5G-Connected Drones
Promise Better Security

Liberty Global, Unmanned Life and Amazon Web Services (AWS) test 5G-enabled surveillance solution at the Port of Antwerp

Highlights

- Drone-based system harnesses 5G connectivity, edge computing and AI to enable faster, more flexible surveillance and lower costs.
- The system can automatically spot any unauthorised entry to a site.
- Network slicing guarantees that multiple drones can have a high-quality connection throughout a flight.
- Tests show the system can deliver a latency of 20-50ms at the application level between the edge and drone
- The companies report interest in the system from the UK, Netherlands, and Belgium across ports, power and utilities, construction, and other sectors.

Testing a flexible new surveillance solution

Securing major facilities, such as ports and industrial plants, can be both difficult and expensive. CCTV and other traditional surveillance tools can be constrained by tight angles and limited range. These limitations can mean blind spots and false call outs. The predictability of fixed camera infrastructure, which can take months to install and connect to fibre communication links, can also leave a site exposed to malicious activities.

One way to overcome these problems is to use drones with cameras for surveillance. Drones could cut security costs substantially by providing a flexible and efficient means of surveying large areas and detecting problems in real-time. They can also access challenging or dangerous areas, making them versatile tools for both

surveillance and other site inspections, as well as acting as a deterrent against malicious activities.

At the Port of Antwerp, Unmanned Life, Liberty Global (through its operating company Telenet) and AWS have tested a drone-based surveillance system, which uses 5G connectivity, cloud and edge computing, and artificial intelligence (AI). The tests employed two drones controlled and managed by Unmanned Life's software platform, via a slice of Telenet's public 5G network and AWS Snowball Edge infrastructure.

Once the mission was underway, the 5G connectivity streamed live high-quality video to the Unmanned Life Web Interface, running on the AWS Snowball Edge's GPU optimised compute. Then a person recognition system, developed with AI, automatically spotted any unauthorised entry to the site and sent an alert. The Unmanned Life' web interface enabled the project team to view the mission in full, including live telemetry and alerts from the drones.

Equipped with compact cellular modems, drones can communicate and transfer real-time video over long distances. Unlike the traditional communication links used by drones, 5G connectivity doesn't require line of sight and isn't impacted by obstacles. It also provides much more bandwidth for sending and receiving data, such as streaming video, payload info, telemetry, commands, and mission data.

As the AWS snowball edge compute handled the data analysis, the drones didn't need to carry substantial computing power onboard, thereby saving battery life. Using compute power at the edge, rather than in the cloud, also delivers the low latency required to ensure the analytics are presented in real time.

Standalone 5G and APIs to deliver configurable connectivity

By using its standalone 5G network to provide a dedicated slice of connectivity, Telenet was able to guarantee that the drones would have a high-quality connection throughout the test flight. "It's the first mobile private network trial we've done leveraging a 5G standalone network built in the cloud," says Madalina Suceveanu, MD, Mobile & Cloud Technology, of Liberty Global. "Through this initiative, we're demonstrating the potential to bring greater efficiency and safety to industrial shipping practices across the world, through leveraging the power of standalone 5G, cloud, edge computing and AI-driven computer vision applications." She notes that the Antwerp trial is one of several pilots that Liberty Global's operating companies are conducting to "supercharge" what it can offer customers, particularly in the business-to-business space.

The pilot at the Port of Antwerp points to how Liberty Global is looking to bring cloud capabilities close to where its customers are generating and using data, while leveraging 5G network slicing and ultra reliable low latency. The telco also intends to offer developers access to network functionality through simple APIs (application programming interfaces) that will enable them to create customisable and scalable products without requiring mobile or fixed telecoms knowledge.

"Trials like this allow us to test the capabilities of our standalone 5G networks, getting a detailed understanding of data capacity and latency upsides associated with edge computing," adds Madalina Suceveanu. "It also highlights the potential for further monetisation of our investments in 5G

through creation of new revenue streams, moving us towards our goal of truly customisable services for our B2B customers – across all industry sectors – which can be adapted to suit the specific needs of their business. We have further pilots in flight across various sectors and solutions in our other European markets, which we will unveil in the coming months."

Low latency enables real-time command and control

The tests at the Port of Antwerp found that the 5G/edge architecture can deliver a latency of 20-50ms at the Unmanned life application level between the AWS Snowball Edge and drone. That is sufficient to enable real-time command and control of the drone swarm, real-time processing of the intrusion detection AI, and real-time display of the processed video to the end user, according to Unmanned Life.

The tests also demonstrated that the network, the edge compute and the application could all handle multiple drones simultaneously. The idea is that an enterprise can use a single interface to manage a swarm of drones and view the data that they are generating. "In the near future, we can have deployments with five, 10, 20 or even 100 drones," says Jorge Muñoz, Chief Commercial Officer of Unmanned Life. A swarm of drones would enable even very large facilities to be checked very quickly.

"In a commercial setting you'd have drones with charging stations," adds Jorge Muñoz. "Modern drone hardware, such as that used in this project, could typically fly for up to 40 to 45 minutes. And then you have the intelligence to be able to switch drones based on how much area you need to cover. If you had enough drones, you could absolutely do continuous surveillance."

By using drones, Unmanned Life estimates enterprises could reduce the time it takes to inspect a fence perimeter by 54%, compared to using a guard in a vehicle, while sending a drone to respond to an intrusion could be 80X faster than sending a security guard.

Commercial solution for a wide range of sectors

Liberty Global, Unmanned Life and AWS believe that drones, fast cellular networks and robust edge compute are a potent combination that could be used across many different sectors and use cases, unlocking new revenue streams for mobile operators and their partners. 5G connected drones could be used to monitor progress on a construction site, inspect infrastructure damage or help develop digital twins that can be used for asset management, as well as for surveillance and security.

Following the successful test in Antwerp, Unmanned Life, AWS, and Telenet have developed a commercial solution to enable enterprises to use drone systems

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They anticipate that a 5G-drone-edge compute solution will appeal to both companies that lack specialised surveillance and security personnel and to companies that want to assign their human teams to perform other tasks of greater added value. As it employs large commercial drones, the solution is designed to be used outdoors for the surveillance of major sites or facilities, such as oil refineries, chemical plants, ports and mines.

Unmanned Life says its U-Security "drone-in-a-box application" can support 5G connectivity, autonomous charging, thermal imaging and AI decision-making. "On an Unmanned Life drone application level, the user simply selects the number of drones they would like to use for the mission, as well as the area of surveillance," explains Jorge Muñoz. "The platform then connects the drone swarm over the integrated network, as well as controls and manages the mission in real-time. Missions can be deployed via a timer, on-demand, or as a reactive response to anomalies on site."

As things stand, flying drones BVLOS in most European countries still requires a permit, but regulators are gradually streamlining the process, as the industry demonstrates the robustness of the technology and gains more experience of operating drones.

Unmanned Life is taking a hardware-agnostic approach so that the end customer can easily add new robots and drones on demand, if they want to scale. This includes legged robots, which can be used for a close inspection of assets on the ground, complementing drones.

"As technology continues to evolve, the seamless orchestration of autonomous drone swarms, real-time streaming, and advanced analytics has the potential to revolutionise not just port management, but also various industries worldwide," adds Jorge Muñoz. "By leveraging the power of 5G, artificial intelligence, and edge computing, this innovative solution sets a precedent for scalable, intelligent systems that can adapt to the ever-changing demands of modern business and technology landscapes."

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About the GSMA

The GSMA is a global organisation unifying the mobile ecosystem to discover, develop and deliver innovation foundational to positive business environments and societal change. Our vision is to unlock the full power of connectivity so that people, industry, and society thrive. Representing mobile operators and organisations across the mobile ecosystem and adjacent industries, the GSMA delivers for its members across three broad pillars: Connectivity for Good, Industry Services and Solutions, and Outreach. This activity includes advancing policy, tackling today's biggest societal challenges, underpinning the technology and interoperability that make mobile work, and providing the world's largest platform to convene the mobile ecosystem at the MWC and M360 series of events.

For more information, please visit the GSMA corporate website at gsma.com

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About the GSMA Foundry

The GSMA Foundry is the go-to place for cross-industry collaboration and making positive change happen, supported by leading technology organisations and companies. By bringing together members and key industry players, engaging, and unifying the end-to-end connectivity ecosystem, the GSMA is solving real-world industry challenges.

Our vision is to unlock the full power of connectivity so that people, industry, and society thrive. This enables the mobile industry's mission: to connect everyone and everything to a better future.

Find out more, or submit a new project idea, at gsma.com/Foundry

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About Unmanned Life

Unmanned Life offers a software platform to deploy, control, and orchestrate different types of robotic devices (drones, legged robots, autonomous mobile robots, and more) as intelligent, autonomous fleets.

U-Security is an application extended by the platform, designed to connect and deploy autonomous drones for security surveillance and inspection of facilities. With cutting-edge features such as 5G connectivity, autonomous charging, thermal imaging, AI decision-making, and more, U-Security can deliver real-time, remote surveillance capabilities, deployed through a simple user interface.

About Liberty Global

Liberty Global is a world leader in converged broadband, video and mobile communications and an active investor in cutting-edge infrastructure, content and technology ventures. With our investments in fibre-based and 5G networks we play a vital role in society, currently providing over 85 million fixed and mobile connections and rolling out the next generation of products and services, while readying our networks for 10 Gbps and beyond. We're creating national champions, combining the best broadband and mobile networks under brands such as Virgin Media-02 in the UK, VodafoneZiggo in The Netherlands, Telenet in Belgium, Sunrise in Switzerland, Virgin Media in Ireland and UPC in Slovakia.

About AWS

Launched in 2006, Amazon Web Services (AWS) began exposing key infrastructure services to businesses in the form of web services -- now widely known as cloud computing. The ultimate benefit of cloud computing, and AWS, is the ability to leverage a new business model and turn capital infrastructure expenses into variable costs. Businesses no longer need to plan and procure servers and other IT resources weeks or months in advance. Using AWS, businesses can take advantage of Amazon's expertise and economies of scale to access resources when their business needs them, delivering results faster and at a lower cost.