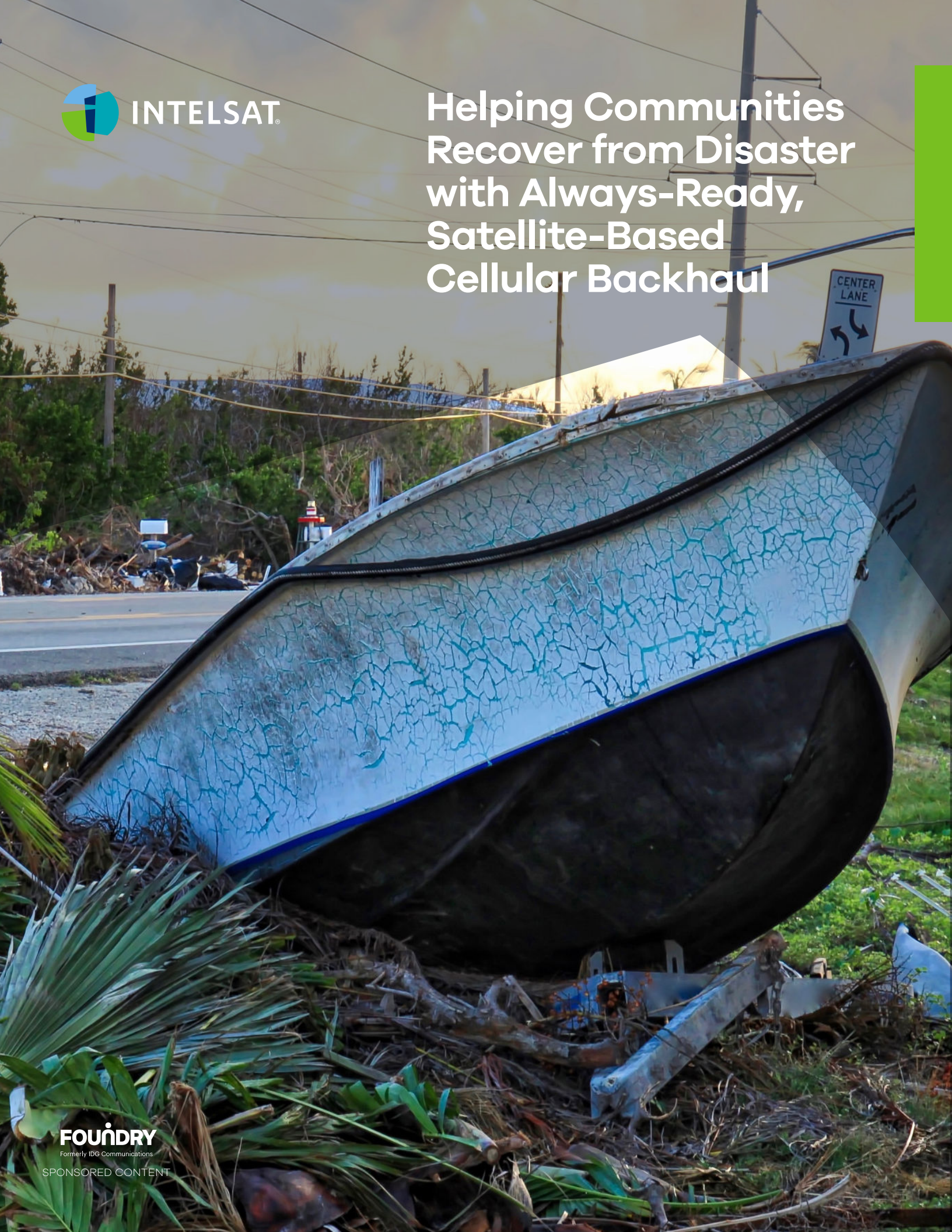

INTELSAT

Helping Communities Recover from Disaster with Always-Ready, Satellite-Based Cellular Backhaul

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In 2017, hurricanes destroyed over 90% of the cellular towers in Puerto Rico, Dominica, and other Caribbean islands. The hurricanes were unusual in their intensity, but the strength of such storms is increasing, meaning that their potential for damaging critical infrastructure will only continue to grow.

And it's not just hurricanes. Other headline-grabbing weather events—flooding in Germany, wildfires in Australia—have increased in frequency and intensity across the globe. These events put pressure on and can even cripple vital communications infrastructure.

This is why mobile network operators (MNOs) and the communities they serve are increasingly turning to space-based solutions for support and recovery. Satellite-based cellular backhaul can quickly enable services when other infrastructure has been rendered inoperable, connecting communities when it's needed most.

"The fastest way to bring connectivity to people is to use satellite backhaul connectivity," explains Raghu Ramaiah, senior principal product manager at Intelsat. "Because satellites are high above the ground, they aren't impacted by disasters like other infrastructure can be."

In addition to enabling MNOs to extend networks and connect users in remote and rural regions, satellite-based cellular backhaul services can act as a kind of insurance, providing MNOs with cost-effective standby coverage that can be activated if disaster strikes.

Here's what you need to know.

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The Challenge of Cell Connectivity During Disasters

When Hurricane Maria hit Puerto Rico and other Caribbean islands in 2017, it knocked out power and communications infrastructure for months, complicating relief and rebuilding efforts.

When wildfires swept through eastern and southern Australia in 2019 and 2020, they also knocked out power and telecommunications, isolating individuals and emergency workers.

Both events represented extremes: Maria was the strongest hurricane to hit Puerto Rico in 89 years. The 2019-2020 brushfire season was the worst on record in Australia. Yet, climatologists expect such events to become more common as the global temperature warms. In fact, according to the UN Environment Programme and GRID-Arendal, the global number of extreme wildfires is on track to increase by 14% by 2030 and by 50% by the end of the century.

In other words, more disruptions are on the horizon.

Besides wreaking havoc on physical infrastructure, disasters present another challenge to MNOs by increasing demand as affected individuals seek to reach loved ones and get news about rapidly unfolding events. "Usually, in disasters, there is a higher volume of traffic than normal because everybody wants to communicate with their families and tell them that they are safe," Ramaiah says.

The expectations for connectivity after a disaster also reflect the growing expectations of customers during normal periods. "Customers now demand and expect connectivity to be available 24/7 no matter what," Ramaiah says. According to Ramaiah, operators can only count on a day or two of forgiveness before customer patience wears thin. "Operators know that they cannot think it's okay that their users are not connected for weeks," he says. Doing so risks having customers leave providers that can't restore service quickly enough for those that can.

Heightened expectations of—and greater need for—infrastructure following intense weather events is a recipe for disaster when that infrastructure goes down. Far more than just an inconvenience, communications blackouts put lives at risk as emergency workers are unable to receive calls for help or stay in contact with each other to coordinate operations.

Service From Space

Satellite backhaul services for cellular networks help fill coverage and capacity gaps in damaged terrestrial infrastructure. They can also quickly deliver extra network capacity for the increased demand disasters bring.

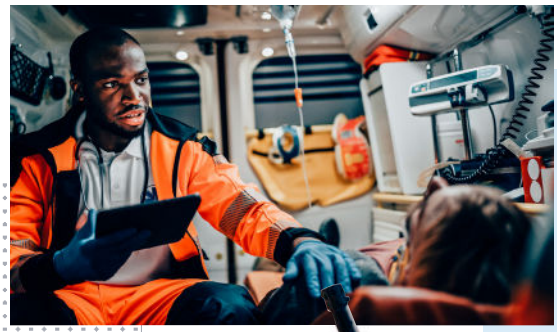
In operation, MNOs place temporary cell towers where they're needed. Those new, temporary sites then connect customers to the core network via satellite without requiring them to change their devices or the way they place calls or connect to internet services.

The key to making all of this work for operators is preplanning and acting proactively instead of scrambling to add capacity under pressure while a crisis unfolds. "Forecasting is a tough game," Ramaiah says. "And when disasters are not happening, operators tend to not pay attention and preplan. They think, 'Why should I pay for extra capacity?' So, what they do is they try to cut costs, and underestimate the need."

Successful solutions quickly provide short-term network backhaul to replace damaged or overburdened terrestrial infrastructure, with services that leverage a satellite operator's experience across previous deployments. They also include preplanning—before disaster strikes.

Satellite cellular backhaul for disaster response and recovery offers:

- **Wide coverage**
  Wide coverage across countries and even continents. Satellites can provide continuous coverage for thousands of square miles, ready to take over for damaged or overtaxed terrestrial infrastructure.
- **High reliability**
  High reliability from infrastructure situated well above the earth, keeping satellites active 24/7 and unimpacted by the conditions on the ground.
- **Quality service on any type of network**
  The same service quality for 3G, 4G/LTE, and even 5G networks that users enjoy in the best of times. Dynamic bandwidth allocation can also distribute capacity across cell sites according to local demand.
- **Cost-effectiveness**
  Cost-effectiveness from service that MNOs can engage only when they need it (instead of paying for idle capacity). MNOs can prepare for potential disasters without installing and maintaining expensive backhaul infrastructure.



Characteristics of Effective Service

With effective satellite-based cellular backhaul, mobile users—including emergency responders—connect seamlessly to an MNO's cell sites. The satellite operator or service provider gives the MNOs the antennas and modems to connect to a high-performance, integrated space and ground network. Orbiting satellites route signals to and from operators' core networks, leapfrogging terrestrial infrastructure gaps.

Since space-based infrastructure is always there and always available, MNOs can engage service and add capacity when they need it. Managed services help operators provide carrier-grade connectivity to users without the need to think and plan in terms of satellite capacity availability. One such service, Intelsat CellBackhaul, works with the MNO early on to accurately forecast and manage the capacity needed to provide the required bandwidth for each cellular site. Managed services help operators provide carrier-grade connectivity to users in the event of a disaster, without the worry of satellite capacity availability. Such accuracy in forecasting is critical, according to Ramaiah. "We provide our experience in similar cases," he says. "We know how much bandwidth the operator will need, and we can suggest how much they should reserve."

Intelsat CellBackhaul provides end-to-end managed service that enables MNOs to deliver cost-efficient cellular coverage anywhere via the world's largest integrated satellite and terrestrial network. It lets operators meet service expectations even when disaster disables terrestrial mobile infrastructure.

Benefits of CellBackhaul Ready

Intelsat CellBackhaul Ready is specifically designed for short-term or temporary cellular network backhaul needs and provides critical benefits to MNOs, including:

- **Expertise in design and planning**
  Managed services help MNOs scope out what they need and when they need it through network planning and design based on extensive, worldwide experience. Determining the expected amount of traffic for a given location is part of the process. Engineering and installation services can further lighten the load.
- **Quick restoration of backhaul infrastructure**
  CellBackhaul puts space-based infrastructure at the ready, to be activated quickly in case of disaster. The service provider should help the MNO understand how satellite services can complement existing cellular infrastructure, and how it will keep cellular service running if that infrastructure becomes disabled.
- **Consistent service levels across network types**
  Thanks to technologies that deliver signal optimization and acceleration without geographic limitations, satellites offer the same consistent level of 3G, 4G and even 5G service that customers are accustomed to and expect, even during emergencies.
- **Economical options**
  Intelsat's managed service provides coverage when an MNO needs it to fill in for damaged infrastructure, and can "stand by" at other times. "CellBackhaul Ready helps the operator by eliminating the need to pay for a large amount of capacity that needs to be used all the time to justify its cost," Ramaiah says. Instead, the service lets operators pay a minimal "keep alive" fee as insurance against disaster and then ramp up when the service is actually needed.
- **Service reliability and prioritization**
  CellBackhaul Ready lets MNOs prioritize emergency responders by throttling unnecessary traffic. "You can control what the regular public is using," Ramaiah explains. "For example, you may give them access to Twitter and email but throttle down streaming movies." This allows MNOs to tailor how they deliver services depending on the immediate needs of users on the ground, adjusting service as situations change over time.

Always Be Ready

Unexpected disasters can strike anywhere. But that doesn't mean MNOs have to be caught unprepared. Planning, along with insurance in the form of satellite cellular backhaul, goes a long way toward keeping essential services up and running, people connected, and emergency services working.

Learn more

Find out how satellite-based cellular backhaul can help MNOs quickly meet the demand for connectivity during and after disasters at intelsat.com/cellbackhaul.

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