

Unmanned/uncrewed aerial vehicles (UAVs), or drones, continue to be a promising future means of transporting goods and people, and an enabler of transformational applications. UAVs are moving towards early commercial adoption, following advances in drone capabilities, improved availability of hardware and affordable pricing of equipment.

The mobile industry is increasingly associated with UAVs, as more operators bring UAV services to market and extensive

testing takes place. 5G's role in elevating the performance of UAVs is paramount.

This is the first of a two-part Spotlight series on the changing commercial models for UAVs, underpinned by mobile connectivity and technologies. While the second Spotlight will focus on people density data, this research highlights the crucial role mobile operators play in facilitating drone applications for emergency response, and how they have several routes to monetise applications.

Analysis

Mobile operators can play a key role in UAV applications

The use of UAVs is growing for emergency-response and public-safety use cases, helping to enhance operational readiness and improve the mobilisation and response of rescue groups. UAVs can help identify hazards, perform quick surface searches and mapping, provide lighting, drop medication, and locate victims of natural disasters by flying over areas that are inaccessible or hard to reach for responders. In the US, drone as a first responder (DFR) programmes are gaining traction with the police, with an estimated 3,000+ police departments already deploying DFR.

While 4G networks and mesh/Wi-Fi technologies can already enable such use cases, 5G elevates the capabilities of UAVs. This in turn enables operations to scale and attractive business propositions to be built:

- For command and control communications (the exchange of mission data between the UAV and UAV operator), Wi-Fi and other types of range-limited connectivity are not an option for covering large areas or distances. Moreover, high reliability and availability requirements cannot always be met. 5G networks and wide area coverage allow drone missions beyond visual line of sight (BVLOS) and offer the potential for multi-drone missions, automated flights and subsequently better economics for flights.
- Live video streaming is key to emergency-response situations and requires the low-latency support offered by 5G. More advanced applications are moving towards machine vision for image recognition; these applications will involve data-intensive AI workloads as well as other context-specific data such as mapping and micro-climate conditions. For instance, Orange Spain recently announced a fire detection application for agricultural sites and food factories. This will rely on the operator's 5G standalone network and will bring together edge compute, ultra-low-latency IoT, drones and robots.

- 5G also enables advanced communications and allows for data storage and edge application hosting for the purposes of training and operational compliance, as well as image and video traffic aggregation. Brinc, a US-based UAV manufacturer, offers drones to help in dangerous situations such as hostage negotiations and indoor search & rescue missions. The drone has systems onboard for two-way audio communication. There are plans to integrate automatic transcription and translation in future iterations.

UAVs to enable 'cell on wings'

A UAV can also be used as a 'cell on wings', with drones turned into air base stations to help provide temporary emergency connectivity in disaster zones. A programme from AT&T in the US has shown that a drone can fly up to 450 feet and transmit strong 5G coverage over 10 square miles for days at a time. First responders and search & rescue personnel with a 5G phone can go from having no service to a fast wireless connection in seconds. AT&T is also supporting the FirstNet public safety network, managing drone deployments. FirstNet is a nationwide, high-speed wireless broadband network designed to improve communications for first responders and public-safety professionals.

Meanwhile, in Australia, Telstra has moved early to deploy drones over its 4G network for mapping and area scans in emergency-response situations. It is also implementing 'cell on wings' for 4G. The operator is looking to 5G for greater efficiencies, particularly in the uplink performance. Similar activities are being pursued by other operators around the world, including KT in Korea, KDDI in Japan and A1 in Austria.

Implications

Mobile operators

- **Offer guaranteed availability and service performance –** As well as enabling connectivity for drones in emergency-response applications, operators should look to offer solutions that guarantee service availability, a certain level of quality and network performance. The pricing model can be split into a standard fee for network access and then charges for additional features and services depending on the application (quality-of-service, or QoS, parameters). Current QoS technologies, such as slicing, are well suited to such offerings. Mobile operators need to promote the advantages of slicing to businesses and show how it can cater to their connectivity needs.
- **Move up the value chain –** Beyond pure connectivity, mobile operators can provide additional network capabilities to support UAV operations, either in general or for specific use cases. For instance, operators can offer cloud services encompassing storage, processing and analytics functions to facilitate payload transmission. In such scenarios, operators can charge for network API use as well as data/application hosting on a subscription basis. Operators can also position themselves as end-to-end security providers, overseeing the aggregation and delivery of video/images. This strategy will be best suited to operators (such as Orange and Telefónica) that have developed significant expertise in ICT services.
- **Facilitate a two-sided market –** Mobile operators can orchestrate the various elements that must work cohesively to deliver effective emergency response using drones. They may need to facilitate data exchange between UTM system vendors, regulators and law enforcement authorities, and emergency-response groups. For example, KDDI has partnered with the Tokyo Metropolitan Government on the use of drones for emergency supplies, as well as Japan Airlines for emergency-response monitoring and systems for safe UAV missions and collision avoidance. In such a scenario, operators can charge based on the number of supported missions. Operators can also act as data providers. The goal here would be to enrich basic UTM services with critical data on the mission, and offer this as a service to emergency-response authorities and air navigation service providers, supporting more reliable governance of airspace.

Policymakers

- **BVLOS needs to be updated and scaled –** Enabling drones to be operated beyond visual line of sight of their controller plays an important role in extending the range of emergency-response use cases. According to GSMA Intelligence's assessment of drone readiness in 12 leading markets, 75% of countries – including those in the European Union Aviation Safety Agency (EASA) framework – now permit BVLOS with an enacted policy.¹ However, even in some countries where BVLOS is permitted, the approvals process needs to be more automated to enable greater scale. A positive move here was EASA's recent introduction of a Light UAS Certificate, enabling drone operators to start operations in standard scenarios without the need for regulatory authorisation.
- **Don't overlook public opinion –** Research conducted by BT Group indicates that the majority of UK consumers would support policymakers in allowing a range of use cases for UAVs, especially for public-safety applications such as missing-person searches and firefighting.² Policymakers should therefore devise UAV regulations that enable the rapid and efficient scaling of emergency-response and public-safety use cases. This will help foster increased public acceptance and familiarity with UAVs, ultimately contributing to the long-term development of the UAV market.

1. See [Race to the top: assessing and accelerating drone readiness in the UK, the G7 and other leading nations](#), GSMA Intelligence, 2023
 2. "Nearly 7 in 10 Brits believe drones will positively impact their future", BT Group, November 2021

Related reading

[MNO drone services business models](#)

[UAVs: commercial applications and the opportunity for mobile operators](#)

Authors

Christina Patsioura, Lead Analyst, IoT & Enterprise Research

James Joiner, Lead Analyst, Network Strategy