

CenturyLink Perspective on a Statewide Public Safety Communications Network

Michael Fargano and Thomas Schwengler

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Utah Legislature - Public
Utilities and Technology
Interim Committee



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CenturyLink's Position

- CenturyLink supports Utah's statewide public safety communications network.
- CenturyLink believes that a public-private partnership is the most efficient and effective way to build a scalable, secure, cost-effective, and reliable network.

Significant downside of building your own duplicative network versus being a customer or partner with a Service Provider

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Significant downside in building a microwave backbone network versus optical fiber network

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Utah Emergency Services Network at a Crossroads

- Does Utah spend the money and take the risk to build its own network and be on the hook for continual funding and technology upgrades...
- Or does Utah seek a service contract and/or partnership with a service provider to get an injection of free market principles...

Being a Service Provider Carries Technology Risk

- **If Utah were to build its own network:**
 - **You are now becoming a service provider in a high tech world.**
 - **The world of a service provider is very dynamic and competitive. Lack of continual investment is the road to oblivion – whether you are an internal service provider (like the current Utah proposed plan) or a free market player.**
 - **Bottom line: Utah takes on significant technological risk, thus performance and financial risk.**
- **It is really more a certainty (not a risk) that Utah will need a significant infusion of funds to keep up with technological change; and if you don't then performance and thus public safety will suffer.**
- **The likely scenario is that Utah will replay the current network obsolescence situation you now face.**



A Model of Options and the Tech Risk they Carry

- Think of a scale with:
 - build your own network and be a service provider on one side; with very high risk.
 - on the other end is a complete service contract with a service provider; with very low risk.
 - partnership in the middle; with moderate risk.

**Tech Risk:
Very High**

**Tech Risk:
Moderate; risk sharing**

**Tech Risk:
Very Low**

**Build your own
network and be
your own Service
Provider**

**Partnership with a
Service Provider**

**Complete service
contract with a
Service Provider**

Drivers of Technology Change

- Technology is changing at all levels in a rapid pace.
- Home and handheld devices; applications; broadband access networks; metro networks; core networks; 4G to 5G; small cells utilizing high capacity broadband network; IoT; smart cars
- All this drives the need for continual investment in networks to handle capacity increases.
- In addition, networks are becoming smarter and more flexible with technology platforms like SDN and NFV; again this requires investment.

Due Diligence is Required: Look at all Options

- Utah taxpayers deserve due diligence in looking at all reasonable options for their emergency services network.
- Look at partnerships, existing infrastructure, and service contract options as fair and reasonable alternatives.
- CenturyLink has mastered these approaches and can help Utah stakeholders understand the benefits.
- Example partnerships: Utah Education and Telehealth Network (UETN). Denver International Airport (DIA); with Network Operations Center (NOC) on DIA premises.

Operating a Network – No Simple Task

- CenturyLink's NOC (complex) was the first Service Provider in the world to be TL9000 certified (quality, reliability and performance).
- TL9000 builds on ISO9000 and is telecom specific.
- TL9000 requires continual quality improvement and we benchmark regularly; that requires continual investment.
- Thousands of technical experts monitor, troubleshoot, and repair every network element 24x7.
- CenturyLink is best-in-class in NOCs.

Section Summary/Conclusions

- Start a due diligence process and look at all reasonable approaches – including partnerships and service contracts.
- Consider tech risk and the certainty of need for continual funding and investment.
- Consider operations and NOCs and what it takes to get to the level of best-in-class.
- We respectfully ask that Utah consider alternative approaches to gain network services.

Significant downside in building a microwave backbone network versus optical fiber network

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Optical Fiber provides more capacity than ever

- *Fiber is the most efficient waveguide and has always been orders of magnitude greater than wireless.*
- Fiber optic physical layers are still improving.
- Dense Wave Division Multiplexing – 80+ wavelengths.
- Each wavelength increases modulation (towards 100Gbps).
- Glass improvements widen usable range for more wavelengths.
- Further research: multicore fiber tests have demonstrated Petabytes per second transport in one fiber.

Wireless Networks Today

- *All major telecom providers regard radio links as a good solution of last resort, where rolling-out fiber is too expensive.*
- Wireless links have improved greatly in recent years.
- For years mostly limited to DS1, DS3, OC-3.
- Today's radios are:
 - Cheaper than before – efficient chips and power amps.
 - Capable of Gbps Ethernet transport over a few miles.
 - Millimeter-wave are working on 10Gbps (<0.5mile).
- Total cost of ownership remains unchanged.
 - Construction, installation, equipment maintenance, repair, update remains expensive.
 - Technology upgrades require costly hardware replacement.

Radio Technology Improvements

- *Recent technology & capacity improvements are significant but:*
 - *Capacity increases are for short distances.*
 - *Rain will cause outages and/or capacity degradation.*

FIGURE 1

Long-term interference propagation mechanisms

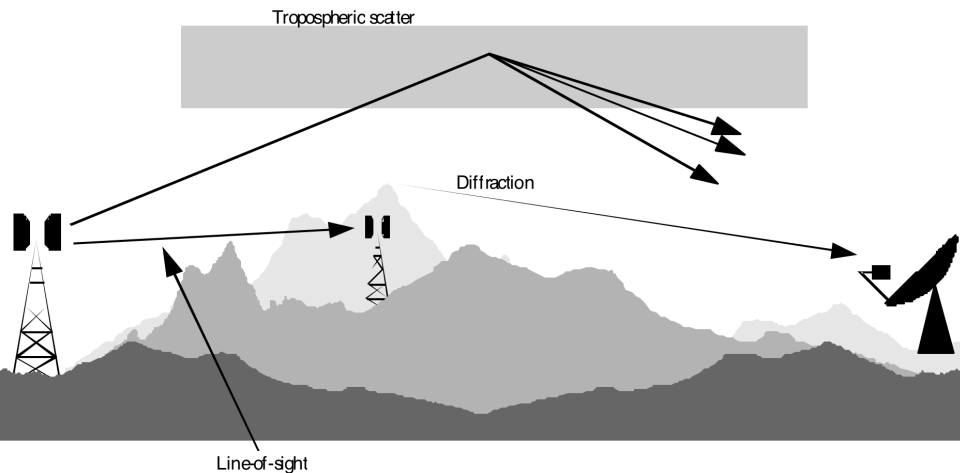
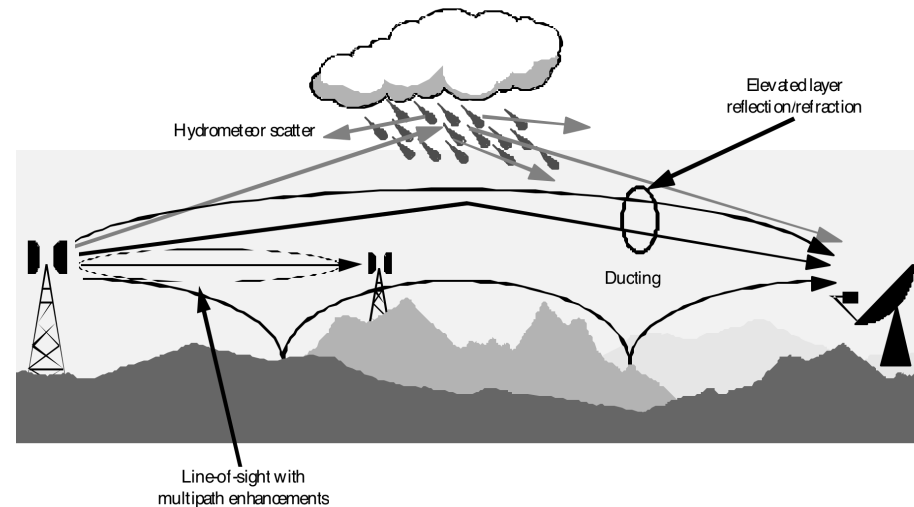


FIGURE 2

Anomalous (short-term) interference propagation mechanisms



Section Summary/Conclusions

- Building a microwave core network when optical fiber is available is a major strategic mistake. Strategic mistakes cost money and potentially impact public safety.

Final Conclusions – Recommendations

- Due diligence (e.g. RFI/RFP) is needed to look at all alternatives.
- Due diligence requires fairness of analysis of the options:
 - *UCA cannot be expected to perform the due diligence given the conflict of interest.*
 - *The Public Utilities and Technology Interim Committee should take on the role of performing due diligence or manage the due diligence process.*