

Once in a lifetime

The challenge of responding to disasters in Queensland, Australia's most decentralised state





The 2023-2024 summer brought intense weather to most of the east coast of Australia with communities in North Queensland hit particularly hard. Coupled with the compounding effect of multiple “once in a lifetime” events, public safety organisations such as Queensland Fire and Emergency Service (QFES) and Queensland Police Service (QPS) are being stretched to their limits. How can we all work together to prevent, prepare, respond, and recover from events with such depth of human impact?

The storm and bushfire seasons in Queensland are intense. Ads sponsored by the Queensland government warn us to be prepared, to have an action plan, to batten down the hatches, and to minimise damage to both property and life. All of this is excellent advice, and builds resilience in our communities, but what happens when the weather outstrips our ability to prepare, and the frequency and intensity of events increases to an unpredictable “new normal”?

This is where we find ourselves now, as communities, as government bodies, as individuals experiencing an overlapping series of “once in a lifetime” events.

Once in a lifetime

What do we mean when we talk about generational or “once in a lifetime” events? Often these events are extreme examples of natural disasters and looking back through the recorded histories of such things we are faced with statistics that are above and beyond what we have seen in the last 50 to 100 years.

In any given storm or fire season a single “once in a lifetime” event may occur, but in the 2023-2024 season we have seen multiple generational events occur both independently and overlapping.

This storm season Queensland has faced seven tropical cyclones, six of which were considered severe with a “serious weather

Emergency” declared in the wake of Cyclone Jasper over the 2023 Christmas period.

- Cairns saw floodwaters exceeding 1977 levels and the highest since records began in 1915.
- Wujal Wujal was completely underwater, and the entire population has been displaced.
- Gympie and the Lockyer Valley “once in 100 year” flood events.
- Flooding and mini cyclones across the Gold Coast, Logan, and Scenic Rim.

The 2023-2024 season has caused an estimated \$675m so far in damages and recovery efforts are significant and ongoing.

And that’s just the storms, bushfires have also been rampant this season with 60 major fires raging across Queensland in late 2023 with the season being called the worst fire season in 70 years. Conditions similar to those seen during Black Summer created a series of blazes that were at some points considered “unstoppable”.

The bushfire season also started abnormally early, and for some responders this meant a continuation from the last season directly into this one, with close to 11 continuous months of fighting fires.

And after the fires came the floods.

What does it mean to respond and recover?

With the rise in both magnitude and unpredictability of these natural disasters a certain amount of “rolling with the punches” is required. Response and recovery both require complex logistics from both the people and supplies perspectives and not everything is going to go right in the field.

“While a plan is important, being able to plan is more important.”

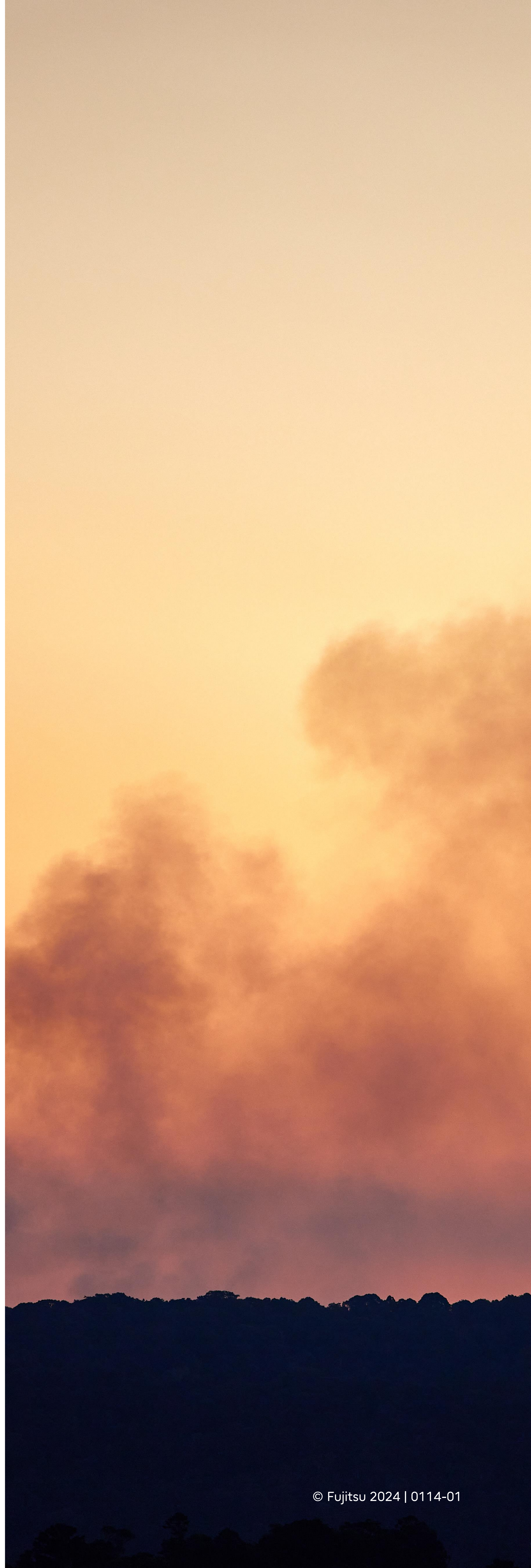
It's easy to say in retrospect that you should have been able to look at the signs and predict one of these events happening. But if it has never happened before, how do you create a model to predict it? In any model extreme predictions that don't follow a trend are discarded as outliers, and if you focus on the outliers then you are focusing on the statistically improbable, this does not of course mean that it won't actually happen.

It cannot be underestimated the value of creative thinking, relationships, and flexibility in the face of these extreme circumstances. There also needs to be the recognition that sometimes there is no great plan, and doing nothing is far worse than doing something.

So, what are the basics?

*“The most important factors both during and after a response are **water, waste, power, and comms.**”*

Let's investigate each of these individually.



Challenges in response and recovery

Relationships, logistics, and communication

Water

Everyone needs clean drinking water, and water for preparation of food. Waterborne diseases can run rampant communities already under huge stress from the disaster itself. Water in most cases boils down to a logistics or an infrastructure repair problem: is there a source of potable water and is it accessible to those in need, or can water or machinery that purifies water be brought to those that need it?

Waste

Sewage and other refuse need to be dealt with in a way that doesn't contaminate water sources or create situations where hygiene-based diseases spread. This is predominantly a facilities and services problem where waste needs to be transported away effectively and efficiently, which also boils down to a logistics problem.

Power

Most severe events included disruption in power supply to affected people or in the case of displacement, the need for new infrastructure to be set up to supply power to temporary accommodation. Power generation again falls to a logistics problem relating to how you get power generation devices to the places they need to be, how you continue to fuel them, and how you distribute or transmit the energy.

Comms (or communication)

Communication is a slightly more complicated topic in that there are many forms of communication required in response and recover situations. Look at emergency warning systems, versus interdepartmental communication for joint response and you have two very different types of communication needs.

Communication modalities might include:

- Emergency warning systems
- Responder-to-responder systems (radio etc.)
- Responder to public systems
- Public-to-public systems
- Interdepartmental communication systems
- Media related communications

In the case of Wujal Wujal the emergency warning system was washed away along with the mobile phone towers, so a system based on SMS no longer works. So how do you communicate effectively with a community when this happens?

“Disaster management is all about relationships.”

Relationships with community leaders become key when the technology fails. But the quote above is about more than that. It's also the relationships with other leaders in disaster management, relationships with the ADF, relationships with government officials. These relationships help you airlift a community to safety, build a temporary village using stockpiled disaster accommodation, and communicate what's happening to community leaders so their people can be safe and informed.

Logistics

What does logistics entail in the context of response and recovery?

During the response it is about getting the right people to the right place with the right equipment. But where are the people? And where is the equipment? Knowing where assets and resources are and in what state of deployability they exist is key to an effective response.

Often communication between agencies is done on a person-to-person level so understanding where assets may be available isn't something that is inherently known under a Common Operating Picture (COP). A lack of COP hinders each agency's ability to work cohesively with their partners or to determine the best course of action.

Logistics also needs to deal with the “what” as well as the “where”. There is no point delivering 20,000 litres of water to a community producing twice that for themselves through water treatment. Understanding the needs of the people being served is also critical to effective logistics, response, and recovery.

Responder to public communication

In many of the discussed events response to public communication generally takes the form of in person communication but depending on the community this may have additional challenges. Australia has a diverse population from many different backgrounds, who speak many different languages.

Cultural and linguistic issues complicate communication to the public. This includes community views towards government or law enforcement, as well as vulnerable people needing to be considered carefully to ensure they are supported as needed.

Responder-to-responder communication

Especially in rural areas responders face significant challenges with connectivity, where reliable communication infrastructure is often lacking. Beyond costly military-grade systems, there is a notable absence of connectivity solutions tailored to meet this critical need.

Responders primarily use radio to communicate when other channels are not available to them, but this is often point to point and hard to get a cohesive picture of events as they unfold.

With the advent of Low Earth Orbit (LEO) satellite capabilities more data centric options are becoming available but can also be susceptible to atmospheric disruption. This creates challenges with fires due to smoke, or operating in gorges, rough terrain, or heavily wooded areas as line of sight to satellites may not be possible.

Public-to-public communication

What would you do if you had no cellular service? How would you communicate with your loved ones, with your community?

Our connectedness through our devices has become core to how we communicate with each other and also how we consume information. In an emergency situation we rely on our mobile phones to provide us with updated information, research e.g., police holding information about firearms registration to a known sovereign citizen who firefighters enter their property to evacuate.

State and federal government agencies also hold information that may be relevant to responders such as information about disability via NDIS or Centrelink.

Each department and agency silos their data, sometimes for perceived legal reasons, or because integration is too hard, or the privacy act is too hard to navigate, or legal has raised a risk. Sometimes information sharing comes purely down to technical challenges.

Inherently it is easier to hoard the information, but in extreme situations knowledge, and therefore how to safely evacuate, and communicate to our families that we are okay.

Providing infrastructure to reenable public communication has quickly become a core need in both disaster response and recovery. Again, LEO communications can help in such situations and trials have begun as part of disaster responses.

Communities can have interesting behaviour where decision making is deferred to responders about whether they should evacuate or not, even as the water starts pooling around their ankles. Didn't receive an SMS? I'm not moving.

Accessible public to public communication allows for better decision support for the public and a more united community response to disaster.

Interdepartmental / interagency communication

One of the challenges to a well-orchestrated response is... well, orchestration, and orchestration requires situational awareness and information for decision support.

Information that is valuable during response and recovery is held by many different organisations. Local government may have planning maps that are of use to fire organisations for in field route access mapping, or as part of post event recovery. Or they may have flood mapping information that helps with risk mapping communities on flood plains.

Each public safety agency may hold information that is relevant to another agency responding, interconnected data across government, can often be lifesaving.



What can we do to help?

Addressing the above challenges is a huge undertaking and requires participation from both public and private sectors as well as the community at large.

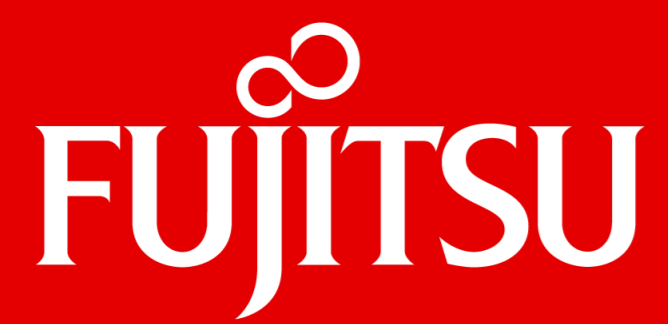
Fujitsu works closely with agencies in the public safety industry to advise on technology solutions and strategy for better community outcomes. We firmly believe in leveraging our knowledge and experience to help the people that save lives and keep our community safe.



We are currently working on several solutions for the industry and welcome both participation and feedback.

- Vehicle as a Node (VaaN) capability utilising novel radio technologies and LEO satellite
- Next generation Computer Aided Dispatch (CAD) in conjunction with our industry partners
- Deployable internet solutions that also leverage LEO satellite and local networking technologies
- Data integration, analysis, and machine learning for emergency management
- Intelligent vehicle integration platforms.

Contact the Fujitsu Safety, Justice and Corrections team to find out more:
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