

UNMANNED UNITED INC.

Resilient Tactical Communications in Jamming-Denied Environments

A public position paper from an American autonomous-systems company

Communications resilience is no longer a supporting function. It is a mission requirement. In contested or disrupted environments, teams must assume that bandwidth will be constrained, links will be intermittent, locations will change, and no single bearer will remain available everywhere. The resulting requirement is not “more radios.” It is a communications architecture that degrades gracefully and preserves the information that matters most.

UNMANNED UNITED POSITION

America’s communications advantage must be built on diverse, interoperable, domestically controlled systems that keep operators connected when any one link is degraded. Resilience comes from intelligent architecture, disciplined mission design, and the ability to adapt—not from reliance on a single network or vendor.

The Core Problem

CHALLENGE	WHAT RESILIENT DESIGN REQUIRES
Spectrum congestion and interference	Multiple bearer options, clear network priorities, and the ability to move essential traffic without overwhelming operators.
Intermittent connectivity	Store-and-forward behavior, graceful degradation, local decision support, and a defined minimum viable information set.
Geographic dispersion	Mesh, relay, satellite, cellular, and line-of-sight options selected for mission context rather than convenience.
Rapidly changing threat conditions	Operational monitoring, disciplined configuration management, and trained crews who understand link status and fallback procedures.

Principles for Resilient Architecture

- Heterogeneity: use complementary pathways rather than assuming one band, one network, or one provider will remain available.
- Priority: protect command, safety, and essential situational awareness before high-bandwidth convenience traffic.
- Interoperability: enable a common picture across air, ground, and command elements without forcing every node to carry every function.
- Recoverability: make failure states observable, make rejoin behavior predictable, and ensure operators know what information is current.
- Sovereignty: retain U.S. control over critical software, keys, data flows, update paths, and lifecycle support.

The Role of Airborne Nodes

Airborne systems can be valuable communications participants because altitude, mobility, and payload flexibility create options unavailable to fixed nodes. A modular airborne platform may support observation, relay, sensor integration, and common-operating-picture workflows in the same mission. These capabilities must be developed with rigorous attention to spectrum authority, cybersecurity, interoperability, and the operational burden placed on crews.

From Demonstration to Deployment

A credible resilience program starts with a mission thread: identify the information that cannot be lost, map likely degraded conditions, select compatible bearer diversity, and test recovery behavior with real users. It then grows into controlled integration, documented configuration baselines, cybersecurity review, sustainment planning, and continuous adaptation. Unmanned United is pursuing modular communications-resilience concepts that support this disciplined approach.

Questions for Decision-Makers

- What information must still move when the primary link fails?
- Which portions of the network, keys, data, and update process must remain under U.S. control?
- How are operators told that a feed is delayed, partial, or stale?
- What is the sustainment plan for software, radios, antennas, power, and field replacement?

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