

## Mobile-Enabled Internet of Drones: An Initiative Project for Advancing Drone Connectivity in 5G and Beyond 5G

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### Abstract:

This research explores the transformative potential of mobile-enabled drone communications as a foundational technology for the Internet of Drones (IoD). The study emphasizes the integration of terrestrial mobile networks, addressing the critical requirements of safe, reliable, and scalable drone operations. With the advent of advanced mobile networks—such as 5G, Beyond 5G (B5G), and pre-6G—the research highlights how ultra-reliable low-latency communication (URLLC) and massive machine-type communication (mMTC) capabilities can address challenges such as interference, asymmetric data flows, and real-time traffic management. The methodology combines theoretical modeling, simulation, and real-world experimentation through the establishment of a comprehensive testbed. The testbed integrates drones with terrestrial mobile networks, demonstrating uplink throughput, latency performance, interference mitigation, and robust connectivity under diverse conditions. Key findings reveal that mobile networks can effectively support high-throughput, low-latency drone communication in both Line-of-Sight (LoS) and Non-Line-of-Sight (NLoS) scenarios, with scalable solutions to overcome interference and environmental challenges. Additionally, drone-assisted communication and integration with Unmanned Aircraft System Traffic Management (UTM) systems underscore the feasibility of real-time tracking, collision avoidance, and secure operations. This research contributes to advancing IoD systems by providing practical insights into mobile networks as a foundation for future mobile ecosystems. By bridging theoretical concepts and experimental validations, the study offers a pathway for policymakers, industry stakeholders, and researchers to enable a globally connected IoD ecosystem.

### Keywords:

Internet of Drones (IoD), Mobile-Enabled Drone Communication, 5G and Beyond (B5G), Drone Communication Testbed