

► BUILDING CAPACITY



Darryl Booth, MBA

Building Capacity Through LTE and 5G Wireless

Editor's Note: A need exists within environmental health agencies to increase their capacity to perform in an environment of diminishing resources. With limited resources and increasing demands, we need to seek new approaches to the business of environmental health. Acutely aware of these challenges, the National Environmental Health Association (NEHA) has initiated a partnership with Accela called Building Capacity—a joint effort to educate, reinforce, and build upon successes within the profession using technology to improve efficiency and extend the impact of environmental health agencies.

The *Journal* is pleased to publish this column from Accela that will provide readers with insight into the Building Capacity initiative, as well as be a conduit for fostering the capacity building of environmental health agencies across the country. The conclusions of this column are those of the author(s) and do not necessarily represent the views of NEHA.

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From my college days, I vividly recall certain moments of clarity. These moments occurred when the concept being discussed by the professor connected to my worldview. These snapshots of understanding were permanently detailed in my long-term memory. I imagine that I'm not alone in the experience of how impactful these "aha!" moments can be.

The business term **knowledge worker** describes workers whose main capital is knowledge, which includes people whose jobs involve handling or using information. Examples include pharmacists, scientists, accountants, and academics. My professor emphasized the fact that knowledge work-

ers (think now about environmental health professionals) require unrestricted access to data and the tools to analyze them, thus leveraging those data against the knowledge worker's training and experience to add greater value.

Leap forward and the model still fits. In fact, it fits extraordinarily well to our environmental health (and other) colleagues working in the field to protect the public's health.

As I meet now with many environmental health leaders, the conversation around field inspection hardware and software often follows a script that I will attempt to reproduce here.

What environmental health professionals love about field inspection software:

- I can avoid or reduce file review.
- I can reference a library of standard comments.
- I can integrate modern tools such as digital photography, video, annotation, and more.
- I benefit from easy communication with my manager, supervisor, and others.
- I can capture digital signatures.
- I can produce a high-quality, readable inspection report for operators and consumers.
- I avoid double data entry.
- I feel gratified that my employer invests in my efforts by providing equipment, software, and access.

Where environmental health professionals can struggle with field inspection software:

- I worry about battery life, readability, added weight, and accessories.
- I worry about the potential for hardware to be stolen or damaged.
- There are conflicting perceptions around paper-based versus digital inspection reports.
- I worry that the performance of the system (e.g., speed, reliability, ease-of-use) might undermine my human interaction with the operator, especially during tense moments.
- I worry that I can't rely on wireless (e.g., LTE and 5G) in a variety of situations where I work, including rural areas, basements, and industrial buildings.

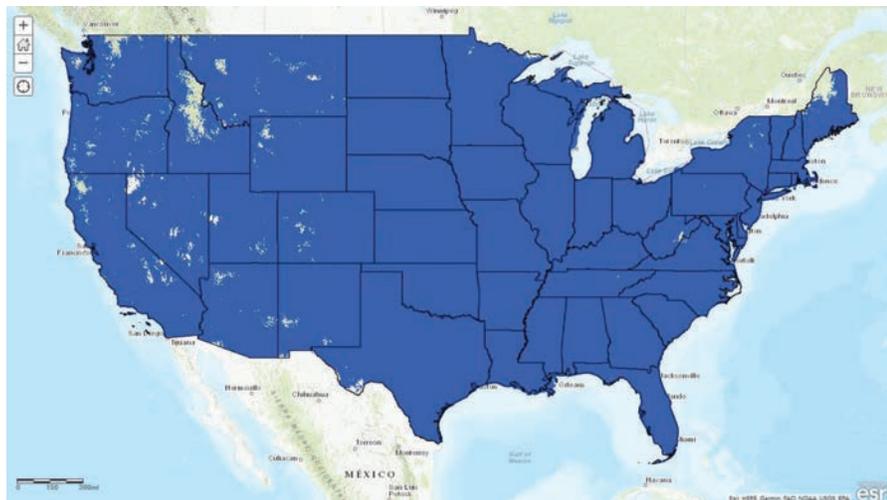
This column takes a deep dive and examines wireless reliability and its promise for the future.

Commercial Wireless Reliability

According to the *2020 Communications Marketplace Report* released in December 2020, nearly 100% of the U.S. population has access to at least one carrier providing

FIGURE 1

Nationwide Mobile Wireless Coverage, Year-End 2019



Note. Blue shading indicates coverage.

Source: Federal Communications Commission, 2020.

coverage to (at least) the U.S. Census block centroid (Federal Communications Commission, 2020; Figure 1). That last little bit, the reference to the U.S. Census Block centroid, is important because the “population” with coverage is counted if the carrier’s signal reaches at least the center-most point within that census block. It *does not* mean that every home or business in that census block has coverage. Just keeping things honest. We can, however, take away that U.S. wireless coverage is widespread and meets the definition of essential and reliable infrastructure. Wireless coverage is secure, inexpensive, and markedly prevalent in our personal and professional lives.

So, why then do we feel angst about relying on this network to do our field work? It is because we each carry a mental file folder of worst-case anecdotes such as the restaurant’s basement, the industrial warehouse, or the onsite wastewater treatment project far away from the nearest tower.

For your consideration: Are the worst case scenarios serious enough and prevalent enough to step away from wireless?

Contemplating that question, I set out to study how other knowledge workers attack the same problem.

When the stakes are highest, the workers’ equipment switches between networks. For example, if one network provider has no service, the device just switches to a different provider. Or, in a more economic option, the software preloads some data to enable offline work for a bit. Return to a covered area and our devices can “push” those inspections to the cloud or home office.

You will not be surprised to conclude that, as in many things, a balanced approach requires trade-offs. To have access to multiple services increases costs. To go offline for long periods increases latency and reduces inspector flexibility. The trade-offs will differ per program area, where public pools tend to exist in areas of great coverage and water wells do not.

I encourage knowledge workers to insist on data access and analysis tools, those things that—when combined with your education and experience—define you as knowledge workers. In that vein, I advocate for modern always-on connectivity where it is possible.

One can check regional coverage per carrier at sites like Signalchecker.com. There are also apps that, when running in the background over days or weeks, can give you personalized coverage maps built over time. Look for apps like Coverage and OpenSignal. Don’t, however, get drawn into a rabbit hole. Most likely, one of the big three carriers is already well-known for good coverage in your area.

Let’s understand that going offline is sometimes a reality. If we think about it objectively, it’s not very often for the vast majority of us. This group can march forward. In less supported geographies, we simply prepare for offline by beginning/ending our day in an area of coverage and keeping those data offline until we return.

Looking ahead to 5G, there is the promise of high-speed wireless sufficient to instantly inform autonomous vehicles of oncoming traffic. A reality in our largest cities, 5G is (at least initially) not that compelling in most geographies.

5G comes in three different flavors. At its host basic (low band), 5G can be slower than LTE. In metropolitan and dense urban areas, high and ultra-high band rollouts bring blistering speeds. This technology will come along very quickly, pushed forward by its commercial applications, and we shall be there to take advantage when it does. 🚗

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Reference

Federal Communications Commission. (2020). *2020 communications marketplace report* (FCC 20-188). <https://docs.fcc.gov/public/attachments/FCC-20-188A1.pdf>

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