ Vol. 79, No. 185 / Wednesday, September 24, 2014 / page 57062 column 1 - http://www.ntia.doc.gov/files/ntia/publications/fr_firstnet_rfc_09242014.pdf

⁹ http://seattletimes.com/html/localnews/2022854455_cellfailurexml.html

¹⁰ Citation needed

7.4. Licensing Band 14 for use in every consumer and business wireless device also presents FirstNet a number of difficulties:

7.4.1. The proposal presents a potential cybersecurity threat, as hackers might use such consumer or business devices in an attempt to overload FirstNet's capacity or to conduct denial-of-service attacks on either FirstNet or 911 centers.

7.4.2. FirstNet may not have sufficient capacity to support the anticipated volunteer, consumer and business use, even though the consumer and business use is at low priority and is pre-emptable.

7.4.3. When all capacity of FirstNet spectrum is in use by public safety, citizens would still be unable to contact 911.

7.5. Does such capability violate the prohibition in the Act on offering services directly to consumers? Probably not, as long as the capability is included by the commercial cellular carrier marketing the devices, and FirstNet does not directly charge consumers and businesses for the capability.

8. The Internet of Things (IoT) and FirstNet.

8.1. The term Internet of Things generally refers to connecting computers and machines used by industry, business and citizens connected to the Internet by a wired or wireless network¹¹. FirstNet should actively consider proposals to place Band 14 radios in a number of such devices.

8.1.1. The first class of such devices would be those directly used by first responder entities. These include unpiloted aerial vehicles (UAV), surveillance cameras, body-worn video cameras used by responders, smart-watches or similar devices used by responders, biological monitoring devices used by responders and so forth. In most cases of such public safety devices there is a security element for which FirstNet is uniquely positioned to support. For example, body-worn video on the helmet of a firefighter might relay images of injured people which would violate privacy laws and rules if generally available to the public.

8.1.2. The second class of such devices are those used by companies or entities to manage their industrial or business networks. One example is the smartgrids under construction by many electric utilities where transformers, substations, generators, electric meters and so forth are wirelessly enabled. Another example are the SCADA (system control and data acquisition) networks used by water utilities, wastewater utilities, gas companies, and oil pipeline companies. Further examples include remote and automated weather stations (vital in wildland firefighting), intelligent transportation systems and traffic control plus video

¹¹ http://en.wikipedia.org/wiki/Internet_of_Things

cameras used by transportation departments, railroad positive train control systems, systems used oil refineries and a number of other private and public utilities to manage their generation and distribution systems. Other potential IoT devices include video surveillance, card-key control, intrusion detection and similar devices used by these entities and companies. Most of these devices need security and definitely have a public safety purpose; therefore they seem to be candidates for using FirstNet's Band 14.

8.1.3. A third class of devices are those used by general business, with rare use for public safety purposes. An example of these devices are the seemingly ubiquitous video surveillance systems used by many private businesses. Recorded video is sometimes used by police to solve crimes, most notably in the Boston Marathon bomber case. However businesses may wish to willingly share video, intrusion detection and similar data with first responder entities in order to keep their businesses secure.

8.1.4. A final class of devices are those used by consumers and businesses such as networks inside homes to manage entertainment, HVAC, appliances and so forth. Again, such devices would have rare use – but still potential – use in public safety.

8.2. Use of Band class 14 in the IoT represents advantages to the preservation of public safety:

8.2.1. Many of the uses, especially those identified in paragraphs 8.1.1 and 8.1.2 have specific public safety purposes, e.g. the restoration of electricity or the monitoring and operation of pipelines carrying flammable or explosive liquids and gases. Such uses seem harmonious with the public safety purposes of FirstNet.

8.2.2. Many of the uses consume relatively small amounts of bandwidth, e.g. monitoring electric meters or water SCADA systems. Such uses would not significantly impact FirstNet's capacity.

8.2.3. Many of these uses also are a potential source of revenue for FirstNet which can be built into a business case for operating and expanding the network.

8.3. Use of Band class 14 in the IoT also represents challenges for FirstNet:

8.3.1. Many if not most IoT uses will bring FirstNet into direct competition and conflict with commercial carriers who see enabling the IoT as a key revenue source.

8.3.2. Some of the IoT uses – especially in video surveillance – will consume large amounts of bandwidth, presenting management challenges for FirstNet's operations and management of priority and pre-emption

8.3.3. IoT devices operating on the FirstNet band must be extraordinarily secure. Many devices presently being placed on the Internet today have serious security flaws and are vulnerable to compromise and cyberattack. In allowing IoT devices to use band 14, FirstNet would need to address security standards, cybersecurity issues and perhaps device certification.

9. Governance.

9.1. Governance structures and the state, tribal and metropolitan or regional levels may be useful in supporting a number of the functions of operating, managing and expanding the first responder network.

9.2. Metropolitan, regional and tribal governance structures would be built upon existing governance bodies in an area. In Washington, for example, Land-Mobile Radio (LMR) networks are often build, maintained and governed by regional or county-wide board such as the Snohomish Emergency Radio System (SERS)¹² Board or the Clark (County) Regional Emergency Services Agency Board (CRESA)¹³. Tribal councils will often oversee networks inside their geographical areas of responsibility, and in Washington tribal councils oversee considerable areas of the state. In some cases such boards not only oversee LMR networks but also govern regional or multi-agency 911 centers. Such governance structures might perform the following duties in support of FirstNet:

9.2.1. Operate network operating centers (NOCs) and manage priorities and pre-emption on FirstNet in the region, or directly interface with a FirstNet NOC to perform such functions.

9.2.2. Oversee local provisioning of devices and authorization of users within their geographic areas.

9.2.3. Identify and prioritize areas requiring improved coverage and capacity after initial construction, providing direct feedback to FirstNet operations or an entity contracted by FirstNet for operations.

9.2.4. Oversee the deployment and management of opt-in-plus networks and equipment as described in paragraph 6 above.

9.3. At the State level, State Interoperability Executive Committees (SIEC) provide a similar governance entity. SIECs might oversee state government staff performing the following duties in support of FirstNet:

9.3.1. Operate network operating centers (NOCs) and manage priorities and pre-emption on FirstNet or directly interface with a FirstNet NOC to perform such functions on state lands or in geographies not overseen by regional or metropolitan governance as described in paragraph 9.2.

9.3.2. Oversee local provisioning of devices and authorization of users for state entity users and other users in the state.

9.3.3. Identify and prioritize areas requiring improved coverage and capacity after initial construction, providing direct feedback to FirstNet operations or an entity

¹² <http://www.sers800.org/>

¹³ <http://cresa911.org/>

contracted by FirstNet for operations. The SIEC function might also help prioritize improvements if conflicts arise in between regions or metro areas in the state.

9.3.4. Oversee the deployment and management of opt-in-plus networks and equipment deployed by state entities as described in paragraph 6 above.

9.3.5. Oversee the standardization of certain apps and database access to be used statewide, for example mapping and common address standards, or access to emergency management functions and resource management.

10. Services unique to FirstNet.

10.1. FirstNet is uniquely positioned to offer certain services to first responders and other entities or companies responding to public safety incidents and events. Such services will often be in the form of uniform access to data and databases or applications which will be made available to every responder or every responder within certain disciplines nationwide. Such access and applications will be a unique value-add for using entities and users of FirstNet. The RFI, in paragraph B “Acquisition Strategy” calls such services “innovative business solutions”. Such services might include:

10.2. Public Safety Applications “Stores”.

10.2.1. Undoubtedly there will be “stores” for law enforcement and firefighting and emergency medical as well as, perhaps, stores for transportation and electric utilities and transit as well as other disciplines.

10.2.2. Ideally FirstNet will allow tribal, city, county and state entities to place their own apps and apps from their vendors into such stores, and to provide customized views of the store for each entity.

10.2.3. Entities might also “force provision” certain apps onto their responders devices so, for example, a volunteer firefighter joining a wild land fire-fighting unit in the State of Washington’s Department of Natural Resources would automatically have access to a certain set of maps and applications once her/his device is authorized for use on FirstNet.

10.2.4. State governments, tribal governments and FirstNet itself may also standardize on certain applications, so that, for example, access to the FBI’s mug shot photographs and facial recognition search database is via the same app used by all law enforcement officers nationwide.

10.3. FirstNet should establish standards – especially security standards – which all such applications must meet. FirstNet should also consider contracting with a private firm to vet and test such applications to insure they are both secure and well-behaved and will not unduly consume network bandwidth and capacity.

- 10.4. Opt-In-Plus (paragraph 6 above) is a unique capability and service which FirstNet could offer to public safety which would also serve as an enticement for use of the network.
- 10.5. Security and identity management are unique capabilities which FirstNet might offer public safety if such services comply with HIPPA, CJIS, FERPA, FERC and other federal laws and requirements.
- 10.6. An extraordinary value FirstNet can bring to the emergency management function is a network which spans almost all the Emergency Support Functions (ESFs)¹⁴ present in a city, county, regional or state Emergency Operations Center during disaster response. If most ESFs are able to use FirstNet to communicate with their field units and obtain data from the field units and deployed devices (see IoT above) a much more comprehensive view of the unfolding disaster will be present in the EOC at a much earlier time during the disaster, allowing elected officials to guide the response and protect the public.
- 10.7. Presently, public safety entities nationwide have little insight into the status of deployables provided by carriers. FirstNet could offer more transparency into the availability of such deployables and faster response when a deployable is required for a planned event such as the Seattle Seahawks victory parade in February, 2014, the State Route 530 Landslide of March, 2014, or wildland fires which occur every year. FirstNet could also offer unique deployables such as unpiloted aerial vehicles (UAV) and allow, through opt-in-plus, local, state and tribal governments to own and manage their own deployables.

Response to FirstNet Request for Information (RFI), Comprehensive Network Solution

11. This draft response is keyed to the paragraph numbering of the FirstNet RFI and also references the General Themes described above.
12. RFI Paragraph E: Questions related to the Acquisition Approach and Certain Program Objectives
 - 12.1. FirstNet should explore nationwide contracts for central functions such as the evolved packet core, nationwide backhaul of the core(s) to state RANs, an applications store (see paragraph 10.1 above), standards and testing of applications (paragraph 10.3 above), devices, deployable devices and capabilities, and nationwide network

¹⁴ See the National Response Framework at <http://www.fema.gov/national-response-framework>

operations centers. Such functions benefit from single vendor solutions and/or comprehensive nationwide solutions and/or economies of scale.

12.2. FirstNet could explore unique opportunities to partner on some of these contracts, e.g. the use of the capabilities of Internet 2¹⁵ for nationwide backhaul.

12.3. FirstNet should explore both nationwide contracts for the state Radio Access Networks but also allow bids on a state-by-state basis for the reasons described in paragraph 5 above. Such bids might include regional or statewide network operations centers. Because some states may successfully opt-out and elect to build their own RAN, FirstNet must plan to accommodate diverse offers for RANs anyway, so it makes sense to also allow such bids in the nationwide comprehensive RFP.

12.4. FirstNet may need to work with the Public Safety Communications Research Lab¹⁶ or a similar private company to develop standards for integrating RANs from multiple offerers.

13. RFI Question 1, page 4: Should FirstNet seek comprehensive nationwide solutions, act as integrator or something in between?

13.1. For the Radio Access Network, local (statewide or within-a-state) solutions will be able to leverage regional capabilities such as NoaNet¹⁷, independent telecommunications companies and other regional vendors.

13.2. See also paragraphs 5 and 12 above.

14. RFI Paragraph 3: Feasibility of different types of coverage.

14.1. See discussion of Opt-In-Plus, paragraph 6 above.

14.2. The deployment of FirstNet via unpiloted aerial vehicles (“drones” – paragraph 6 above) and deployables especially through Opt-In-Plus is important to allowing individual using entities to tailor their coverage and capacity and allow them a measure of control over implementation.

¹⁵ <http://www.internet2.edu/>

¹⁶ <http://www.pscr.gov/>

¹⁷ Paragraph 5.1 above and <http://www.noanet.net/>

15. RFI paragraph 4: Leasing spectrum capacity and Opt-out states.

15.1. Leasing spectrum capacity: See discussion under paragraph 7 and especially 7.3.2 above.

15.2. Opt-out states: see paragraphs 5 and 13 above. If FirstNet accommodates regional or statewide procurements in its own RFP, it will also be much easier to accommodate opt-out states who conduct their own RFPs for an individual statewide solution.

16. RFI paragraphs 5, 6 and 7: Financial Sustainability and innovative business solutions. A number of proposed innovative solutions are contained throughout this response, but see especially Opt-in-Plus (paragraph 6), Band Class 14 in all devices (paragraph 7) and Band Class 14 used in the Internet of Things (paragraph 8) above.

17. RFI paragraphs 8 and 9: Compelling and Competitive Pricing Packages.

17.1. FirstNet needs to offer multiple service and pricing packages. Usage-tiered pricing would not, in general, be used for devices carried by public safety responders on the person (smartphone, tablet, smartwatch) or in their vehicle in most urban and suburban areas. This comment is primarily market-driven, as several commercial carriers have “all you can eat” pricing packages.

17.2. Usage-tiered pricing might be useful in fixed and deployable video camera configurations (e.g. surveillance) to encourage frugal use of bandwidth during the vast amounts of time when those devices will see little use. Usage-tiered pricing would also encourage locally-installed (i.e. next to the remote camera) recording devices, as opposed to streaming high-speed video across the wireless network. Using priority and other management controls, using entities could “turn up” the video frame-rate when an incident occurs.

17.3. Usage-tiered pricing or pooled devices pricing would be useful for public safety volunteers such as volunteer firefighters and search-and-rescue. These individuals would primarily use the commercial networks of their devices, but would switch to the FirstNet network when called to function in an official capacity. Such pricing capability, along with having Band 14 in a consumer device, encourages use and thereby encourages more volunteerism, improving overall public safety. (See also paragraph 7.3 above).

17.4. Usage-tiered pricing would definitely be useful when connecting most Internet-of-Things machine-to-machine devices which use telemetry or relatively low bandwidth, e.g. electric meters or traffic signals.

17.5. In pricing, FirstNet should also consider putting Band 14 in all devices (paragraph 7) and having fixed pricing for consumer devices with Band 14 capability (with costs collected via the carriers), for example 50 cents per device per month.

18. RFI Paragraphs 10 and 11: Accelerate Speed to Market

18.1. An advantage of awarding RAN contracts to regional or statewide offerers (paragraph 5 above) might be more rapid deployment in rural areas, where such offerers may have significant presence.

18.2. FirstNet should consider linking milestones for its rural deployment to coverage maps based on public safety incidents (911 calls, fires, emergency medical calls for service, crimes), but with those areas modified by the experience and expertise of responders in rural areas. In this fashion FirstNet could bring early deployment to rural areas with the most serious and frequent incidents.

19. RFI Paragraphs 12, 13, 14: System Hardening

19.1. The most frequent causes for cell site and cellular system outages are change management/human error, failure of electrical power and failure of backhaul connections¹⁸. Certainly many public safety entities can relate to their telecommunications carriers making network changes at “off hours” which happen to be weekend nights early in the morning when demand for law enforcement and emergency medical services is often peaking.

19.2. For tower failures, the most frequent causes are construction errors (31%), ice (29%), special wind (19%), aircraft (11%), and anchor failure (10%)¹⁹.

¹⁸ Eirik Folstad, slide 12, http://www.drcn2011.net/presentations/Paper_Eirik_Folstad.pdf

¹⁹ <http://www.inti.gob.ar/cirsoc/pdf/antenas/TowerFailuresCausesandCures.pdf>

- 19.3. FirstNet should concentrate on these primary causes of failure when issuing RFPs. FirstNet should examine, for example, the offerors' approach to change management and change control to minimize human error and to insure maintenance staff coordinate changes with local public safety entities so such changes do not occur at peak times of public safety activity. Similarly, the RFPs should examine in detail approaches to backup power such as those specified in the NPSTC Public Safety Grade Report²⁰ - backup batteries, backup generators, solar cells, wind and similar techniques already in use in commercial and public safety networks. Dual (redundant) backhaul connections of fiber or high-speed microwave are an absolute requirement.
- 19.4. FirstNet must consider using existing commercial, tribal and government-owned sites and making investments in those sites to improve hardening and resiliency. A checklist of important hardening requirements could be included with the RFP to allow offerors to evaluate sites they propose in response to the RFP.
- 19.5. FirstNet should actively consider the use of existing sites and backhaul networks (fiber, microwave) built by local, tribal and state governments. Additional investment in such sites by FirstNet will benefit local and state entities as well as entice them to use FirstNet for their mobile data networking needs. However negotiating with hundreds or thousands of local jurisdictions for site or backhaul use is a daunting task.
- 19.5.1. FirstNet could ask commercial respondents to its RFP to conduct such negotiations with local and state infrastructure owners.
- 19.5.2. FirstNet could ask State governments to serve as intermediaries to broker statewide agreements for the use of local and state tower sites and backhaul.
- 19.5.3. FirstNet could employ an independent third party to standardize and negotiate such agreements.
- 19.5.4. FirstNet might use microwave backhaul to reach rural, tribal or remote areas to establish permanent sites to provide coverage. If so, leasing of microwave capacity to carriers, wireless internet service providers (WISPs) and similar commercial entities may provide an additional source of income.
- 19.5.5. Many states will probably identify federal lands as requiring coverage due to the number and types of incidents and disasters. Examples include areas subject to frequent search-and-rescue operations for hikers, heavily visited portions of national forests, and locations subject to frequent wildfire. FirstNet is in a unique

²⁰ <http://www.npstc.org>

position to negotiate with other federal agencies to provide coverage in such areas, and then could offer the backhaul and sites to commercial carriers as well, generating additional income.

19.6. FirstNet should consider heavy investment in deployable assets such as unpiloted aerial vehicles (UAVs aka “drones” – paragraphs 6.4 and 14.2 above), backpack-mounted and vehicle mounted eNodeBs, cell-on-wheels (COW) or systems-on-wheels (SOW) and similar assets which can be rapidly deployed during outages to provide communications. Widespread availability of such deployable assets nationwide serves multiple purposes:

19.6.1. Adding capacity in selected areas during incidents and local disasters with intensive network use;

19.6.2. Adding capability in remote or unpopulated areas during public safety emergencies (wildfires, mountain search-and-rescue);

19.6.3. Providing rapidly deployable sites when cell sites fail, there contributing to the hardening of the entire network.

20. RFI Paragraph 15: Priority and Pre-emption.

20.1. Pre-emption will rarely be needed in a well-managed network. The ability of a network operator to manage priorities for users, applications, devices, sites and similar elements of the network will allow throttling of bandwidth for lower-priority uses thereby preserving bandwidth for higher-priority users, who rarely will need to “pre-empt”.

20.2. FirstNet should provide capability for local management of priority on the network, e.g. the ability of a local or state network operations center, in communications with the communications leader and incident commander(s) on site, to manage priority on the network.

20.3. FirstNet should set minimum standards for allowing such local management, e.g. the availability of a local, tribal or state Network Operating Center (NOC) with fully trained staff plus the Governance infrastructure (paragraph 9 above) of all using entities in a region or state who agree to use that NOC and its capabilities.

21. RFI Paragraphs 16 and 17: Opt-Out RAN Integration

- 21.1. FirstNet should consider commissioning a FirstNet Architecture Board to work with the FirstNet Chief Technical Office and network vendors and states. The Board would build upon the work of FCC's Interoperability Board to create a universally usable architecture for the network.
- 21.2. FirstNet should consider working with APCO and NPSTC and the commercial vendors building and operating the network to create standards for the network and its operation. FirstNet could engage APCO to move such standards through an ANSI standards process which will carry the authority to enforce the standards with all users and states, including opt-out states.

22. RFI Paragraphs 18 and 19: Integration of RANs and Infrastructure on a Cost-Reimbursement Basis

- 22.1. FirstNet must consider the use of infrastructure already owned and operated by governments, leveraging the existing investments by local, state and federal taxpayers. However negotiating with hundreds or thousands of local jurisdictions for site or backhaul use is a daunting task (paragraph 19 above).
- 22.2. FirstNet might consider engaging an outside third party (government, non-profit or commercial) to prepare standard agreements and pricing models to leverage such infrastructure.

23. RFI Paragraphs 20 and 21: System Reliability and Restoration

- 23.1. Refer to recommendations elsewhere in this document regarding widespread use of deployables (paragraph 19.6 above) and the potential for opt-in-plus (paragraph 6) to improve reliability and allow rapid network restoration.
- 23.2. FirstNet should consider creating an app to measure availability and connectivity on every device (or at least many of the devices) deployed on the network. Indeed such an app could be deployed on existing public safety devices to measure availability, connectivity, speed, and other measures of reliability today on public safety's existing use of commercial networks. This data could be relayed to a central collection point via telemetry. This data would help to establish baselines for the present networks as well as measures for FirstNet to meet. Once FirstNet is operating, this data would be used as one measure of service levels. The same application could be used to measure reliability and service levels in opt-out states.

24. RFI Paragraph 22: Lifecycle Innovation. See recommendations in paragraph 21 above.

24.1. In order to continually upgrade the network and stay current with the latest versions of LTE software and hardware, FirstNet needs to have sufficient funding from ongoing operations, i.e. be sustainable.

24.2. Sustainability will rely on a variety of different funding sources, and FirstNet should consider them all and specifically the recommendations made elsewhere in these comments:

24.2.1. User fees (paragraph 17 above);

24.2.2. Sale of excess network capacity (spectrum capacity);

24.2.3. Fees collected through carriers for potential Band 14 capability on consumer and business mobile devices (paragraph 7 above);

24.2.4. Internet-of-things implementations insofar as they support public safety (paragraph 8 above).

24.3. Many public safety entities already use 4G LTE capabilities. To entice these entities to adopt FirstNet instead of their current carriers, FirstNet must offer at least equal coverage and superior, unique services.

25. RFI Paragraphs 23, 24 and 25: Customer Care and Marketing.

25.1. FirstNet must consider local provisioning of devices and services using models similar to commercial telecommunications carriers, e.g. franchising local and state entities to provision devices much the same way commercial carriers will franchise physical stores to sell their services and devices.

25.2. FirstNet should consider local views of apps stores as described in paragraph 10.1 above to improve network usability and customer adoption/satisfaction.

25.3. FirstNet should consider opt-in-plus (paragraph 6) and roaming agreements with one or more existing telecommunications carriers to improve initial coverage and for transitioning existing public safety customers to the network.

25.4. FirstNet should consider placing Band 14 capabilities in many consumer devices (paragraph 7 above) to maximize the potential kinds of devices available to public safety and hasten adoption.

- 25.5. For most public safety entities and users coverage – especially initial network coverage – will be vastly more important to rapid adoption than any other feature of the network (paragraph 4 above). Without extensive coverage coupled with competitive pricing it will be difficult for most entities to justify transition to FirstNet.
- 25.6. Active, involved, local and state governance structures are probably key to marketing and adoption. Such structures encourage public safety entities and users to “own” their network and to actively participate in its operation and expansion (paragraph 9 above).
26. RFI Paragraphs 26 and 27: Facilitate FirstNet’s Compliance with the Act and Other Laws. See also paragraph 9, Governance, for recommendations.
27. Statement of Objectives (SOO)(RFI Appendix B). The SOO appears to be well-considered and the SIEC generally agrees with the objectives with the following exceptions and comments.
28. The SIEC recommends that State Consultation be included as one of FirstNet’s Core Objectives. The State and FirstNet consultation is one of FirstNet’s principal duties under the law²¹, an essential part of FirstNet developing a sustainable product that its market wants and the central purpose of the \$116.5 million NTIA State and Local Implementation Grant Program (SLIGP).²² FirstNet has committed to expend substantial resources into its state consultation program, but has failed to list this consultation as a core objective of the organization. Therefore the SIEC recommends that FirstNet adopts a core objective to successfully complete the consultation process with U.S. states and territories in such a manner that facilitates its remaining core objectives.
29. The SIEC is concerned about the throughput speeds specified in the SOO, which are >256kbps > 95% of time. The FCC’s definition is 1 Mbps uplink/4 Mbps downlink²³ as of this writing. It is difficult to specify definitive throughput speeds in an RFP, but those speeds should at least be equal to those of commercial carriers. See paragraph 23 above for ideas on measuring those present speeds and the speeds delivered by FirstNet when implemented.

End of Washington SIEC Response

²¹ See specifically US Middle Class Tax Relief and Job Creation Act of 2012 Sec. 6206(a)(1), Sec. 6206(c)(2)(A) and (B)

²² See NTIA State and Local Implementation Grant Program, Notice of Federal Funding Opportunity, pp. 4-21. Available at: http://www.ntia.doc.gov/files/ntia/publications/sligp_ffo_02062013.pdf

²³ See FCC Sixth Broadband Deployment Report, GN Dockets 09-137 and 09-51; FCC 10-129.