

# Tactical Communication Survivability in the Hyper-Lethal Battlespace

Lesson Identified White Paper

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Written by:  
CPT Josiah M. Turner

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## Executive Summary

The conflict in Ukraine demonstrates a new warfare paradigm defined by ubiquitous sensors and a compressed enemy kill chain, which can prosecute targets in as little as three minutes from detection. In this environment, communication equipment is a critical liability. The monthly loss of over 3,000 Motorola radios and 300 Starlink terminals in Ukraine is a metric of this vulnerability. This paper translates tactical observations from the Armed Forces of Ukraine into a framework for U.S. Military and NATO units. Survival and mission success require a shift from legacy concepts to a model built on tactical discipline, signature management, and decentralized innovation. Tactical elements must operate at a high tempo to master sensory evasion and rapid adaptation. This document provides actionable recommendations to implement these changes, transforming formations from targets into survivable, decisive assets.

## Introduction

A battalion Tactical Operations Center (TOC) is operating in the field. To save time, a signal team runs a 100-meter MILSAT cable across an open field. At dawn, a Russian Orlan-10 drone's automated imagery analysis flags the unnatural dark, straight line, follows it to the TOC, and passes the coordinates. A Lancet drone strikes the generators seven minutes later. A second Lancet hits the command post thirty seconds after, eliminating the battalion command element in under ten minutes. The kill chain was initiated not by RF intercept, but by cabling complacency. This illustrates that for signal assets, the distinction between communicator and target has been eliminated. In a software-defined conflict where innovation and speed determine outcomes, the central task for tactical units is ensuring survivability to maintain relevance.

## The New Battlefield Paradigm

### Communication Equipment as a Liability

The battlespace is saturated with low-cost, disposable, and rapidly deployable sensors. This reality has collapsed the enemy kill chain to between 3 and 15 minutes. Static sites, large elements, and cumbersome communication kits are liabilities near the forward line of troops (FLOT). Every piece of equipment that emits heat or RF, every cable laid, and every footprint left creates a point of failure for the mission. High equipment losses in Ukraine confirm this. To remain effective, units must provide a multi-faceted PACE plan composed of interconnected military and Commercial-Off-The-Shelf (COTS) solutions that are small, agile, quick to deploy, and employ Low Probability of Intercept/Low Probability of Detection (LPD/LPI) characteristics.

### Tactical Imperatives: The Human Element

The operator's discipline determines the effectiveness of the equipment. Survival requires mastery of fieldcraft, signature management, and emission control.

**Physical Signature Management:** Survivability begins with disciplined site selection. Low Earth Orbit (LEO) and Middle Earth Orbit (MEO) satellite constellations are reliable, but their terminals are primary targets. Terminals must be positioned 80-100 meters from the command post. Standard 30-meter commercial cables are insufficient, forcing Ukrainian operators to construct custom-length cables. This must be a core soldier skill. All cables must then be buried or camouflaged. Antennas will not be placed on command posts, vehicles, or prominent terrain. Terminals must be concealed within the environment (e.g., in trash piles, vegetation, or structures) to break up their shape. Furthermore,

adversaries use thermal emissions to locate terminals. Thermal covers, which reduce heat signatures while allowing traffic to flow, must be standard issue, along with varied camouflage covers for woodland, desert, urban, and snow environments.

**Emission Control (EMCON) and Fieldcraft:** Strict EMCON is mandatory. Non-essential communications must be powered off. During movement, units must operate with radios in receive-only mode or powered off. The use of concise burst transmissions reduces the probability of detection. This discipline extends beyond the electromagnetic spectrum; enemy drones hunt for "patterns of life" such as footprints, trash, and signs of maintenance. All personnel must minimize these signatures.

**Mission Command as a Force Multiplier:** This level of discipline is enabled by Mission Command. Commanders must communicate intent with enough clarity to preclude the need for clarifying radio traffic. This empowers junior leaders to exercise disciplined initiative and make decisions that accomplish the mission without creating electromagnetic or physical signatures. Trust, built on competency and character, is the foundation of this command philosophy.

## Organizational Adaptation: Fostering Speed and Innovation

The innovation cycle in Ukraine is approximately 40-80 days, where one side's tactical or technological adjustment forces the other to counter at speed. U.S. Army processes must be evaluated to ensure they can match this tempo.

**Empowering Bottom-Up Solutions:** The Army cannot wait for formal defense innovation channels to solve problems that soldiers have already addressed at the unit level. Ukrainian success derives partly from a decentralized system that provides battalions with funds (e.g., 100,000 euros annually) for innovation, experimentation, and local vendor agreements. This approach bypasses standard procurement timelines.

**Creative Application of Technology:** Drones must be incorporated into signal kits for site reconnaissance, communications relays, and establishing mobile mesh networks. Dependencies must be diversified by using a variety of commercial SATCOM and radio vendors across different bands and orbital planes to complicate enemy targeting. The Army must also invest in hardened cellular capabilities and decoy emitters that replicate thermal and RF signatures, forcing the enemy to expend resources on false targets.

## Recommendations

1. Revise TTPs for Signature Reduction. Mandate 80-100 meter standoff distances for all terminals. Make thermal covers and multi-environment camouflage standard issue. Enforce the burying or concealment of all cables as a non-negotiable task.
2. Master Core Fieldcraft Skills. Train all signal soldiers to be proficient in fabricating extended cables in all conditions. Drill rapid site setup, teardown, and displacement.
3. Restructure for Agile Operations. Organize around small, 4-6 person multi-skilled teams. Empower these teams to operate with minimal oversight and configure all PACE systems.
4. Fund and Foster Decentralized Innovation. Provide company commanders a discretionary budget for COTS experimentation. Establish a process to capture, validate, and scale innovations from the lowest echelons.
5. Diversify the Communications Portfolio. Identify, test, and integrate a variety of commercial SATCOM, radio, and hardened cellular technologies. Avoid dependence on a single vendor, band, or constellation.
6. Embrace Deception and Unmanned Systems. Invest in and deploy decoy emitters that replicate the signatures of real terminals. Integrate small drones into signal kits for reconnaissance, relay, and network extension.

The lessons from Ukraine are an immediate directive for change. Our equipment is a liability. Every watt of power, degree of heat, and straight line is a beacon for an enemy with a kill chain measured in minutes. Soldiers and Signalers must evolve from technicians into sensory evaders. This requires an organizational culture that operates at a high tempo, where the 80% solution is embraced and improved. It demands unwavering discipline in fieldcraft and strict adherence to emission control, underwritten by a command climate where competency and character foster the trust required for Mission Command. The principles of maneuver, surprise, and security must now be applied to a transparent, lethal battlespace. The relevance of modern military operations depends on it.