

Where are we with FirstNet Planning?

and how does FirstNet relate to other telecommunications planning requirements, jobs and Economic Development opportunities?

Vermont FirstNet is one very unusual IT procurement process. The concept and enabling Federal legislation aims to create a “public safety grade” wireless broadband communications network for first responders and others. It entails a 25 year contract term yet the life-cycle costs remain totally unknown. A reasonable estimate would be \$100M or more.

The Radio Area Network (RAN) portion of FirstNet is where Vermont has a significant choice to make impacting not only Vermont's FirstNet effort but also other important telecommunications planning efforts. We can and we should use the FirstNet initiative, momentum and evolved planning process as a vehicle to resolve a number of long-standing telecommunications management, planning and governance shortcomings.

The FirstNet national core network will be built by AT&T and databases are likely to be built by federal agencies, AT&T and other subcontractors. We should assure that these are built to a non-proprietary standard in order to be accessible via multiple carrier networks. These include, for example, mapping companies, EPA and hazardous chemical supply chain vendors. Vermont will have little to say about these database designs other than if we were to contribute useful data, software applications, ideas or inadvertently disclose sensitive, personally identifiable data. CAUTION!

The way the national FirstNet legislation was crafted, presumably with extensive (aka. expensive) influence by the industry, including AT&T, the opt-in decision, or even not making any decision at all, will result in a 25 year monopoly procurement that somehow bypasses all state scrutiny and safeguards that Vermont has put into statute and Administrative Bulletin 3.5 in response to a series of failed and very expensive IT procurements over the last 20+ years. This is very serious.

As an Opt-In decision is apparently not now being considered to be a “procurement” under the definition of IT activity or service governed by Bulletin 3.5, the statutory detailed planning requirements, life cycle cost analysis, cost benefit analysis, privacy protection and public access impact reviews, Independent Expert Review, technology architecture review, etc, have not been completed, nor even started, for the default opt-in AT&T Radio Area Network plan for Vermont.

Furthermore, the AT&T state plan for Vermont is shrouded in over-broad claims of proprietary trade secrets and system security risks, all therefor alleged to be exempt from Vermont Public Records Act disclosure requirements. Similarly, the nationwide contract between FirstNet and AT&T which presumably contains the details of exactly what the states are buying into, and any penalties for non-performance, are also not being made available for review. States are in effect flying almost totally blind.

The key details that **we do know** about the impacts of an Opt-In decision are as follows:

- Vermont would forfeit \$20M to \$25M in available NTIA grant funds. FirstNet would instead award these funds to AT&T for their discretionary use.
- Vermont would forfeit to AT&T all rights to control the 20 MHz of Band 14 radio spectrum which would otherwise be leased to the State of Vermont for state priorities such as e911, community broadband and FirstNet related projects.
- Vermont would have no recourse against AT&T for non-performance in network build out plans, coverage, timely “deployable” delivery or network hardening requirements such as backup power or violations of personal privacy.
- Vermont may also be inadvertently forfeiting all state regulatory jurisdiction of the Vermont Public Utility Commission over FirstNet network hardening by AT&T to *Public Safety Grade standards* such as tower reinforcements, generator backup power requirements, protected ring architectures for diverse routes for fiber backhaul and most importantly, privacy protection for the very sensitive personally identifiable information which will be transported across the FirstNet state core network and potentially into the national core networks or spilled into proprietary AT&T databases such as *Hemisphere*.
- AT&T has acknowledged that they do NOT plan to harden all radio towers to Public Safety Grade standards, nor will they assure installation of backup generators and fuel supplies at every tower, thereby virtually assuring numerous tower failures in any severe snow/windstorm event or regional power blackout. What recently happened in Houston and Puerto Rico, losing 95% of cell towers merits detailed study. After three weeks, communications are only 30% restored.
- AT&T's dubious proposal to respond to an emergency in rural Vermont by trucking in a "deployable" temporary cell site in areas not served by LTE towers or microcells, with up to a 14 hour delay is not only grossly insufficient but it does not account for the possibility of impassable roads as Vermont has experienced or severe weather unsuitable for highway travel. This plan is folly and does not protect Vermonters adequately by any stretch. The proposed AT&T solution might more aptly be described as *deplorable*.
- AT&T has acknowledged they do not plan to build out the Band 14 spectrum quickly across all of Vermont nor will the State retain the option to control the use of this valuable 700 Mhz band 14 radio spectrum.
- AT&T's existing coverage and the proposed AT&T coverage maps are demonstrably inaccurate and therefore not reliable, risking leaving vast portions of Vermont with none or very weak cellular coverage, putting our citizens, visitors and first responders at unacceptable risk.

- Verizon Wireless, on the other hand, which currently holds an estimated 70-80% of Vermont's public safety first responder cellular contracts, (a full 90% for the Department of Public Safety) has stated that Verizon has no intentions of building a Band 14 network. They will however build a dedicated national FirstNet core and will certainly make a concerted effort to retain their existing public safety customers in Vermont and elsewhere. FirstNet is attempting to preclude this.
- Vermont based VTel owns the adjacent spectrum to Block D Band 14 across most of Vermont and might cost-effectively deploy Band 14 in Vermont at less cost and more rapidly than any other carrier. This option also has a jobs impact worth considering.
- AT&T's FirstNet plan for Vermont is not tailored to immediately enhance wireless coverage to assure 911 access along all state highways and in community centers consistent with the goals and policy of 30 VSA 202c
- AT&T's plan in no way supports state broadband buildout goals and, as an example, AT&T has thus far refused to enter a roaming agreement with CoverageCo, the state's vendor for roadside microcell installation to fill dangerous gaps in highway e911 access. AT&T is also working to dismantle Network Neutrality rules.

Multiple requests to both the Secretary of Administration and the Secretary of the new Agency of Digital Services inquiring as to any progress on the Independent Expert Review and life cycle cost analysis for the proposed opt-in AT&T system have not achieved meaningful results. Secretary John Quinn recently provided a brief reply on September 19 stating:

"As you probably already know, the Agency of Digital Services initiates independent reviews (IR) after a vendor is chosen but before a contract is signed."

The relevant statutory sections governing "information technology activities" planning requirements and Independent Expert Review are excerpted here:

3 VSA 2222 (a) (9) (A)

- (A) a life-cycle costs analysis including planning, purchase, and development of applications, the purchase of hardware, and the ongoing operation and maintenance costs to be incurred over the expected life of the systems; and a cost-benefit analysis which shall include acquisition costs as well as operational and maintenance costs over the expected life of the system;
- (B) the cost savings and any service delivery improvements, or both, which will accrue to the public or to State government;
- (C) a statement identifying any impact of the proposed new computer system on the privacy or disclosure of individually identifiable information;
- (D) a statement identifying costs and issues related to public access to nonconfidential information;

3 VSA 2222 (a) (10)

...For purposes of this section, "information technology activities" shall mean:

(A) the creation, collection, processing, storage, management, transmission, or conversion of electronic data, documents, or records;

(B) the design, construction, purchase, installation, maintenance, or operation of systems, including hardware, software, and services which perform or are contracted under Administrative Bulletin 3.5 to perform these activities.

3 VSA 2222 (g)

(1) The Secretary of Administration shall obtain independent expert review of any recommendation for any information technology activity initiated after July 1, 1996, as information technology activity is defined by subdivision (a)(10) of this section, when its total cost is \$1,000,000.00 or greater or when required by the State Chief Information Officer. Documentation of this independent review shall be included when plans are submitted for review pursuant to subdivisions (a)(9) and (10) of this section. The independent review shall include:

(A) an acquisition cost assessment;

(B) a technology architecture review;

(C) an implementation plan assessment;

(D) a cost analysis and a model for benefit analysis;

(E) a procurement negotiation advisory services contract; and

(F) an impact analysis on net operating costs for the agency carrying out the activity.

Unfortunately, December 28 is fast approaching and as the FirstNet 'procurement' requires no contract be signed to be deemed an Opt-In, there will be no opportunity to conduct these reviews unless an Opt-Out decision is made. Opting out would result in an additional eight months of planning time. In fact, there is now insufficient time to do these reviews before December 28th, even were deemed to be required by law.

FirstNet is fundamentally a telecommunications network, an IT system and IT services all rolled into one. Vermont statutes in 30 VSA 202d state clearly that: (emphasis added)

*(a) The Department of Public Service shall constitute **the responsible planning agency of the State for the purposes of obtaining... a technologically advanced telecommunications network... The Department shall be responsible for the provision of plans for meeting emerging trends related to telecommunications technology, markets, financing, and competition.***

In accordance with Vermont statute, the Department of Public Service is **the designated agency** which is supposed to have completed a FirstNet alternatives analysis as well as other detailed maps and plans for broadband and the 2017 rewrite of the Ten Year Telecommunications Plan. Nonetheless, the PSD has been not much more than a passive observer of the FirstNet process being led by the Department of Public Safety with casual and occasional advice from the PSBNC members.

According to statute 30 VSA 202d:

The Plan shall be for a 10-year period and shall serve as a basis for State telecommunications policy.

The Department of Public Service Connectivity Division is also obligated to map wireless and broadband coverage as detailed in 30 VSA 202e.

(4) if monetarily feasible, the areas served and the areas not served by wireless communications service, and cost estimates for providing such service to unserved areas.

Mapping is fundamentally necessary in order to complete a credible and complete Ten Year Telecommunications Plan, due by year end 2017, as well as to support an informed FirstNet decision. The Department, as with the PUC, has bill-back authority to fund their operations such that the regulated utilities pay a proportionate share of the costs of the regulatory and planning activities. Thus it cannot possibly be credibly argued that the necessary updated wireless propagation analysis and mapping was not “monetarily feasible”.

Despite repeated requests emphasizing the need for an update to the 2010 and 2013 wireless propagation studies and drive tests in order to compare the AT&T wireless coverage proposed with Verizon and VTel's recently turned up LTE coverage, the Department of Public Service continues to refuse to conduct these studies either to support informed FirstNet / PSBNC decisions or to complete the 2017 required rewrite of the Ten Year Telecommunications Plan. Similarly, the Department of Public Safety claims that they need only compare proposals to the initial and inadequate requested Baseline_Coverage made to the NTIA which is also claimed to be secret. CAUTION

Executive Order 05-13 was signed by Governor Shumlin in 2013 creating the Public Safety Broadband Network Commission (PSBNC) whose purpose is:

...to ensure the building, deployment and operation of a statewide interoperable public safety broadband network that meets the interoperability goals and specifications of the FirstNet nationwide public safety broadband network ...

...the Commission shall report to the Governor annually on implementation of the public safety broadband network in Vermont and nationally, and shall include information regarding the use of grant money received in Vermont for the purpose of building a public safety broadband network. The report shall also include information regarding how the completed system will be sustained.

The PSBNC has not met monthly, has not begun to address the many issues outlined herein and has only recently issued an RFP which appears to have been designed to fail, specifically discouraging any coordinated i.e. broadband approaches.

It is my understanding that Vermont Statutes trump Executive Orders, thus the PSD should have been required to take the leading role to plan for FirstNet, albeit in close coordination with the PSBNC. The conflict and its resolution now comes down to building legislative oversight capacity or even intervention, which is precisely why we are here today.

It's been a full decade now, dating back to 2007, when the DPS first missed a Ten Year Telecommunications Plan deadline, during which time nearly \$250M in public funds from State and Federal sources were invested in Vermont's telecommunication infrastructure. During this same time the PSD and the VTA apparently adopted the attitude that the Vermont statutes relating to telecommunications planning requirements were just "*aspirational*" rather than "**serve as a basis for State telecommunications policy.**" as set forth in 30 VSA 202d.

So we now have this massive twenty-five year, \$100M IT/Telecommunications project called FirstNet, with a required decision imminent and grossly deficient planning to support the decision.

- We have an automatic Opt-In date approaching on December 28th.
- We have no current and duly adopted Ten Year Telecommunications Plan to serve as a "basis" for this decision.
- We have no analysis to review of FirstNet alternatives, prepared either as part of the Ten Year Telecommunications Plan nor the PSBNC Request For Proposals.
- We have no Independent Expert Review of the AT&T secret plan.
- We have no life-cycle, cost benefit, privacy implications or public access analysis.
- We have a looming decision deadline that impacts potentially \$100M and the next 25 years of public safety telecommunications services and systems, and thus impacts the health and safety of all Vermonters, visitors and first responders.

Its important to note that, despite PSBNC Chairman Terry LaValley's protestations otherwise, FirstNet was never intended to be a Public Safety only dedicated network. It was always designed to be operated on ***hardened to public safety grade*** commercial cellular LTE networks with the ability to enable priority and preemption features of LTE technology such that First Responders and other emergency officials will not need to compete for available cellular channels in times of emergency.

The network that will carry FirstNet traffic will also carry commercial subscribers and FirstNet users will likely be subsidized by the other commercial users of network. This presents a unique opportunity for Vermont and the three Vermont LTE carriers provided their customers can all reach FirstNet services, a question not yet resolved.

The unique opportunity is that the State of Vermont could enter a public/private partnership with a vendor able to integrate one or more LTE carriers into a statewide FirstNet RAN. The revenue model required to sustain such a network would necessarily be both transparent and accountable, assuring continued investment in hardening and improving the network. This is a fundamental requirement of the NTIA grant funding.

The federal enabling legislation is explicit on this point in [Section 6208](#):

(d) REQUIRED REINVESTMENT OF FUNDS.—The First Responder Network Authority shall reinvest amounts received from the assessment of fees under this section in the nationwide public safety interoperable broadband network by using such funds only for constructing, maintaining, operating, or improving the network.

In an Opt-Out multi-carrier network scenario, or even with a single Vermont LTE carrier, a share of the FirstNet eligible subscribers' monthly rates would need to be separately accounted for and deposited into special funds subject to audit by the Vermont FirstNet governing Council, whoever that ends up being, and presumably the Vermont Public Utility Commission in much the same way as the Universal Service Fund is now managed to support e911, TDD and the Connectivity Fund.

As Verizon Wireless currently serves the lions' share of public safety subscribers in Vermont, and VTel may well have designed their network to complement, as well as to compete with Verizon, to achieve the best possible FirstNet coverage for Vermont and the best strategy to create the most resilient network, and to reach the NTIA required subscriber counts is for the State to explore partnering with a network integrator that would incorporate both VTel's and Verizon Wireless' infrastructures, and possibly AT&T's as well. VTel would build out Band 14 and Verizon retains its customers.

The revenue stream from thousands of FirstNet eligible subscribers to the Vermont FirstNet special fund would be substantial and the risk of not meeting the required NTIA subscriber levels would be minimized. The complexity of where to invest the initial NTIA grant of up to \$25M, into which LTE network, and how to prioritize ongoing revenue reinvestments in network hardening to best serve the State's goals can be resolved in the context of a Telecommunication Governing Council and PUC proceedings. Some unresolved but crucial plan elements still must be addressed:

- NG911 integration? FirstNet connectivity to and from PSAPs
- Bridging to existing Land Mobile Radio (LMR) networks?
- LTE relationship to enhanced E911 coverage goals along state highways?
- Relationship to state fiber and broadband goals and planning?

- Enforceable Privacy protections for FirstNet personally identifiable information?

What is the best course of action for the Governor and Legislature? No question:

Opt-Out and hire competent engineers to plan for eight months!

What would a credible and comprehensive planning process look like?

Who takes the lead? Who are the participants?

How exemplary transparent can this process possibly be?

How can we make Vermont a proving ground for *FirstNet - done right*?

How might we attract additional federal funding to accomplish this?

How might we work with the State of New Hampshire whose FirstNet Commission has just last week recommended that the Governor Opt-Out?

How might Vermont work with not only New Hampshire, but also Maine and the northern counties of New York, possibly using the Northern Border Regional Commission as a governance structure both to build FirstNet more quickly but to coordinate and integrate support for economic development based on broadband?

A FirstNet public/private partnership of this scale will require greater involvement and oversight by diverse stakeholders, Executive, Legislative, Telecommunications Carriers and Non-Governmental organizations than any other telecommunications project in our history. This is no longer just a Department of Public Safety project. It also will require analysis of the impacts and opportunities across state and local governments, healthcare, education, economic development and regulatory sectors.

A hardened high performance telecommunications infrastructure serving public safety requirements will also now necessitate our developing an understanding within the legislative, executive and judicial branches of precisely how much our future economic prosperity relies on high performance networks enhancing, regulating and learning to build opportunity founded upon these new broadband networks.

Let's focus on FirstNet First.

Telecom Carriers

Identify potential LTE carrier partners.

- Verizon?
- VTel? Both?
- U.S. Cellular?
- T-Mobile?
- AT&T? All of the Above?

Integrators

Rivada Networks has already been selected by New Hampshire and thus might be the best systems integrator positioned to help Vermont develop a state plan, possibly with one or more neighboring states and LTE carriers.

State Participants

Vermont

New Hampshire as a potential RAN partner?

Maine? Their Governor's Opt-In decision may not yet be legally binding!

Northern Border Counties of New York?

Massachusetts?

Governance issues will immediately arise

Northern Border Regional Commission as a vehicle?

All-Carriers Propagation Analysis and drive tests - transparent data

The Vermont PUC first needs to order access to precise tower and antenna data as the carriers will not willingly provide these details.

Carriers and States need to fund both one time and refresh propagation modeling and drive tests. We should also explore the potential for developing home grown capacity for refreshing wireless coverage mapping, possibly at VTC.

All-Carriers fiber backhaul inventory

All-Carriers microwave backhaul inventory

State of Vermont microwave OC-3 SONET ring backhaul capacity

Gap / Dead-Zone mapping

- LTE
- 2G/3G gap mapping along highways for border to border e911 access
- LMR gap mapping to support necessary consolidated dispatch planning

Tower inventory

- Hardening assessments
- Wind/Snow/Ice resistance
- Backup power
- Diverse backhaul via fiber and/or microwave
- Microwave line of sight access
- Accessibility for service/refueling in severe weather conditions

Finance modeling

- Engage First Responders as investors \$10/mo. vs \$30/mo. or \$50/mo.
- FirstNet revenues use restricted by federal law to:
Operation, Maintenance and Improvements to Vermont FirstNet

What better plan could possibly be designed for a first responder public engagement process than having a known portion of each subscribers' FirstNet cellular data and voice fees being prudently and transparently reinvested toward an agreed upon incremental network hardening strategy, both completing today's LMR canopy while simultaneously growing FirstNet toward a ten year plan for complete statewide LTE broadband and FirstNet coverage?

Early years expenditures should prioritize coverage enhancements

- Core sites need to be hardened immediately
- LMR Fail-Over is an on-going immediate priority
- Mid years lean toward tower and ring hardening enhancements

Integration with Ten Year Plan and Five Year Strategic IT Plans

Shared middle mile dark fiber builds for both backhaul and broadband

CUDs potential for DWDM to convert ring to resilient mesh architectures.

GOVERNANCE AND OVERSIGHT

The Vermont FirstNet alternative RAN plan, the Ten Year Telecommunications Plan, the Five Year Strategic IT plan, the Connectivity Broadband Action Plan and the Healthcare IT Plan must all be well coordinated to result in an efficient, integrated policy and action framework to strengthen our economy.

The management of such an effort should be accomplished by a newly created Vermont Telecommunications Council appointed by the Governor pursuant to an Executive Order in the near term, and which should later be crafted into statute after legislative review.

The planning, coordination and governance of FirstNet, E911, a new Vermont Interactive Television, VCOMM for LMR radio coordination, the state owned SONET microwave network, the prior VTA owned fiber assets, the VTRANS fiber buried in the I-89 & I-91 median, VELCO fiber assets and the state government's leased fiber speed circuits configured as a Ten Gbps network must all be working in harmony toward greater government efficiency and economic development.

A Vermont Telecommunications Council making executive, not advisory decisions is needed now, informed by a small number of advisory working groups. The working groups would be convened of subject matter experts from the public, private and non-profit sectors working to evolve sound policy and technical analysis. The Council would be staffed by a lean group of professionals reassigned from existing departments or borrowed from academia or industry. This structure would provide the necessary expedited and prioritized planning, analysis and recommended action items for the full Council's financial and policy decisions.

At present, what is required is independent, objective expert analysis and consulting to design such a governance structure and this should begin immediately. These consultants' services can be funded as an eligible expense from the \$500k remaining available in the FirstNet SLIGP grant funds. This finance opportunity for the required consulting must be acted on immediately as the remaining SLIGP funds must otherwise be returned to NTIA as the SLIGP-2 competitive notice of funding opportunity (NOFO) has recently been announced.

Planning integration:

- Planning oversight by whom?
- Proprietary and security exemptions identified and strictly limited
- Immediate integrations of e911 and Broadband Planning efforts
- Priority emphasis on backup power for VOIP telephones

Regulatory oversight

- New rules for hardening, testing, audit and reporting.
- New rules of supervised access to mission critical splice cans

- New rules of supervised access to generators
- New rules of supervised access to equipment rooms/cages
- Reconcile/Coordinate rulemaking across VT/NH/MA/ME/NY

FCC will eventually catch up and take over

Cross Border Radio Coverage protocols

Cross Border Data Protection protocols

Security

- Encrypted Storage Rules
- Audit trail on all sensitive data accesses

Potential Supporting Roles for:

- Regional Planning Commissions
- Communications Union Districts
- Public Safety Dispatch Entities /PSAPs
- Regional Economic Development Commissions
- Independent Telephone Companies
- Independent Cable Companies

An affirmative Opt-OUT decision by Governor Scott is necessary, made prior to December 28 and communicated no later than December 28 to NTIA and the First Responder Network Authority. This opens up the following significant opportunities for Vermont's FirstNet RAN:

- Invite Verizon, VTel and AT&T to discuss their willingness to make available portions of their Vermont LTE infrastructure for a statewide interoperable multi-carrier RAN design. We might expect AT&T to decline.
- Immediately begin to compile the database of all first responders and other FirstNet eligible users in Vermont such that all three LTE carriers can plan to implement procedures to turn on priority and preemption services for these users.
- Negotiate a public/private partnership with one vendor/integrator to design, improve, operate and manage a Vermont FirstNet RAN.
- Complete the FirstNet RAN plan in close coordination with the completion of the Ten Year Telecommunications Plan, which for the first time ever will be based on comprehensive infrastructure mapping and completed by a competent engineering firm.
- Design an incremental FirstNet network hardening design and complete LTE coverage strategy to be dynamically implemented in concert with local feedback regarding coverage gaps and consistent with available Vermont FirstNet revenues.
- Identify economically efficient strategies to leverage Vermont's FirstNet buildout in a manner which also enhances e911 coverage and provides dark fiber middle

mile infrastructure to support accelerated community broadband efforts.

- Design a FirstNet subscriber rate structure which maintains affordability for volunteer first responders and plow operators as well as state and federal employees, which enhances public engagement in decisions relating to reinvesting revenues consistent with agreed upon priorities for coverage enhancements and network hardening priorities.
- Design regulatory oversight mechanisms to assure that network reliability and resiliency measures are implemented, tested, audited and that accountable outage reporting requirements are in place and effective.
- Examine and quantify the potential for sustainable jobs creation resulting from the choice of our FirstNet implementation with a focus on minimizing use of itinerant technicians and engineers, instead immediately cultivating training programs and seek to identify new graduates entering the workforce as well as retraining retiring or laid off workers from FairPoint, SoverNet, etc.
- Compare and contrast the long term economic impacts and benefits of committing to a "*Buy Vermont First*" strategy of FirstNet construction and management as an alternative to existing practice of carriers relying on out of state telecommunications construction subcontractors with many if not most management decisions made in other states as well.
- Explore and quantify the potential to rapidly multiply the number of good jobs created by developing a strategic plan toward building and managing additional high performance fiber speed networks and by cultivating opportunities for high paying jobs in network design, engineering, construction and maintenance, by replicating the FirstNet hardened network model to similarly serve the needs of Healthcare, Education, Public media, VLCT, Local governments, NGOs, Assisted living, Music, Early Childhood Education, etc.
- Submit the completed FirstNet RAN plan to NTIA and FCC for approval prior to August 2018
- Subject to plan approval, negotiate for the State of Vermont to lease the available 20 MHz of the Band 14 spectrum
- Subject to plan approval, submit application to NTIA for the \$25M

Should all of these worthwhile and still productive efforts fail to achieve a viable plan or partnership, or should the approval of the plans not be granted by either the NTIA or the FCC, Vermont will be automatically enrolled back in the AT&T plan. This is true regardless of current threats by AT&T to withdraw pending offers of a package of additional towers if not accepted now as part of an opt-in incentive.

The choice is clear.

Stephen Whitaker

2017.10.12