EXICOM
EXCELLENCE IN COMMUNICATION

ASSURED DATALINKS FOR THE UNMANNED ERA

WHY RESILIENT, JAM-RESISTANT NETWORKS ARE BECOMING THE BACKBONE OF INDIA'S NEXT-GENERATION UNMANNED WARFARE

WHEN THE SPECTRUM BECOMES THE BATTLEFIELD

From the Russia–Ukraine war to India–Pakistan border tensions, one lesson stands clear: when the EM spectrum goes dark, even the most advanced platforms fail. Today's conflicts begin not with artillery or air strikes, but with invisible EM attacks—jamming, spoofing, and severing command links before the first missile is fired.

Modern warfare has entered an era where control of the spectrum means control of the fight. For India, now deploying UAVs, UGVs, and autonomous maritime systems, this challenge is immediate. Conventional radios, built for peacetime clarity, cannot endure contested EM environments. The battlefield of tomorrow demands adaptive, self-healing links that stay connected even under fire.

THE COMMUNICATIONS CHALLENGE

COMBAT EXPERIENCE HAS SHOWN THE LIMITS OF LEGACY SYSTEMS:

- EM jamming and GNSS denial cripple telemetry and positioning.

- Fragmented networks prevent air, land, and sea assets from working together.

- Bandwidth saturation freezes ISR video and data feeds.

- High mobility and attrition demand links that rebuild themselves as the battle moves.

A UNIFIED NETWORK FOR UNMANNED AND MANNED SYSTEMS

Exicom's tactical communications architecture is built around a single principle, one network that connects every platform.

It provides a mission-grade IP backbone that links air, ground, and maritime domains without relying on fixed towers or static relays.

- Airborne (UAV) datalinks handle command, control, and full-motion video (FMV) with adaptive diversity to maintain connectivity under interference.

- Ground (UGV) and vehicle relays form mobile hubs that connect smaller robots and teams on the move.

- Maritime nodes extend the same mesh across coastal and blue-water operations.

- Swarm and edge modules allow drones and robots to coordinate peer-to-peer even when isolated from command.

- Dismounted integration keeps human operators inside the same network, accessing live ISR and issuing mission commands seamlessly.

The outcome is a true multi-domain communications layer resilient, flexible, and operational across terrain and theatre.

WHY MESH NETWORKS MATTER

A mesh network doesn't rely on any single link or relay.

Every node in a drone, vehicle, or soldier becomes part of a living, self-healing web that automatically finds new routes for data when others are lost.

- **No single point of failure:** UAVs can re-route control or video through nearby nodes.

- **Continuous handoff**: Air, land, and sea assets share one common data path.

- **Priority awareness:** Control signals take precedence over bulk video, ensuring autonomy loops stay intact.

- **Adaptive resilience:** Frequency agility, power modulation, and channel switching blunt the effect of jamming.

- **Edge autonomy:** Even when partially jammed, unmanned platforms retain enough control to loiter, recover, or return safely.

DESIGN PRINCIPLES FOR THE AUTONOMY ERA

Exicom's design philosophy follows a simple truth what survives on the battlefield matters more than what performs in the lab. India's new Integrated Theatre Command mindset demands systems that adapt, self-heal, and hold control even when the spectrum is contested.

- **Latency built for autonomy :** Networks are tuned for machine control, keeping critical commands and telemetry stable even under full ISR load.

- **Video is mission data :** FMV feeds are prioritised and compressed dynamically, so reconnaissance imagery remains live even as bandwidth drops.

- **Relays that move with the fight :** Airborne, vehicle, and ground nodes form instant backhaul the foundation of India's communications-on-the-move vision.

- **Stay hidden, stay connected :** Cognitive radios constantly sense and adapt to the EM environment, hopping frequencies and cancelling interference to remain undetected and operational.

- **Open and interoperable :** The network is IP-native, enabling smooth integration with Indian autonomy stacks, ground control stations, and allied systems.

- **Ready for swarms and mixed teams :** Scalable to 144 nodes per frequency band, it connects UAVs, UGVs, and command elements in one adaptive mesh.

- **Secure by design :** Each link uses FIPS 140-2–certified AES-256 encryption, protecting mission data even under aggressive spectrum attacks.

- **Reach that matches terrain :** With LOS ranges up to 150 km and NLOS links around 20 km, the system maintains communications from deserts to mountains to coastal waters.

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# UNDER THE HOOD: EXICOM'S MESH FABRIC

Key Capabilities

- Throughput: up to 87 Mb/s

- Network Density: 144 nodes per frequency network

- Encryption: AES-256, FIPS 140-2 certified

- Cognitive Radio: real-time channel adaptation

- LOS/NLOS Range: 150 km (LOS) / 20 km (NLOS)

- ECCM-enabled for enhanced jamming resistance

- Form Factor: modules from 85 g (aerial) to 1.3 kg (vehicular)

These features allow Exicom's system to operate as the communications backbone for unmanned platforms dependable, jam-resistant, and mission-ready across the full EM battlespace.

MANNED PLATFORM

UNMANNED PLATFORM

MAKE IN INDIA

#CommsOnTheMove
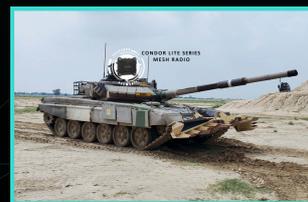
REAL-WORLD APPLICATIONS

- **ISR swarms:** Dozens of small UAVs stream FMV to a mobile C2 node, sustaining coverage even when some links fail.

- **UGV convoys:** Ground robots exchange autonomy and sensor data through vehicle and aerial relays, maintaining command chains across terrain.

- **Shipboard drone ops:** USVs and UAVs share targeting data and telemetry across a maritime mesh that links seamlessly to shore command.

- **Cooperative autonomous strike:** Multiple UAVs coordinate live, keeping C2 intact under heavy EM interference.

CHECKLIST FOR UNMANNED SYSTEM BUILDERS

1. Can your UAV maintain control and video under jamming?
2. What's your real-world latency under ISR load?
3. How quickly can your link re-route through another node?
4. Are control signals prioritised over payload data?
5. Is your link IP-native, secure, and open for integration?
6. What happens when GNSS or backhaul fails?

These are no longer technical checkboxes they define battlefield survivability.

CONCLUSION

As India moves toward network-centric and autonomous warfare, communications are becoming the real weapon system. Drones, robots, and ships are only as effective as the networks that bind them together. By developing adaptive, encrypted, and self-healing communications across air, land, and sea, Exicom Technologies India is shaping the invisible architecture of India's future battlefield where the fight for dominance begins, and is often won, in the EM spectrum. In tomorrow's wars, speed and precision will still matter, but connectivity will decide who commands the sky, the ground, and the sea.

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