



# UrgentLink<sup>®</sup>

DISASTER COMMUNICATIONS NETWORK

**Rockwell  
Collins**

Building trust every day

# Background

Tragedies such as September 11, Hurricane Katrina and more recently Hurricane Harvey, Hurricane Maria, and the California wildfires have illuminated the limitations associated with our current public safety communications infrastructure, as well as commercial services that many public safety organizations use as a backup.

## Recent disasters

Public safety communications are critical every day, but in a disaster they are a vital lifeline to those who need it most. However, traditional communications infrastructure, by the very nature of its design, is vulnerable in the event of a disaster.

Hurricanes, tornadoes, earthquakes – as well as man-made incidents such as bombs and cyber attacks wreak havoc on physical communications infrastructure. Components such as power lines, telephone, cable systems, mobile phone towers and even public safety-grade radio systems are all potential targets. Examples abound and the statistics are disheartening. Analysis of several recent disasters shows what an impact a disaster can have on communications capability:

### Hurricane Harvey

- › Three counties had 50 percent of cell service out<sup>1</sup>
- › Nine PSAPS down or degraded<sup>1</sup>
- › Five telephone switching centers offline, 38 on backup power<sup>1</sup>

### Hurricane Maria – Puerto Rico

- › Island-wide 100 percent power outage<sup>2</sup>
- › 11 of 20 public safety radio sites destroyed<sup>3</sup>
- › 95 percent of cell sites offline<sup>4</sup>

### Wildfires – California

- › 77 cell sites offline in Napa<sup>5</sup>
- › Key cellular hub damaged in Napa<sup>5</sup>

Because of the way disasters impact communications, planning on the use of backup modes of communication is expected. Backups generally fall into three broad categories: cellular phones, satellite phones and ham radios. Although for many, cellular is often the primary means of communication for private organizations.

Many public safety agencies and critical infrastructure corporations rely heavily on commercial cellular phones as backups. These are fine when a primary radio system lacks coverage or is temporarily out of service, but when a disaster occurs cellular sites and networks are also vulnerable. Commercial cellular networks are typically less resilient than public safety grade communication systems.

Many of the interoperability problems brought to light after September 11 as a result of first responders' inability to communicate have been resolved, but until now issues concerning the physical limitations of our national communications infrastructure and how well it can survive a disaster have not been addressed.

Many disaster management and recovery professionals have told us they have varying degrees of success with satellite phones as backup communications. They cite improper use by the end user, connection reliability due to adverse effects of weather and failure to function after being stored for months or years as their primary challenges.

For example, in Puerto Rico during the Hurricane Maria response – the dense fog, frequent cloud cover and rain on the south eastern end of the island made hand-held satellite phones highly unreliable. User error is also an issue with hand-held satellite phones, including errors such as attempting to use them indoors, without a full view of the sky, or before the phone fully registers with the network.

Ham radio operators provide a very important service during and after a disaster. Using High Frequency (HF) radios they can communicate long distances without reliance on local infrastructure that may have been damaged or destroyed. Many of the operators are trained in disaster response and generously volunteer their time and equipment to help out.

There is a weakness – availability. Ham radios require a skilled and experienced operator. The greatest need for them is typically during the first 24-48 hours after a disaster and it's during this time that it's most challenging for people to get around. If the ham radio operator is not on site when the disaster strikes you will not have access to their services.

In the case of Hurricane Maria, it took three days for the ham radio operator, supporting the Red Cross, to get to their headquarters.<sup>6</sup> And a week after, hurricane officials were calling to ask for even more ham's to be sent in from the US mainland. This challenge was faced despite this event being predicted ahead of time. What would the delay be with a disaster such as an earthquake that cannot be predicted days ahead of time?

It doesn't have to be that way. What if you could have the beyond-line-of-sight communication capability that doesn't rely on local infrastructure *or* local expertise? What if it was *always on* and easy to use? More reliable than satellite and didn't require a communications expert like a ham operator? Something always on site that can be used when any disaster strikes?

# Critical public safety communications during a disaster

The need for disaster communications supporting first responders and other public safety and critical infrastructure personnel during a disaster is clear and simple – without it, public safety is at risk. During a disaster, there are three primary functions that disaster communications facilitate: emergency requests for assistance, informing the public and coordinating response resources.

But what happens when the communications infrastructure fails? Examples include law enforcement and fire personnel unable to respond to requests for help, emergency managers unable to coordinate disaster responses or ask for the appropriate types of assistance, hospitals unable to properly respond to requests for assistance or report their capacity, critical infrastructure sites such as nuclear power plants and dams may have needs, risks or failures that go unreported.

## Public safety communications infrastructure challenges

Currently, there are extensive communications capabilities available, but as Hurricane Maria and other recent disasters demonstrated, many of today's communications systems are built with local resources leaving them at risk to a disaster that can – often times simultaneously – render them inoperable.

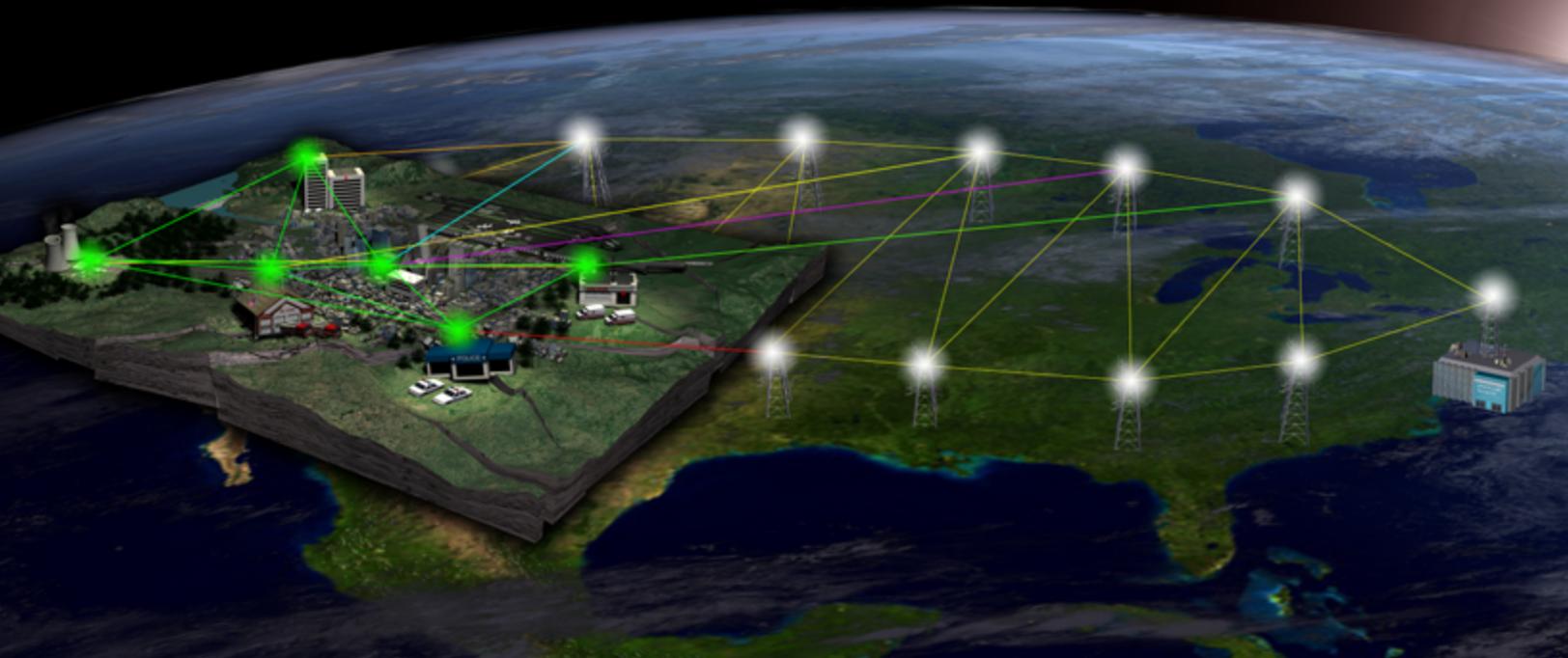
Cable and phone systems can connect globally, but rely on wires or fiber that can be severed by an earthquake or other disaster. Mobile phones and traditional public safety radio systems have their own unique challenges. Often, they are only able to communicate within several miles of their radio towers and those towers are subjected to the elements associated with the disaster.

Beyond that, all of the options noted require a large source of electrical power to operate, which can often be disrupted during an emergency. Generators can provide a temporary backup, but they are also subject to the impact associated with the disaster and shut down when they cannot be refueled.

While satellite phones overcome several of the physical limitations discussed, they are expensive, challenging to operate, require line of sight with the satellite so the user needs to be outside or have a fixed external antenna – and capacity is sometimes overrun during a disaster.



In some instances, emergency managers rely on Radio Amateur Civil Emergency Service (RACES) users to provide disaster communications. Yet, this too has risks. The number of qualified RACES operators is low, and there is a unique skill set as well as a radio operator license required to manually work the radios. Availability is also an issue. In a disaster such as a hurricane, RACES operators can plan ahead to be on site, but if a tornado or earthquake occurs, pre-planning is not an option.



# A nationwide backup disaster communications network for public safety

Rockwell Collins has been actively engaged in developing and deploying mission-critical infrastructure and security systems for decades. We view the challenge associated with disaster communications as one that can overcome the existing infrastructure issues by providing a means of wirelessly connecting emergency responders and critical infrastructure sites within the disaster zone as well as outside the disaster zone, enabling those in need to reach out for assistance.

With the UrgentLink® national disaster communications network, first responders in the field are able to communicate with public health, public safety and critical industries in the event of a natural or man-made disaster that renders local communications infrastructure inoperable. UrgentLink services include voice and text messages for status updates.

## How it works

Rockwell Collins' UrgentLink uses Federal Communications Commission (FCC)-licensed radio frequencies specifically authorized for disasters and the company's purpose-built High Frequency (HF) network to provide a disaster communications network capable of enabling nationwide, highly reliable backup emergency communications.



The network relies on specialized HF radios to communicate. Unlike most other radios that work in line of sight, HF radios can, in most conditions, work over hundreds or thousands of miles beyond line of sight. In fact, the HF technology used in UrgentLink is the same HF technology that U.S. Customs and Border Protection, the Office of the President and the U.S. military rely on for both primary and backup communications.<sup>7</sup>

UrgentLink users can communicate in a number of ways: through the system to other UrgentLink users nationwide, patched-in through the Rockwell Collins operations center to any available phone, by talking directly to one or multiple UrgentLink radios in their area. In addition to traditional radio communications, status updates can be done via data messaging.

UrgentLink users are all connected to Rockwell Collins' operations center, which provides 24/7/365 service. When an UrgentLink user needs to contact Rockwell Collins, he or she pushes one button to reach support personnel. Rockwell Collins radio operators can help UrgentLink users communicate effectively by connecting them to other UrgentLink users or to phones that have not been affected by the disaster. How does this work? If, for example, a user in Southern California needed to talk to the Office of Emergency Services (OES) after a major earthquake disables local communications, UrgentLink enables him or her to connect to the operations center, who then places a call to the OES's operations center in Sacramento (in this example, connecting a radio to a phone) to coordinate the response to the disaster.

In addition to operations center support, UrgentLink customers can also talk directly to each other in a peer-to-peer mode within a disaster zone. Direct communications means that hospitals can coordinate resources with each other within a region, police and fire departments can reach emergency management, and critical infrastructure sites can report their status.

UrgentLink radios have a one-touch calling capability and do not require a highly trained user or license to operate, allowing emergency managers, police, fire, hospital managers or others to easily access the system.

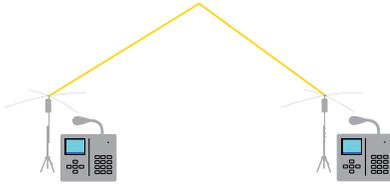
Rockwell Collins provides and maintains the radios as part of the UrgentLink service. The intelligent radios use Automatic Link Establishment (ALE) so they can determine the optimal way to connect to the other radios on their own, reducing the training requirements. With HF radio, atmospheric conditions that change over the course of a day directly affect the quality of radio calls. This normally requires a radio operator to manually use their skills or trial and error to determine the best frequency to use. ALE regularly tests connection quality and allows the radios to be aware of the optimal frequency to use at any point in time. The radios are also pre-programmed with the addresses for other radios with which they may need to communicate. Together, ALE and pre-programming greatly simplify the end-user experience.

Radio sites around the country provide overlapping coverage nationwide. If one site is compromised by a disaster, UrgentLink customers will generally be able to reach at least one other site, and often more.

# UrgentLink® capabilities

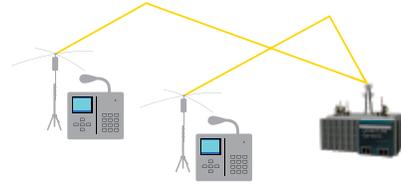
## Direct voice connection

Communicate with other users directly, within the disaster zone or with a radio outside of the affected area.



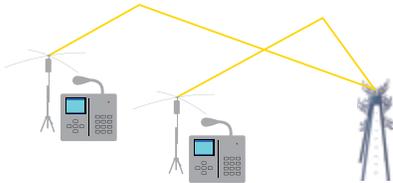
## Radio patch

One-touch access to the operations center to be patched to another UrgentLink customer radio.



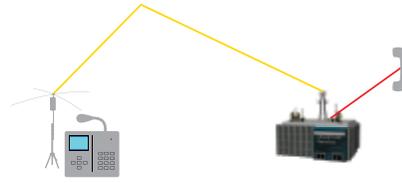
## Auto patch

Automatically connect to other users through the UrgentLink network without an operator.



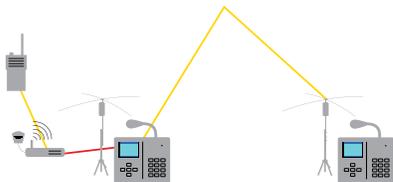
## Phone patch

One-touch 24/7/365 access to be patched to a phone by the UrgentLink operations center.



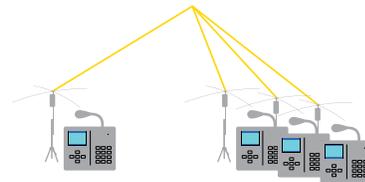
## Radio system integration

Connect to a local land mobile radio and patch to any other UrgentLink radio.



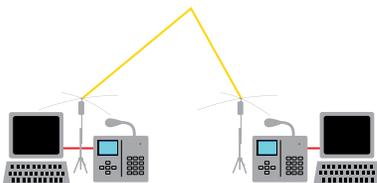
## Group call

Communicate with a group of users within the disaster zone or with other users outside the affected area.



## Data messaging

Exchange messages within the disaster zone or to radios outside the affected area.



# Why UrgentLink®

Rockwell Collins' UrgentLink overcomes the challenges faced by local radio and phone systems destroyed by a disaster by using radio technology that can reach thousands of miles.



## Key benefits

- › Always-on service
- › Nationwide coverage\*
- › Independent of local infrastructure for connectivity
- › Users can communicate with sites inside and outside of the disaster zone
- › Easy-to-use interface that requires no radio expertise
- › Supports voice and data messaging

*\* Maritime operations are presently excluded from all UrgentLink offerings.*



Notes:

- <sup>1</sup> “Communications Status Report for Areas Impacted by Hurricane Harvey August 26, 2017”, FCC.gov, Retrieved February 2018 from [https://apps.fcc.gov/edocs\\_public/attachmatch/DOC-346368A1.pdf](https://apps.fcc.gov/edocs_public/attachmatch/DOC-346368A1.pdf)
- <sup>2</sup> “Puerto Rico governor: Power could be out for months”, CNN.com, Retrieved February 2018 from <http://edition.cnn.com/2017/09/20/americas/hurricane-maria-caribbean-islands/index.html>
- <sup>3</sup> “BAD THINGS HAPPEN”, EFJohnson.com, Retrieved February 2018 from <http://info.efjohnson.com/atlas-survives-maria/>
- <sup>4</sup> “Communications Status Report for Areas Impacted by Hurricane Maria September 21, 2017”. FCC.gov, Retrieved February 2018 from [https://apps.fcc.gov/edocs\\_public/attachmatch/DOC-346840A1.pdf](https://apps.fcc.gov/edocs_public/attachmatch/DOC-346840A1.pdf)
- <sup>5</sup> “Danger, road closures hamper efforts to restore phone and internet service in North Bay fire areas”, Mercury News, Retrieved February 2018 from <https://www.mercurynews.com/2017/10/10/danger-road-closures-hamper-efforts-to-restore-phone-and-internet-service-in-fire-areas/>
- <sup>6</sup> “Ham radio operators are saving Puerto Rico one transmission at a time”, CNN.com, Retrieved February 2018 from <http://www.cnn.com/2017/09/27/us/puerto-rico-maria-ham-radio-operators-trnd/index.html>
- <sup>7</sup> “Connectivity for Global Reach,” HF Global Communications System, June 2002. Retrieved August 2015 from [http://www.hfindustry.com/meetings\\_presentations/presentation\\_materials/2002\\_jun\\_hfia/presentations/11\\_scope\\_command.pdf](http://www.hfindustry.com/meetings_presentations/presentation_materials/2002_jun_hfia/presentations/11_scope_command.pdf)





### Building trust every day.

Rockwell Collins delivers innovative aviation and high-integrity solutions that transform commercial and government customers' futures worldwide. Backed by a global network of service and support, we are deeply committed to putting our solutions to work for you, whenever and wherever you need us. In this way, working together, we build trust. Every day.

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