goTenna

WHITEPAPER

Published May 2020

Disaster response communications in the age of COVID-19

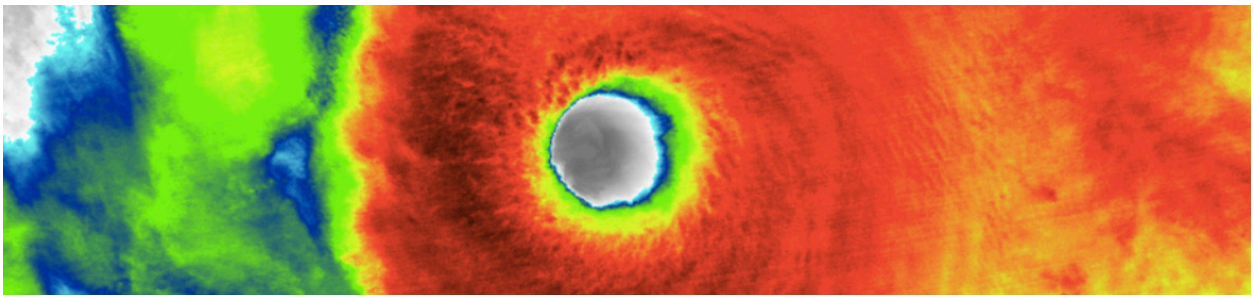
How the coronavirus will impact emergency management organizations' ability to coordinate and communicate during secondary disasters

Craig Fugate

Former Administrator of the Federal Emergency Management Agency (2008-2017)

COVID-19 will teach us many lessons, and the reality of every state's resources being fully engaged in pandemic response will illuminate challenges that have long existed. The next incident may not necessarily require ventilators and face masks, but one constant across all entities will be the need for reliable methods of communication, especially for first responders.

To develop the findings of this whitepaper, goTenna sought the input of Craig Fugate, the former Administrator of the Federal Emergency Management Agency and a career emergency manager. Here are his insights.



COVID-19 presents an immediate challenge to emergency management organizations responding to secondary disasters like hurricanes, floods, and wildfires.

Throughout the United States today, emergency operations centers are working remotely, first responders are precariously putting their lives on the line in the field, and both state and municipal governments are managing unique and unprecedented demands for hospital beds, testing sites, and mass feeding operations.

Resources and capabilities are palpably stretched thin — and this creates a significant, immediate challenge for emergency managers simultaneously preparing for seasonal floods, hurricanes, and wildfires. The response to recent tornadoes in the southeast United States was already hindered by COVID-19. The current flood season — while not as relentless as previous years — will similarly compound communities still recovering from the 2019 season.[1] In California, scientists expect the state's increasingly dry weather conditions to bring longer, more dangerous wildfires.[2] And now, perhaps particularly ill-timed, we're also seeing warmer temperatures in the Gulf of Mexico and Atlantic Ocean that signal record-breaking activity in the upcoming 2020 hurricane season. [3]

With threats from cybersecurity to climate change, disaster response challenges were mounting even without the need to operate within the "new normal" that COVID-19 presents. While this pandemic is the first emergency declared on a nationwide basis, it likely won't be the last. Our ability to address the challenges of a national incident occurring in all fifty states now will determine our preparedness and resilience for years to come.

COVID-19 will change the way emergency management organizations communicate.

As ventilators, tests, and personal protective equipment (PPE) flood our newsfeeds, we can't forget the basic need underlying any disaster response: communications. Whether emergency management professionals carry two-way radios or satellite phones, these tools enable critical situational awareness as an incident evolves. They facilitate an effective deployment of resources, and most importantly, they help keep everyone involved safe.

Even in the best of circumstances, our nationwide disaster response communications are limited. Radios are expensive to purchase and maintain from a technical standpoint, but also time-intensive to implement and train responders. Different jurisdictions have different systems, and a regular challenge of any emergency incident is interoperability — getting those systems, and the people who rely on them, to talk to each other. Existing communications infrastructure and equipment is outdated, and often fails when emergency responders need it most. The realities of recent disasters are staggering. Even a sampling of communications status reports from the Federal Communications Commission show how limiting our communications capability is in the aftermath of a disaster; 77% of cell sites were not functional a full month after Hurricane Maria's landfall in Puerto Rico in 2017,[4] up to 50% of cell sites in the Florida panhandle were down during Hurricane Michael in 2018,[5] and in the wake of the wildfires last year in California alone, over 200 cell towers were lost.[6] Our most disaster-prone communities have been trapped in an endless cycle of respond, repair, rebuild — and communications are the crux of both the problem and the solution.

Every community, and especially the ones still in the midst of recovery, are not fully prepared for the secondary disasters that lie ahead. But now, emergency managers must face our persistent communications issues as they take on a new shape with COVID-19.

> **"Think big. Think worst case scenario. You plan for that. You don't wait for it to happen, or you don't hope it won't happen."**
>
> — Craig Fugate on a recent episode of *60 Minutes*[7]

1 Traditional mutual aid and trained first responder resources may be overwhelmed or unavailable.

In a "normal" disaster, it's not unusual for states and communities to assist by sending their radios and communications equipment to the most impacted areas. This mutual assistance is a hallmark of the American response capability, but in a nationwide incident like COVID-19, there is simply not enough equipment to go around. With states gradually unveiling phased re-opening plans, trained professionals typically on call to respond as soon as disaster strikes will likely need to stay grounded. The lack of trained staff is especially detrimental to wildfire responses that require large, coordinated crews; the Bureau of Land Management is already calling for states to allow firefighters to travel and support incidents outside of their local jurisdictions.[8]

2 Local volunteers and supply chains will need to step in and fill the gap.

"Spontaneous volunteering" is a factor FEMA has worked to understand and incorporate into response planning.[9] Often, responders look at this as a "bug" in the system. In the age of COVID-19's travel restrictions, it's actually our greatest strength. However, traditional Incident Command Structure is simply not designed for interoperability with civilians and volunteers even in normal operations. In fact, typical training for Communications Officers and Units in the National Incident Management System focuses almost exclusively on government-operated systems. In larger incidents where public-private partnership becomes inevitable, emergency managers simply do not have the time to train volunteers on the proper protocol and technical skills required for operating current communications equipment. Today, those volunteers include medical professionals, truck drivers, grocery store workers, and food service workers.

3 Responding while social distancing.

Even if emergency management organizations had enough equipment and staff resources to respond to incidents in this unprecedented time, the need to maintain the personal safety of responders is now especially critical. Enforcing social distancing is key, and that means more remote coordination. Something as simple requiring face masks has led to anecdotal challenges where first responders receive unclear messages over conference calls and voice radio channels. Public safety agencies are currently implementing pandemic operating procedures called for by the Department of Homeland Security more than a decade ago,[10] but our communications landscape — and expectations for technology — has evolved considerably since then.

4 Communications equipment is expensive, and even an abundance of stimulus and grant funding won't cover "sunk" deployment costs.

COVID-19 has shut down the global economy for months. On the other side of this, state and local leaders will struggle for the resources they need. New York, for example, is expecting a tax revenue shortfall of $4 billion to $7 billion.[11] Certainly, as communities respond to COVID-19, priority is on giving first responders the tools they need to do the job — which includes communications capability — but many emergency management organizations will unfortunately need to balance those priorities with the sheer cost of normal operations.[12] Even if communications equipment is desperately needed, the investment must be justified more acutely. Investment in a radio system is a major commitment for any jurisdiction, costing not only money but time to implement, train, and maintain.

Mesh networking solutions from goTenna connect the frontline emergency responders of the COVID-19 era via a common denominator: the smartphone.

Governments regularly tell people to count on their neighbors and family members to be first on the scene, not a first responder. More likely than not, those people have a smartphone in their pocket. As emergency management organizations look to deploy spontaneous volunteers and local supply chains more than ever before, we need to embrace the reality that smartphones — not radios — are the common denominator for the "new" emergency management workforce. But we also need to make sure that they work.

All over America, our communications depend on being geographically proximate to a tower or wifi router; moreover, we expect these central telecommunications hubs to be functional. Mesh networking technology — originally developed for the military decades ago — offers a decentralized approach to communications. Instead of transmitting data through a central tower, base station, or hub, information passes from device to device using radio frequencies. Unlike traditional systems, there is no single point of failure. Individual devices or "nodes"within a mesh network automatically reroute data transmissions along the most efficient path, even as nodes drop in or out of an operation. This peer-to-peer setup also uniquely extends range allowing data to "hop" across multiple devices to get to the furthest point in the network. In a reality where the need for an app-based common operating system has never been greater, mesh networking solutions ensure emergency management organizations' ability to enable mobile connectivity even when cell, wifi, and satellite systems become unreliable or unavailable.

Mesh networking solutions from goTenna aren't our first introduction to this type of technology — but the company's goTenna Pro suite brings the simplicity and ease of use truly needed for today's civilian-friendly disaster response communication systems. Each mesh networking device, weighing less than 3 ounces, pairs to any iOS or Android device operating the company's native or supported third-party mobile applications. goTenna's off-grid mesh networks support the capability to exchange encrypted text-based messages privately or in groups, share objects and other points of interest on a map, and track locations for each individual operator down to a five-second interval. No matter the preferred app, the functionality is likely more intuitive than explaining how to communicate over a shared radio channel. The deployment time is as equally seamless as downloading an app and connecting it to the mesh networking device via Bluetooth.

goTenna's mesh networking devices have already been used in the response to several disasters with trained emergency management and rescue professionals — often traveling from out-of-state to support local agency efforts in the most impacted areas.

In the COVID-19 era, we can imagine how emergency management organizations — now likely relying more on local resources — could use the same mesh networking solutions in the immediate aftermath of a disaster when fixed infrastructure isn't an option:

Key Communications Questions

These questions can guide emergency management organizations as they look to procure new communications equipment in the response to COVID-19 and secondary disasters.

- ☐ Is everyone who needs to communicate connected?
- ☐ Does it work for multiple incidents?
- ☐ Can we communicate with volunteer organizations?
- ☐ Can people use their own phones?

Search and Rescue Operations

Search and rescue operations are inherently a group pursuit. When a call comes in, all available trained staff and volunteers show up to respond regardless of the equipment supply. Search and rescue teams have already had to change their approach to responsively socially distance during COVID-19.[13] Instead of distributing traditional two-way radios and face masks, rescue specialists now working in smaller groups — or even individually — could share more clear, frequent information on search progress as well as hazards and other position-location information using off-grid mobile apps on their own smartphones without risking their health and safety.

Supply Chain Management

As nonprofit organizations augment mass feeding operations in senior centers, schools, and other relief sites, it will become more difficult for decision makers at emergency management organizations to receive regular reports on supplies, traffic, and shortages — even in reliable service areas. When communities are counting on these resources, it's critical to know exactly where and when they will be arriving. Instead of relying on a few scattered satellite phones, mesh networking could enable critical text-based communications and location-tracking between every member of the team.

Fire Line Accountability

Even when external agency partners are not in immediate danger, emergency management organizations always need to be prepared for the unpredictable — and that couldn't be more true of wildfires. In a situation where a private sector contractor lends their staff and resources to assist with containment efforts, an easily interoperable mesh system to track individual and vehicle locations and share the latest fire perimeter updates adds an extra layer of accountability and safety that hasn't existed before.

Certainly a single system such as goTenna Pro won't solve every communications challenge, nor should we expect it to. Emerging technologies that allow for real-time imagery and video streams over a disaster site wouldn't be supported on goTenna's low-bandwidth networks, for instance. And there are likely still times when voice radios may be the preferred primary channel for communications, while mobile apps become the standard for map-based situational awareness. Any tool, with its benefits and limitations, should nevertheless be able to "plug and play" with what's already in use.

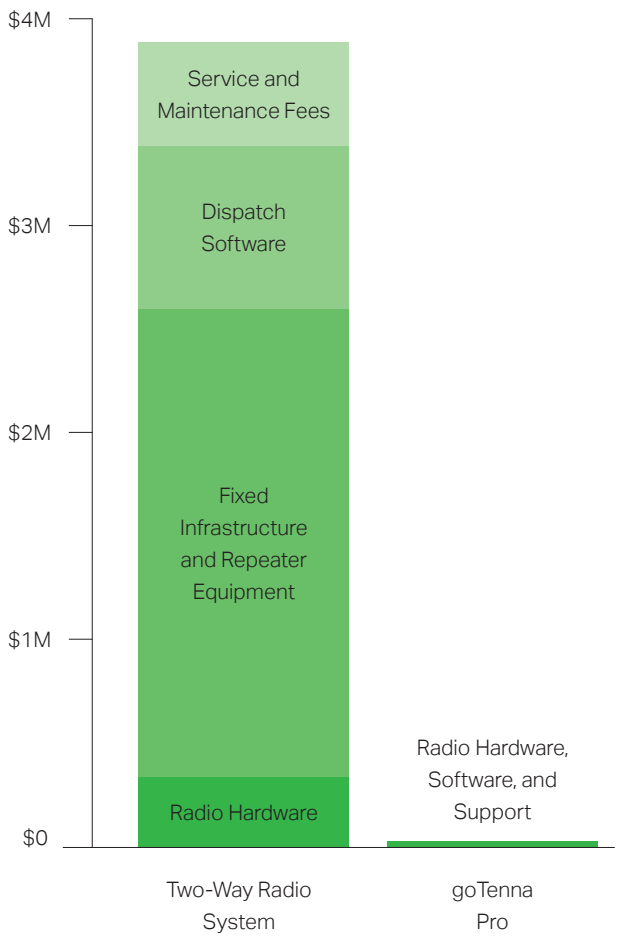
As agencies reevaluate their frontline disaster response toolkits in the COVID-19 era, they should focus on the technology that provides added value to their organizations. goTenna Pro uniquely doesn't take away from an emergency organization's standard communications equipment loads — it adds a redundant, resilient, off-grid situational awareness capability down to each individual's smartphone or tablet, and even supports data backhaul through cell and satellite connections to mobile command posts.

The COVID-19 era will also teach us to find the tools that cover our most essential needs — to stay connected with everyone supporting the incident, in any environment — in the most cost-effective manner possible. Consider thecosts of a traditional two-way radio system versus goTenna Pro's mesh networking system. Even a small public safety organization with 25 first responders faces a multi-million dollar investment to support the baseline radio hardware with towers, repeaters, dispatch software, as well as regular service and maintenance fees. At a mere fraction of the cost, emergency management organizations can be extending that same level of situational awareness and command and control functionality to even more staff and volunteers with goTenna Pro.

In any disaster, resilient communications are a challenge that must be addressed immediately or the response won't be as effective as it could be. That challenge has never been greater in the age of COVID-19. Mesh networking solutions like goTenna allow emergency management organizations to tell their staff and volunteers, for the first time: "Just bring your phones, and we'll make sure you always remain connected to each other in the field and back to us at central command." The unique complexities of simultaneously responding to COVID-19 and secondary disasters will be with us until we have a vaccine, and surely long after. For that, we need to plan our resources and investments in months and years, not weeks. It's time to consider the solutions that eliminate the guesswork and increase operational efficiency in the immediate aftermath of a disaster when every second counts. Ultimately, the "new normal" for disaster response communications will be the smartphone.

Comparing the costs of a traditional two-way radio system vs. goTenna Pro

Approximate costs for an agency with 25 first responders



*Based on publicly available contract information, a complete two-way radio system, including necessary tower infrastructure, equipment, software, and services, costs approximately $3.8M.

**A goTenna Pro X Deployment Kit costs approximately $25,000 and includes radio hardware, unlimited end user accounts for native and third-party software applications, as well as technical support.

Footnotes

[1] Union of Concerned Scientists. (2020, March 25). Retrieved from https://blog.ucsusa.org/kristy-dahl/new-ucs-analysis-coronavirus-and-flooding-set-to-collide-in-us

[2] Stanford Woods Institute for the Environment. (2020, April 2). Retrieved from https://news.stanford.edu/2020/04/02/increasing-risk-extreme-wildfire-weather/

[3] Penn State University Earth System Science Center. (2020, April 21). Retrieved from http://www.essc.psu.edu/essc_web/research/Hurricane2020.html

[4] Federal Communications Commission. (2017, October 11). Communications Status Report for Areas Impacted by Hurricane Maria. Retrieved from https://transition.fcc.gov/Daily_Releases/Daily_Business/2017/db1011/DOC-347187A1.pdf

[5] Federal Communications Commission. (2018, October 12). Communications Status Report for Areas Impacted by Hurricane Michael. Retrieved from https://docs.fcc.gov/public/attachments/DOC-354529A1.pdf

[6] Pogash, C. (2019, October 31). California Blackouts Hit Cellphone Service, Fraying a Lifeline. Retrieved from The New York Times: https://www.nytimes.com/2019/10/28/business/energy-environment/california-cellular-blackout.html

[7] Cooper, Anderson. 60 Minutes. (2020, April 19). Addressing the strain the coronavirus has put on America's food supply chain with José Andrés. Retrieved from https://www.cbsnews.com/news/jose-andres-chef-feeding-coronavirus-impact-60-minutes-2020-04-19/

[8] U.S Department of the Interior Bureau of Land Management. (2020, April 28). Bureau Of Land Management Strengthens Wildfire Response Capabilities Across The West Despite Covid-19. Retrieved from https://www.blm.gov/press-release/bureau-land-management-strengthens-wildfire-response-capabilities-across-west-0

[9] Volunteer Management Committee of National Voluntary Organizations Active in Disaster. Managing Spontaneous Volunteers in Times of Disaster: The Synergy of Structure and Good Intentions. Retrieved from https://www.fema.gov/pdf/donations/ManagingSpontaneousVolunteers.pdf

[10] U.S. Department of Homeland Security. (2009). Information for First Responders on Maintaining Operational Capabilities during a Pandemic. Retrieved from https://www.firstwatch.net/wp-content/uploads/2018/05/DHS-Comprehensive-First-Responder-Pandemic-Guide-Pandemic.pdf

[11] DiNapoli, T. P. (2020, March 17). State Comptroller DiNapoli Releases State Revenue Projection to Reflect Coronavirus Impact. Retrieved from https://www.osc.state.ny.us/press/releases/mar20/031720.html

[12] Romm, Tony. Washington Post. (2020, April 29). Mass layoffs begin in cities and states amid coronavirus fallout, threatening education, sanitation, health and safety. Retrieved from https://www.washingtonpost.com/business/2020/04/29/cities-states-layoffs-furloughs-coronavirus/

[13] Kordenbrock, Mike. Billings Gazette. (2020, April 3). Montana search and rescue groups: Pick the 'conservative outing' during COVID-19 pandemic. Retrieved from https://billingsgazette.com/news/local/montana-search-and-rescue-groups-pick-the-conservative-outing-during-covid-19-pandemic/article_a53970b3-7539-5707-b423-2e86eb788996.html

About Craig Fugate

W. Craig Fugate is a senior advisor at BlueDot Strategies. Most recently, Craig served as President Obama's FEMA Administrator from 2009 to 2017. Craig led FEMA through multiple record-breaking disaster years and oversaw the federal government's response to multiple natural disasters, including devastating tornadoes in the Midwest and hurricanes Irene, Matthew, and Sandy, among others.

Prior to his time in the Obama Administration, Craig worked for more than a decade with Democratic and Republican governors at Florida's Division of Emergency Management, serving as Director for more than seven years. During his time in Florida, he launched the largest mutual aid response to affected states in the aftermath of Hurricane Katrina.

About goTenna

goTenna is the world's leading mobile mesh networking company and provider of off-grid connectivity solutions for smartphones and other devices. In the public sector, goTenna's innovative mesh networking protocol is embedded into lightweight, low-cost tactical radio devices and paired with easy-to-use mobile apps enabling mobile, long-range connectivity even without cell, wifi, or satellite.

The goTenna vision to create a resilient communications system was ignited during Hurricane Sandy in 2012, when approximately a third of cell towers and power stations were knocked out. Based in Brooklyn, goTenna now supports mission-critical law enforcement, public safety, and defense operations around the world. For more information on goTenna's solutions for disaster response, please visit www.gotennapro.com.