

Rural Coverage Challenges and Opportunities

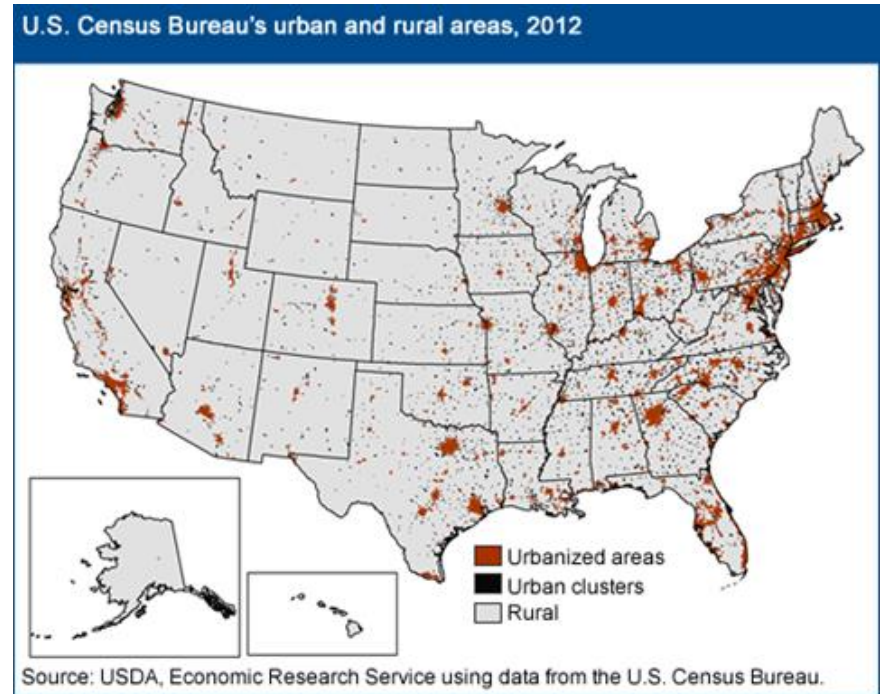
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Rural Coverage Challenges

- Money, Money, Money
 - 20,000 to 30,000 cell sites to cover rural areas
 - Rural areas comprise 16% of the US population (2010 US Census)
 - 97% of the land area of the US is classified as rural
 - Low population/many cells = limited spectrum value in rural areas
 - Limited value in using “excess” band class 14 spectrum
- Need for diverse and creative solutions to meet rural coverage requirements



- Urban = areas of >2,500 people
- Rural = area not included within an urban area

Types of Rural Broadband Coverage

	Amount of Coverage	Capital Cost	Operations Cost	Reliable	Timeliness
Satellite on Move	Nationwide (some blockage)	Low	Med (limited users)	No	High
Commercial Cellular	76%	Low	Low	No (1)	High
Deployable / COW	Virtually anywhere	Depends (2)	Depends (2)	Yes	Poor (2+ hours)
FirstNet (Band Class 14)	TBD	High	High	Yes	High (where available)

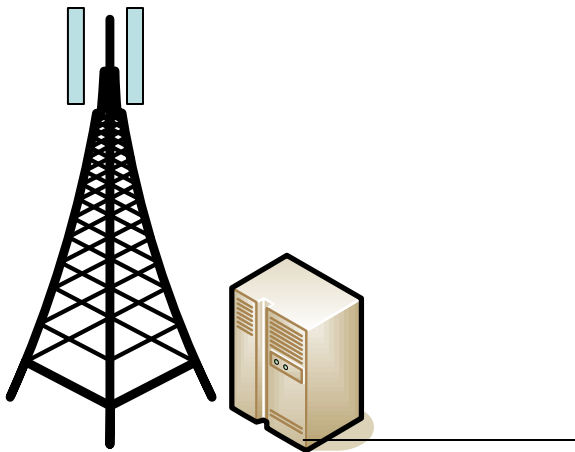
(1) Not “as is”, but could be hardened with priority service

(2) Depends on number of deployables required nationwide to achieve desired response time.

Incident Broadband Requirements

	Possible to Pre-Plan	Bandwidth Needs	Peak Traffic Need (Typical)	Deployable Usability
Routine Traffic Stop	No	Low	< 5 minutes	None
Emergency Medical	No	Depends	< 15 minutes	None (unit has mobile needs)
Derailment, Explosion	No	High	> 60 minutes	Yes, during recovery
Active Shooter	No	High	< 60 minutes	Possible
Planned Event (e.g., parade)	Yes	High	N/A	Yes
Wildfire	No	High	Ongoing	Yes

Service Availability Factors



- Equipment Failures
 - Power and backhaul are highest risk of failure
 - Tower, passive devices, lowest risk of failure
 - Electronics are at medium risk, but typically have low risk of failure
- Network Congestion
 - Highest risk during major incident (public consumption)
 - Typically significant unused capacity and spectrum in rural areas

Summary

- Unlike urban areas, commercial cellular spectrum *is not the issue in rural areas*
- Rural areas are very large, unreasonable to expect deployables in all cases in timely manner – leaving insufficient service for majority of incidents
- Nationwide Band Class 14 build-out in rural areas will be expensive over an extended timeframe
- Potential partnership opportunity that does not force Band Class 14, but instead finds economic solution to highly available service *augmented by deployables using Band Class 14 and satellite service*
- *Add redundant power source and backhaul to commercial service to make it more “public safety grade”*
- *Offer access to public safety sites in rural areas not served commercially*
- *Leave it open for the marketplace to solve problems – not dictate how the problem is solved.*

Q & A



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