VISLINK

WHITE PAPER

Aero5 Augmented by Starlink: Redefining Aerial Connectivity

Executive Summary

Reliable, high-quality video transmission from aerial platforms is mission-critical for public safety, defense, and live broadcast operations. Traditional line-of-sight (LOS) and terrestrial cellular networks often fall short — especially when missions extend into remote regions or involve unpredictable conditions.

The Vislink Aero5 changes that equation. Purpose-built for aviation and UAV platforms, Aero5 integrates multi-bearer bonding, advanced HEVC encoding, and cloud-based control. When augmented with Starlink's LEO satellite network and bonded 5G connectivity, Aero5 ensures that live video streams remain continuous, resilient, and actionable — even when primary networks are unavailable. This hybrid architecture provides unmatched situational awareness and operational assurance in environments where coverage gaps or aerial dynamics could otherwise compromise mission success.

The Connectivity Challenge

- **Coverage gaps:** Cellular networks may be limited in rural, mountainous, maritime, and disaster-stricken regions.
- **Aerial obstructions:** High-bank angles, rapid altitude changes, and fuselage shielding can cause signal degradation and packet loss.
- **Latency sensitivity:** High RTT (round-trip time) disrupts live video feeds, impacting situational awareness.
- **Mobility stress:** Banking helicopters, rotating UAVs, and fast-moving aircraft face variable pointing and handoff challenges.

The Aero5 Advantage

The Vislink Aero5 was engineered for aerial platforms with resiliency, efficiency, and mission flexibility in mind.

Key capabilities include:

- **Simultaneous bonding of up to eight 5G/LTE modems** with optional LEO satellite links (e.g., Starlink).
- **4K UHD HEVC video encoding,** delivering maximum quality at efficient bitrates.
- **ARINC-compliant, DO-160G certified** rugged design for aviation environments.
- **Flexible streaming formats** including NDI, SRT, RTMP, and more.
- **Cloud-based management, security, and routing** via Vislink LinkMatrix.

These features ensure that Aero5 maintains stable connectivity where single-network solutions cannot.

Starlink as an Augmentation Layer

Starlink provides an important global coverage overlay for Aero5 deployments, expanding connectivity into regions where terrestrial networks are sparse. Its key features include**:**

- **Low latency:** <50 ms RTT typical, compared to >600 ms for GEO satellites.
- **High throughput:** 20–250 Mbps per terminal.
- **Mobility-ready form factors:** Compact terminals suitable for rotary-wing, UAV, and fixed-wing applications.

However, Starlink alone cannot guarantee uninterrupted service in dynamic airborne scenarios. Line-of-sight interruptions, orbital handoffs, and antenna orientation can still cause short connectivity drops. This is why cellular bonding is essential — masking Starlink's vulnerabilities and ensuring that live feeds remain continuous and reliable.

Airborne Test Insights: Law Enforcement Scenario

When tested in a law-enforcement-style helicopter deployment, the Vislink Aero5 yielded the following observations:

- **High bank angles:** Maintaining near-seamless transmission required an upward (0°) antenna orientation — a configuration practical for airborne use.
- **Starlink drops:** Short losses occurred during rapid orientation changes or when orbital transitions coincided with maneuvers.
- **Bonding resilience:** 5G/LTE seamlessly covered these drops, keeping the video stream intact and preventing loss of situational awareness.
- **Seamless Augmentation:** Cellular remained the primary link throughout, with Starlink providing a rapid and transparent boost in areas where cellular coverage was challenged — ensuring uninterrupted connectivity for operators.
- **Power efficiency:** A steady 20–28 W draw confirmed feasibility for airborne integration without impacting mission endurance.

Conclusion: While Starlink adds valuable reach, cellular bonding remains critical to guaranteeing the seamless, mission-assured connectivity required for defense, public safety, and media missions.

The Case for Bonding

Single-path connectivity is never sufficient for mission-critical aerial operations. Bonding provides:

- **Resiliency:** Real-time path optimization ensures continuity when any individual network falters.
- **Failover without disruption:** Instantaneous and automatic switching prevents single-point failure.
- **Bandwidth aggregation:** Leveraging 5G/LTE with LEO links delivers the throughput needed for multi-stream UHD video.
- **Operational confidence:** Operators remain assured that live feeds will not cut out at the most critical moments.

Use Cases

Public Safety

Live situational awareness during pursuits, search-and-rescue, and disaster response. Aero5 ensures uninterrupted feeds when cellular towers are compromised, with Starlink extending coverage into rural and remote areas.

Defense and Security

Secure tactical ISR feeds from helicopters and UAVs, where network bonding guarantees video integrity despite aerial maneuvers or denied environments.

Broadcast and Media

Reliable aerial coverage of sports, marathons, and events in regions where cellular density fluctuates. Bonding keeps feeds stable, while Starlink augments coverage when venues extend beyond terrestrial reach.

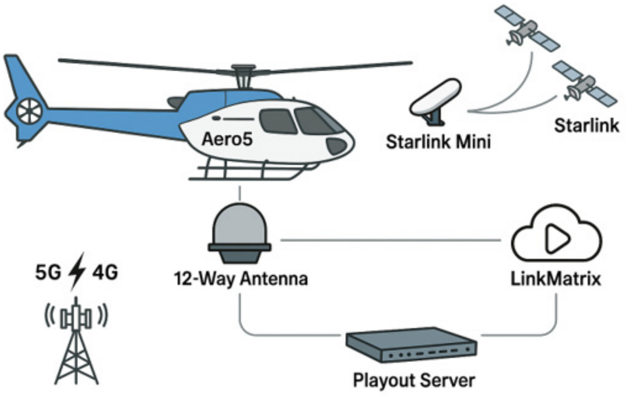
Maritime & Aviation

Ship-to-shore or air-to-ground video links remain continuous even when vessels and aircraft leave cellular zones. Starlink extends coverage, while 5G maintains low-latency reliability near coasts or airports.

Technical Architecture

Aero5 + Starlink Integration:

- **Aero5 Transmitter:** Encodes 4K UHD video, bonds 5G and satellite.
- **Starlink Mini Terminal:** Provides LEO link, mounted with 0° view to sky.
- **LinkMatrix Cloud:** Manages bonding, encryption, routing, and remote control.



Strategic Benefits

- **Assured coverage:** Overcome gaps in terrestrial networks — cellular where available, Starlink where not — always bonded for continuity.
- **Operational efficiency:** Fewer redundancies, simpler deployments.
- **Future readiness:** Designed to incorporate additional LEO constellations as they come online.
- **Security:** End-to-end AES encryption and centralized cloud management safeguard mission data.

Conclusion

The Vislink Aero5 augmented by Starlink, provides a next-generation solution for aerial video. Real-world airborne testing demonstrates that while Starlink brings valuable extended reach, cellular bonding is essential to mask its limitations and maintain mission assurance.

For public safety, defense, and broadcast organizations, Aero5 ensures continuous, secure, high-quality aerial video — enabling operators to maintain total situational awareness, anywhere the mission takes them.

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