EMERGING TOOLS TO SUPPORT
SITUATIONAL AWARENESS

This paper is an excerpt from an extensive publication on critical communications supporting situational awareness. To download the full report, please click here:

SITUATIONAL AWARENESS
REQUIRES RELIABLE CRITICAL COMMUNICATIONS

In this paper, we'll share best practices and technology insights in critical communications and introduce a planning principle that can help fire departments make the right decisions for their future critical comms setup.

Download full report

Situational awareness supported by wireless communication is critical to the success and safety of emergency response operations. As the number, ferocity, and unpredictability of mass emergencies grow, so does the need for planning critical communication solutions able to provide uninterrupted voice and data connectivity.

Operating in the noisy, stressful, and chaotic environment of a fireground or an emergency scene, observations and estimations of the unfolding situation can be hard to make, even for experienced firefighters and incident commanders. The development of new digital tools for personnel accountability, command, and control will transform the way firefighters work and train. In the face of increasing mass emergencies due to extreme weather events, and of the number of annual civilian and firefighter fatalities, fire chiefs and other decision makers must make these tools available to firefighters to make them safer and more effective.

KILLER WEATHER

CASE

According to the National Safety Council, the number of direct and indirect deaths from weather events has increased 35% from 2017 to 2021. The deadliest weather events in the United States over the past five years include Hurricane Irma and the California wildfires.[1] To keep firefighters safe, new digital tools and capabilities are needed to support situational awareness when dealing with these types of mass emergencies.

[1] https://injuryfacts.nsc.org/home-and-community/

safety-topics/weather-related-deaths-and-injuries/

A PICTURE IS WORTH A THOUSAND WORDS

Using body-mounted cameras, firefighters on the front line can potentially live-stream footage of everything that's going on around them – virtually putting incident commanders in their boots while they work. A picture is worth a thousand words, and that is a lot more than proper radio discipline allows. Meanwhile, dash mounted cameras in fire apparatus could help provide an additional outside perspective, as well as a useful overview of everything that's going on at the fireground or emergency scene.

> Could the 19 members of the Granite Mountain Hotshots have been and saved if they had had access to drone images warning them of the wildfire's sudden change of direction?

IT IS TIME TO TAKE ACTION

CASE

1,388,500 fires resulted in 3,500 civilian deaths and 62 on-duty firefighter deaths[1] in 2020, according to The National Fire Protection Association (NFPA). Fire chiefs and other decision makers need to constantly ensure that volunteer and professional fire brigades have the best possible tools available to help bring down these numbers through improved situational awareness.

[1] https://www.nfpa.org/News-and-Research/

Data-research-and-tools/Emergency-Responders/Firefighter-

fatalities-in-the-United-States

[1] https://www.nfpa.org/News-and-Research/Data-research-

and-tools/US-Fire-Problem/Fire-loss-in-the-United-States

AN EYE IN THE SKY

Unmanned aerial vehicles – UAVs or drones for short, can vastly improve information gathering to support situational awareness. Drones can provide a visual overview to assess incident scope and severity before dispatch and arrival. Aerial footage makes it easier to assess what resources are likely to be needed for any emergency and can help highlight potential hazards and incident developments. UAVs are also useful for gathering data and video footage about incident sites, conditions, and developments, providing the big picture that can prevent firefighters from being caught off guard.

INCIDENT LOGS IMPROVE TRAINING AND DIGITAL FORENSICS

Another useful capability is the ability to create a digital incident log, recording and timestamping every message exchanged during an operation. After the conclusion of an emergency response operation, firefighting departments and other authorities may wish to revisit the timeline of the operation to establish exactly what happened and why. Combined with equally timestamped digital footage from drones or dash mounted cameras, these logs can prove a valuable training tool, adding to the department's continuous improvement. And in the event of firefighter injuries or death, a comprehensive and timestamped digital log can prove indispensable to finding out what went wrong to prevent it from happening again.

Potential big-impact digital tools for firefighters

- UAVs / drones
- Digital incident command
- Dash mounted cameras
- GIS, building occupancy, and pre-incident planning data sets

NEXT UP: SMART CYBER FIREFIGHTING?

It sounds like science fiction, but the Fire Protection Research Foundation, an affiliate of the NFPA, recently published a report outlining a proposed Next Generation Smart and Connected Fire Fighter System: 'This research aimed at proposing a situational awareness system that uses the information from the firefighter gear to extract the necessary knowledge about the fire fighter environment and transmit it to the command.' Among other things, the system would combine fireground sound recognition, prediction of firefighter exhaustion, and human/object/event recognition with thermal imaging through Augmented Reality goggles. The system relies on a communications backbone enhanced to enable the massive flow of data collected from all the various sensors in firefighter's equipment.

https://www.nfpa.org//-/media/Files/News-and-Research/

Fire-statistics-and-reports/Emergency-responders/

RFNextGenSmartFFSystem.pdf

NEVER FORGET: LACK OF COVERAGE HAMPERS YOUR EFFORTS

To drive the greatest value from new digital capabilities available to your firefighting agency, you need to provide a robust data connection that carries broadband internet to the frontline. Investing in drones and dash mounted cameras will not support situational awareness and help firefighters protect people and property without a critical comms setup that ensures constant digital connectivity. Loss of coverage will mean losing tools directly dependent on data connectivity like drones, automated personnel accountability reporting (PAR) systems, access to GIS data, and incident command management tools. Your command-and-control tools may be designed to keep operating after communications fail, but they will no longer benefit from rich data sets hosted in the cloud or video transmissions from drones.

CELLULAR NETWORKS CAN BE MOST VULNERABLE EXACTLY WHEN THEY'RE MOST NEEDED

In emergencies like floods, disasters and wildfires, cellular networks are just as vulnerable as traditional radios, because the antennas and towers they rely on often get damaged or destroyed. Some mobile networks are fully dependent on fiber links that are quickly destroyed by flame. Furthermore, terrestrial networks usually depend on electricity from the local power grid. When the power goes, the networks go.

[1] https://www.cisa.gov/sites/default/files/video/22_0602_ecd_dependencies_2020-nashville-bombing_508C.pdf

[2] https://www.bbc.com/news/world-us-canada-62174477

[3] https://urgentcomm.com/2020/03/18/att-provides-some-details-about-march-5-firstnet-data-service-outage

FIRSTNET SUFFERS DATA-SERVICE OUTAGE

On March 5, 2020, the American LTE-based first responder network FirstNet suffered a down-period in the southeast USA[1]. As a result, some voice and data services were unavailable to FirstNet clients for hours. This is a good example of why fire chiefs and other decision makers always must plan for the unexpected: Even a state-of-the-art emergency comms solution like FirstNet, which is being rolled out across the US, can suffer an unexpected outage. If your department relies on a single line of communication, all of their digital tools as well as basic LMR PTT voice messaging will be lost in case of an outage.

[1] https://urgentcomm.com/2020/03/18/att-provides-some-details-about-march-5-firstnet-data-service-outage/

BOMB ATTACK CAUSES FIRSTNET OUTAGE

IA bomb caused massive disruption for first responder networks across a multi-state region of the US for almost a week[1]. Bombings are mercifully rare, but this example goes to show how bad things can happen suddenly and unexpectedly. And when bad things happen, they also very often happen to the communication networks used by firefighters and other public safety agencies, seriously hampering their efforts to save lives and property – and to stay safe themselves. How does your department plan to handle a mass emergency in your community if LTE communication lines go down?

[1] https://www.cisa.gov/sites/default/files/video/22_0602_ecd_dependencies_2020-nashville-bombing_508C.pdf

CANADIAN LTE OUTAGE

In July of 2022, a major service outage left more than 12 million Canadians without use of their cable internet and cellular networks for a day. This included fire and rescue services responsible for keeping thousands of Canadian citizens safe. Fire chiefs need to be aware of all threats facing their networks across their operational area. From natural disasters to technical SNAFUS, networks can and will fail. Without contingency plans in place, fire departments will fail with them – putting firefighters and civilians at risk.

https://www.bbc.com/news/world-us-canada-62174477

PLANNING FOR UNINTERRUPTED DIGITAL CONNECTIVITY IS A PREREQUISITE FOR NEW TOOLS

Wireless digital voice and data connectivity enables inter-agency communication and the use of new, digital tools that further support situational awareness and firefighters' ability to protect people and property. As we have seen in this paper, a number of big-impact solutions are already widely available, while others are still at an early stage. What they have in common is their dependence on reliable digital connectivity from the dispatch room to the frontline. Fire fighters and the decision makers who support them must start planning their critical comms infrastructure to support digital connectivity to let firefighters and the communities they serve benefit from the advances in technology.

GET THE FULL STORY – AND VALUABLE INSIGHTS FOR PLANNING RELIABLE CRITICAL COMMS

To download the full report, including an introduction to PACE planning, a valuable planning principle for critical comms that ensures reliable connectivity for first responders, please click here:

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