



Resilient by Design: A New Framework for Emergency Communications

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Agency: N.C. Department of Information Technology

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Executive Summary

Hurricane Helene struck western North Carolina in fall 2024, becoming the deadliest and most destructive natural disaster in state history.

With \$53 billion in damage, catastrophic flooding, loss of life, and prolonged devastation across mountain communities, the storm knocked out broadband and cellular networks over wide areas of the mountainous region. Residents were stranded without basic communication – not to mention access to critical services – and first responders were unable to efficiently coordinate urgent, life-saving work.

Helene revealed the state's most critical vulnerability: a communications infrastructure too dependent on terrain, geography, and physical assets that can be disrupted or destroyed.

In response, the N.C. Department of Information Technology launched a statewide strategy to help agencies ensure they are never again left disconnected during a crisis. The approach integrates:

- High speed, infrastructure independent low earth orbit (LEO) satellite connectivity into the state's enterprise network services
- Mobile command units (MCUs) equipped with satellite, cellular, mesh networking, land-mobile radio integration, and off-grid power systems that can quickly be deployed anywhere in the state, regardless of terrain

State agencies have already put the satellite service and MCUs to work in routine operations, daily emergency missions, and preparedness activities.

Although North Carolina has not experienced a storm of Helene's magnitude since, the state is better prepared. When the next disaster strikes, these tools will help ensure that operational continuity and coordinated response remain possible even in the most infrastructure-challenged areas.

Idea

Helene demonstrated that traditional telecommunications infrastructure – fiber, microwave, copper, and cellular networks – cannot fully withstand large-scale or geographically complex disasters. Landslides buried fiber, towers lost power for prolonged periods, and the mountainous terrain slowed restoration, leaving communities isolated for days.

Even under normal conditions, many mountain communities have struggled to obtain high-speed internet due to the difficulty and cost of laying infrastructure across steep, remote terrain.

Helene highlighted a universal challenge: physical infrastructure will always be vulnerable to Mother Nature – not to mention other threats such as cyberattacks and structural failures. Those vulnerabilities are magnified in geographically difficult areas. Local governments, health agencies, law enforcement, wildlife personnel, and emergency responders all shared the same need – access to communication systems that do not depend on terrain-limited infrastructure.

NCDIT's opportunity – and obligation – was clear: build a communications model powerful and flexible enough to operate anywhere, independent of geography or physical infrastructure.

Integrating low earth orbit (LEO) satellite technology into managed services would enable agencies to access high-speed, redundant connectivity tailored to their operational needs. Paired with deployable mobile command units (MCUs) – self-sufficient trailers equipped with satellite, cellular, and technologies – the approach would ensure communications can be restored quickly and reliably, regardless of geography.

This innovative model embeds redundancy and rapid deployment into the core of statewide IT services instead of relying on one-off pilots or fragmented solutions.

The business case is compelling: without resilient communications, delays grow, risks escalate, and recovery slows. By leveraging bulk procurement, managed service models, and cross agency coordination, North Carolina delivers a scalable, cost-efficient, and replicable approach that strengthens community safety and operational continuity.

Implementation

Designed as a true enterprise initiative, the project united NCDIT, N.C. Emergency Management, state agencies, and local partners under a shared vision of resilience.

Implementation followed a phased, collaborative approach: a statewide needs assessment post-Helene; procurement of low earth orbit (LEO) satellite devices and mobile command units (MCUs); technical integration into managed services; and extensive operational readiness testing.

Low Earth Orbit (LEO) Satellite Integration

NCDIT procured LEO satellite devices for use as a managed IT service and worked with chief information officers at various state agencies and emergency managers to tailor service types to operational needs.

Agencies can now subscribe to NCDIT's service and access high-speed, infrastructure dependent connectivity for:

- Primary service in unserved/underserved rural or mountainous regions
- Secondary high-availability failover for public-facing or mission-critical facilities
- Cold disaster recovery that can be activated on demand

Agency Adoption of LEO Technology

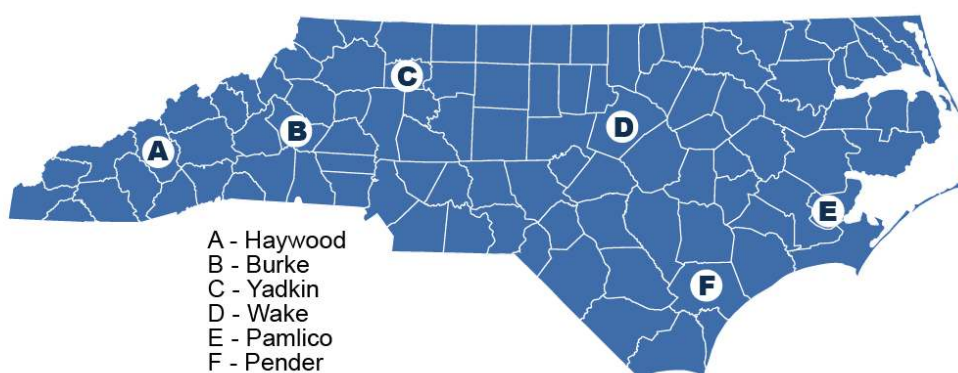
- N.C. Department of Environmental Quality
- N.C. Department of Natural & Cultural Resources
- N.C. Department of Transportation
- N.C. Wildlife Resources Commission
- N.C. Department of Justice
- N.C. Department of Agriculture & Consumer Services
- N.C. Department of Insurance
- N.C. Office of the Governor
- N.C. Department of Health & Human Services

Mobile Command Units (MCUs)

NCDIT acquired six MCUs, outfitted each with advanced connectivity, and transferred them to N.C. Emergency Management for operational use.

Each MCU includes LEO satellite technology, cellular routers, mesh networking, land-mobile radio integration, solar charging, onboard/off-grid power, and workstations for incident command, communications, and drone video feeds.

Emergency Management has placed the MCUs strategically across the state – three in Western North Carolina (Haywood, Burke, and Yadkin counties), one in the central part of the state (Wake County), and two along the coast (Pender and Pamlico counties).



Six mobile command units have been strategically placed across North Carolina for quick deployment in times of emergency

Impact

Helene reshaped North Carolina's understanding of what resilience requires and became the catalyst for establishing a communications framework that can operate anywhere—regardless of infrastructure limitations.

The integration of low earth orbit (LEO) satellite technology and deployment of mobile command units (MCUs) has created capabilities that did not previously exist.

As of May 2026, 10 agencies are now using the LEO connectivity service – either as a managed enterprise option or as a standalone capability – providing flexible, redundant pathways that support mission critical operations in both urban and remote regions.

As the program matures, statewide adoption will continue to grow, and these tools will ensure that agencies and first responders can quickly re-establish critical communications, maintain continuity of operations, and reconnect isolated communities during severe disruptions.

While the state has not yet had to deploy these systems in a major post-Helene disaster, North Carolina is significantly more prepared – and the technology is already proving its value.

Expanding Broadband Access in Underserved and Remote Mountain Areas

LEO satellite connectivity has been transformative for agencies operating in difficult terrain.

For example, staff with the N.C. Wildlife Resource Commission working in remote mountain offices previously relied on spotty cellular service or had no connectivity at all. Satellite service now enables them to support daily operations more efficiently.

Unique installations, such as the remote research station at Mount Mitchell State Park in Yancey County, illustrate how satellite connectivity can reach locations where fiber installation would cost hundreds of thousands of dollars. In this case, equipment was hauled up steep trails to enable research-critical broadband in challenging high-altitude terrain.



A low earth orbit satellite device installed at the Somerset Place State Historic Site in Washington County.

Strengthening High Availability and Failover

Public-facing and mission-critical offices – such as Division of Motor Vehicles, State Ferry offices, and state-operated healthcare facilities are working to pilot resilient failover options that meet each location's unique needs. Hospitals with dual fiber connections are working to add satellite as a tertiary backup, ensuring continuity even during fiber cuts or regional outages.

Enhancing Preparedness Through Cold Disaster Recovery

Other agencies have acquired cold disaster recovery kits to activate during storms, outages, or whenever necessary.

Ahead of Hurricane Erin in August 2025, NCDIT deployed a kit to a 911 public safety answering point (commonly known as a 911 call center) in Dare County, demonstrating that the LEO technology can be stood up quickly, deliver reliable bandwidth, and support multi-jurisdictional coordination.

Complementing N.C. 911 Board and PSAP Initiatives

In parallel with NCDIT's efforts, the N.C. 911 Board – which oversees the statewide 911 system and administers funding for 124 primary public safety answering points in the state – is looking at integrating LEO satellite connectivity into its continuity planning, ensuring these facilities have access to cloud based tools during local outages – particularly essential in hurricane-prone Eastern North Carolina.

This expanding adoption across statewide partners amplifies the overall impact of North Carolina's communications resilience strategy and reinforces the shift toward infrastructure-independent continuity solutions.

Ensuring Mobile Command Readiness

The six mobile command units that NCDIT acquired are in a ready state for when an emergency occurs, however, they have demonstrated their readiness to support field command, having been used on

occasion in Pender County for training exercises and in search operations for people who have gone missing.



One of six mobile command units strategically sits in Pender County in southeast North Carolina, ready to quickly be deployed when needed.

Conclusion

Nearly two years later, Hurricane Helene's devastation continues to reverberate across North Carolina. Many communities in the western part of the state are still rebuilding homes, restoring infrastructure, and working to reconnect residents with essential services. The scars left by Helene are a stark reminder of the vulnerabilities that exist when communications infrastructure fails during a disaster.

NCDIT's integration of low earth orbit (LEO) satellite technology and investment in mobile command units (MCUs) reflect more than a response to a past crisis; they represent a forward-looking commitment to preparedness. While the full impact will be measured in future disasters, North Carolina is already positioned to respond faster, restore communications more reliably, and support communities more equitably.

By embedding resilience and rapid deployment into statewide IT services, North Carolina has set a new standard for emergency preparedness. Agencies, first responders, and local governments can be better equipped to maintain operations and serve residents – regardless of the challenges ahead.

These innovations ensure that North Carolina will not only recover from Helene but emerge stronger, better connected, and more resilient for the future.

The long-term impact is a shift from reactive workarounds to built-in resilience. North Carolina now possesses a scalable, equitable, and future ready framework that keeps government operations accessible even during prolonged outages. Redundancy, rapid deployment, and statewide reach are no longer optional – they are foundational to how the state operates.

When the next disaster strikes – and it will – North Carolina will not face the same communications collapse. The systems and strategies established through this initiative will enable faster response, stronger coordination, and quicker restoration of essential services than ever before.