

City of Seattle
Request for Information
Public-Private Partnership for the Purpose of Providing State-of-the-Art
Wireless Mission-Critical Voice and Broadband Data Capabilities for Public
Safety and General Government

Vendor Session Notes

Host (Stan Wu): Radio communication is critical to every front-line first responder. Government does not want to have to go to voters every decade or so to fund replacement systems. Depending upon the economic environment, it may not be feasible for voters to say "yes," even to fund critical systems. Therefore, a subscription-based alternate (an approach that eliminates the large capital expense) may be attractive.

Local governments have the expertise to build, operate, and maintain land mobile radio (LMR) systems; however, LTE is a new technology. We do not necessarily have the expertise to build and manage cellular networks. The problems noted in the RFI are not unique to us; local governments around the country are facing similar issues.

We have heard that it will not be possible to have LMR and broadband data on a single network for 5-10 years. Based upon your knowledge, we would like to hear your comments: Is it possible to have land mobile radio service on an LTE network?

Q: It is important to consider emergency notification capability. LTE may permit you to offer service in a different manner than LMR. Is the City willing to consider an alternative?

A: Yes. The technology solution is not as important as the functionality that is delivered.

Host: What is your forecast for having LMR functionality imbedded within LTE technology (so a single device could provide mission-critical voice and broadband data services)?

Public safety mission-critical voice over LTE is possible, but there is a lot of standards work that needs to take place. The key thing that will drive this is the business case – whether or not companies can make revenue by supporting a public safety LTE build out. If governments continue to build out LMR systems jurisdiction-by-jurisdiction, there will never be enough revenue for vendors to really look at pushing forward with mission-critical voice on LTE. If you can get some momentum by having multiple jurisdictions work together, as this region is doing, then the larger revenue / opportunity will drive development of standards much

sooner. In terms of technology, many companies could do this. It will take funding (economic opportunity) and standards to really make it happen.

A definition document has been developed (by the NPSTC Broadband Working Group, referenced in the RFI). The next step is to develop a requirements document which will talk about the number of voice sessions needed, etc.

Doing what you want to do – combining voice and broadband data on a single network – will be very dependent upon the amount of spectrum available. If public safety does not get the 700 MHz D-block, the ability to do voice and data over the same network will be severely limited.

Today, equipment manufacturers can emulate channelized voice communication over LTE, but it doesn't have all capabilities (reliability) and functionalities. Services will only be as reliable as the underlying network they ride on. Does the network have enough spectrum? Can you prioritize users? Do you have QoS? In the case of emergency, can you effectively shut some private users off? Do you have talk-around and "man down" capabilities? Technically, these things can be achieved; however, the industry needs to prioritize what to do next – which LMR functionalities to develop first.

Host: In general, what is the time frame for the technology: 5 years? 10 years? 15 years?

You could ask 10 people and get 12 different answers. Realistically, vendors could demonstrate basic voice capabilities over LTE today. Within 2 years, you could get 80-85% of the requirements. Getting the 15-20% could take 10 years because there are things that need to be implemented within the LTE standard.

Equipment requirements vary. You want to put as many users on the system as possible to spread the cost. Not every user will have the same requirements. For example, investigators use tablets while fire fighters absolutely need ruggedized devices.)

In the future, government users may have multiple devices – a personal area network around themselves. City of Seattle has PBX systems today. What if that was all eventually handled by LTE? While I am in the building, my desk phone could connect to a femtocell tied to the PBX via a reliable network that would continue to operate even if the public telephone network is down. As I leave the building, my phone would roam onto a public safety LTE network, and eventually roam onto a commercial carrier network when I am beyond the coverage area of the public safety network. That would add even more devices to the LTE network.

Dual mode (voice and data) capability is possible and could be available in the foreseeable future. The question is: How do you work with today's products and transition to the future state? You may spend as much time managing the transition from P25 LMR and existing cellular architectures to dual mode, LTE systems. The transition will be significant because the LMR and LTE "worlds" are so different. When you put RF people in the same room as IP people, there will be a conflict of ideas because the two technologies are so different. Part of the planning effort should focus on how to bring the two teams together.

Host: We estimate that it will take 2 years to get LMR (mission-critical voice) into the LTE standards. It will then take another two years to implement LMR functionality (such as push-to-talk, one-to-many connections with hundreds of radios and within 1/2 second) on the LTE infrastructure. After that, there will be a period of testing at the national level (for example, at PSCR) and potentially some pilots. We estimate that this could be a 10 year effort overall. Our dilemma is that we need to replace our LMR systems within 5 years. If you have a different view on this, we would really like to get additional information from you.

Q: What do you mean by "Single System for Voice and Data?" Is a single, integrated network supporting multiple technologies (LTE and P25) sufficient? For example, could you have an initial deployment of LTE primarily for data with backup (non mission-critical) voice capabilities and use a P25 system for mission-critical voice, and later add mission-critical voice to the LTE system as standards are defined?

A: That seems like a logical transition. Again, our thinking is that it could take 10 years to complete this transition.

Q: What is the driving reason for needing to replace LMR within 5 years?

A: Technology obsolescence.

DHS/OEC created a national emergency communications plan (NECP, published in July 2008, now being updated). Every state also has a statewide emergency communications plan that rolls up into the NECP. Every state is looking at how they will sustain their current LMR system and how they will move onto some form of a broadband network. This is not unique to the Puget Sound region. Mission critical voice has a variety of requirements. We may not need to meet every mission-critical voice requirement before we can begin this transition. There is a gap analysis that identifies what capabilities will exist in the next version of LTE and how that would meet mission-critical voice requirements. There are proprietary solutions being proposed today that suggest that it will not require a forklift upgrade to add mission-critical voice capability to LTE. We suggest that you include in your response a gap analysis (by month and year) of anticipated challenges for

the next 2+ years so public safety across the county can more accurately assess when they are ready to move from LMR to broadband wireless systems.

Q: It would be helpful to hear from public safety which requirements are the most important so the most important things can be worked on first.

A: There is no easy answer. It needs to be a back-and-forth process between public safety and private industry – an evolving conversation about what is possible now versus what is still off in the future.

Q: There is a definition of mission-critical voice. Some LTE voice capability will exist in the next version of LTE. We need to do a gap analysis (between what is possible today versus public safety requirements) and prioritize the work. Some things will be standards issues. Some things will be technology issues. My question is: Does this list of mission critical voice requirements exist?

A: It is under development. It is helpful to look at requirements as on-network voice requirements versus off-network voice requirements. On-network voice capabilities could be solved first. Many manufacturers are working on this already. There are issues: how many talkgroups you can support, how many dispatch channels you can make available, etc. but this (on-network requirements) is a good place to start.

Q: If this gap analysis leads to a unified set of features that is approved, then what is the expectation that would follow: that certain companies would offer solutions that fulfill those requirements? It seems like this could that lead to another interoperability problem unless solutions are developed within the standards process and within agreed timelines.

A: We don't want to go too far into the standards development process. In terms of this RFI, it sounds like the consensus in this room is that you cannot do mission-critical voice over LTE today. If there is an immediate need, we need to implement a two-network solution. It would be interesting to hear if that is the case in your responses.

We do want private industry involvement during the standards development process. For example, it would be very helpful to have manufactures tell us what could be easily developed versus what will be very difficult and take more time. If public safety defines requirement on its own, the requirements may exceed what is possible and cost effective. Having a single, robust, reliable infrastructure with good coverage is more important than certain features to public safety. Economics will not necessarily allow implementation of two networks.

Off-network communications presents a real challenge. LTE standards don't currently allow for device-to-device communication. Two possible approaches: (1)

modify the LTE standard to allow device-to-device communication or (2) look at others standard that might allow for off-network communication. From a functionality standpoint, a single device might offer on-network and off-network, but it would only use LTE for on-network and some other standard for off-network. That may be the quickest path to full functionality in a single device.

Q: You said earlier that a subscription-based service may make sense. What does that mean?

A: Today, we subscribe to a service (for wireless data) and pay a monthly fee. As a result, we can budget for service as an operational expenses (# of devices times monthly fee times 12 months = annual operating budget). The risk of technology obsolescence falls to the owner of the network. However, if we give control of the network to someone else, they must meet our needs (for example, the ability to add and remove subscribers or to change talkgroups on the fly in the middle of the night). We don't care who owns, operates, and maintains the network, but we need a level of control.

Q: As time goes on, everything becomes obsolete, and someone has to pay to upgrade the network. Are you trying to avoid all upgrade cost?

A: We are not trying to avoid cost. We would like to shift the risk of technology obsolescence to professionals and subscribe to a service that meets our needs. Part of your subscription fee could include a premium to upgrade the network to keep it valuable to us. It's in your interest to do this, because if the service is no longer valuable to us we will go somewhere else. At this point, we have not decided that we will take this approach, but we would like to have some dialog about it.

We are looking at the possibility of combining networks to reduce overall cost. That's really what we really want to talk about. This is the business that you (carriers) are in, and you do it well and often. Can we partner with you, and what does that look like?

Q: Beyond the cellular broadband "last mile" services, are you interested in extending this model across all City services (for example, data center aggregation)? You provide public safety services/functions, and those functions don't necessarily end with last mile services. You could see additional cost savings by extending this to data center aggregation, virtualization, cloud computing.

A: We would be interested. If you believe that you can provide a service for public safety that could provide other efficiencies/compliment other work that King County and Seattle are already doing, we are open to that discussion.

Need to consider information availability beyond just the agency that owns the data. (How would out-of-area responders coming to Seattle on mutual aid calls

access critical information that historically only Seattle responders could access?) The whole concept of moving public safety information into a "cloud" to make it widely available has not been adopted by public safety. Public safety agencies have their own dispatch and records systems. We would need to know how those services would migrate to a commercial "cloud" service. It stands to reason that a commercially-available application should be able to serve public safety purposes. For example, a commercial augmented reality application should be able to provide a firefighter approaching a building with information about how many people are in the building.

Q: I heard that you are facing a 5-year obsolescence for LMR. Should we consider how labor unions will respond to the change? For the sake of the RFI, should we assume that there will not be any interruptions from unions, etc.?

A: In our analysis/planning, we have kept our police and fire chiefs in the loop. Most people in the region are aware that we are facing this obsolescence issue and are working with us. We are looking for the right way going forward (from the operations, technical, management, and funding points of view). Provided the functionality is equal, we are not concerned. Don't let responses be constrained by a labor issue. That said, if you believe it will be an issue, please put that in your response (that would be more information for us to consider).

May want to consider the example of how Seattle Public Utilities designs, builds, and operates treatment plants. A private company does designs, builds, and operates the plants while SPU does all of the governance.

Host: Things that the public sector could provide/share:

- *Spectrum (provided Congress allows it and that public safety gets priority, when needed)*
- *26 radio sites (in King County) and approx 45 sites throughout the three counties. We know that LTE will require many more sites than that, and government does not have these sites.*
- *Public buildings. Within Seattle there are several buildings are suitable for radio sites (in fact, some are used by commercial carriers today).*
- *Fiber: Within Seattle, there are over 500 miles of fiber that could be used for backhaul. In general, the region has a lot of fiber.*
- *Microwave: There are several microwave loops used for backhaul throughout the three counties today*

- *Funding: Agencies have operational funding (to keep existing LMR systems operational). Some agencies also have some capital funding. As part of its regional planning process, the region is looking at possible funding models for the next generation wireless network.*
- *Existing LMR equipment: some existing equipment may be able to be re-used.*
- *Four agencies each have their own radio repair shops that provide 7X24 support.*

We would also like to see solutions that could help us expand the number of users (to drive per user cost down). New users could include private utilities, public transportation, private transportation, public schools, and private schools. It could also include other applications. (For example, City of Seattle has 400,000 electric meters.)

City of Seattle has received multiple requests to share the list of attendees to enable companies to identify potential partners. If you do not want us to share your name and contact information, please send an email to PPP_RFI@seattle.gov so we can remove your name from the posted list.

Q: How about in-building coverage?

A: We would like coverage through the second wall.

Host: Things that private companies could provide/share:

- *Capital dollars*
- *System ownership, especially an LTE system that is part of the national architecture*
- *System operation (may be a shared responsibility – you know technical operation, we know operational requirements of first responders)*
- *National backhaul network (to join Seattle’s public safety network to those of other waiver jurisdictions)*
- *Roaming agreements*
- *Additional spectrum*
- *Radio sites. We would be very interested to know if you would be willing to share sites and under what conditions. Many sites would be needed for an LTE network. Additional sites could also be required for LMR to improve coverage, where needed.*

- *Seattle has an extensive network with unused fiber. With an LTE data network, you need fiber for backhaul. Could public fiber be used for the public safety network as well as for private purposes? (Fiber would not be restricted to public use only.)*

Q: What about minimum data speed?

A: 1/3 of workforce is mobile. Many have to come into the office because current service is not fast enough. Requirement will change over time. Only constraint is the minimum requirement are defined in Seattle's conditional waiver authorizing use of the 700 MHz spectrum.

Q: Any interest in sharing an LTE core with State of Oregon in future?

A: Yes

Host: In terms of response: This is informal. Don't spend a lot of time getting executive approvals without first bouncing ideas off us. Once we agree on a concept that we both like, we can pursue more detailed responses and executive approvals.

The objective is a functional, low-cost, supportable network. WE are not so concerned about who owns and operates the network at this point.

This is an RFI, not an RFP. If you can't meet all of the requirements, we still want to hear from you. We want to understand what your corporate strategy is. Are you already moving in this direction? If not, what do you need (from a corporate perspective) to make it happen? Is there something that we could provide to help you move in that direction? Please respond.

Q: If we submit a response will it be considered proprietary if it is marked as such?

A: Yes. However, we are governed by Washington State law that defines proprietary very narrowly. Intellectual property is considered proprietary, but pricing is not. See RCW 42.56 at www.leg.wa.gov for details. If we are required to disclose information, we will let you know before we do.

Host: The RFI requests pricing. Because you do not have enough information to pricing things out in detail, we are just asking for unit (list) prices. That will give us an idea of overall cost.

Q: Do you have a sense of timeframe for reviewing RFI responses, deciding whether or not to release an RFP, producing that RFP, etc.

A: We have a looming deadline for LMR. Within 12 months, we expect to have some kind of procurement process. There is a regional executive policy committee, chaired by Deputy King County Executive Fred Jarrett, that is actively considering

how to build and finance the next voice system. Some decisions about financing and next steps will be made in REPC meetings (generally open to the public). Send a note to RFI_PPP@seattle.gov if you would like more information about REPC meetings.

Comment regarding next generation 911: How do we get video to the first responder in the field? It has to be over this network. There are standards in place that define how some of that must be done. This network must meet those requirements.

Q: Are you interested in learning about devices?

A: That's a dilemma. You have to put the device in the hands of someone that will use it. There is no single device that every first responder will use. There are about 4 million first responders in the US – a tiny fraction of the commercial market for devices. If first responders want too many different devices, it will drive cost up. Public safety needs to consider what's available commercially. If device requirements are too complex, they will be too expensive.

Comment: The ability to implement personal area networks / vehicle area networks and allow first responder to choose their devices should be considered in responses.

Host: Because this is an RFI (and not an RFP), comments and questions are not cut off at this point. You can continue to submit questions to RFI_PPP@seattle.gov. We will respond and post responses at www.seattle.gov/doi/vendors.