

**The Ultimate Cloud
Network Infrastructure**
for Autonomous Robotics

**THE EDGE INFRASTRUCTURE FOR THE
ORCHESTRATION OF AUTONOMOUS ROBOTS**
Report By Unmanned Life

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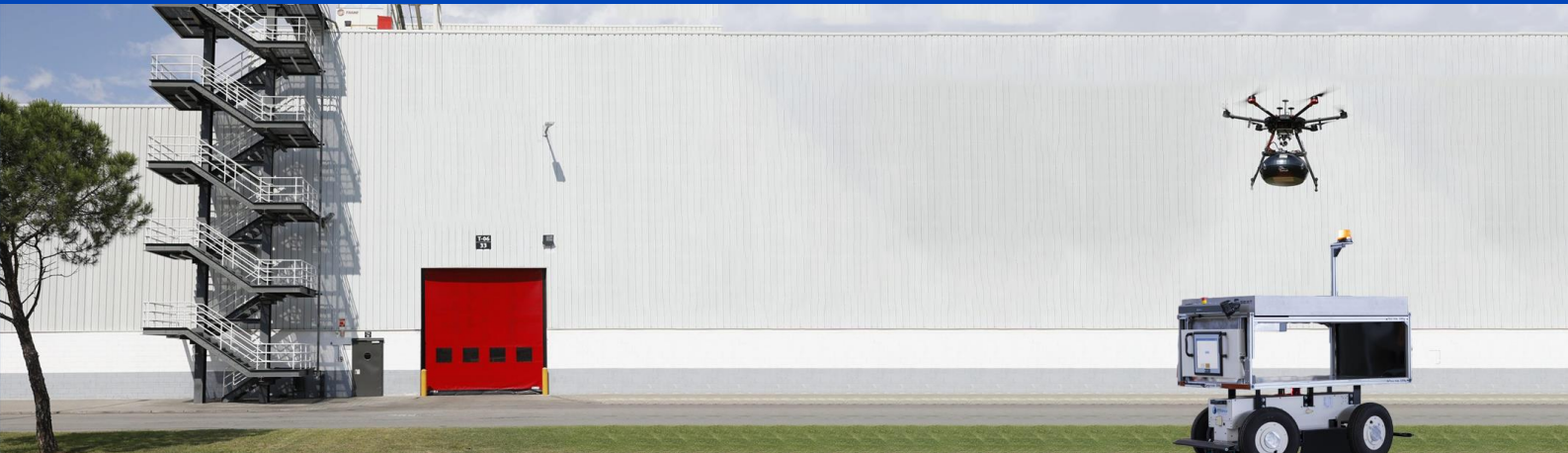


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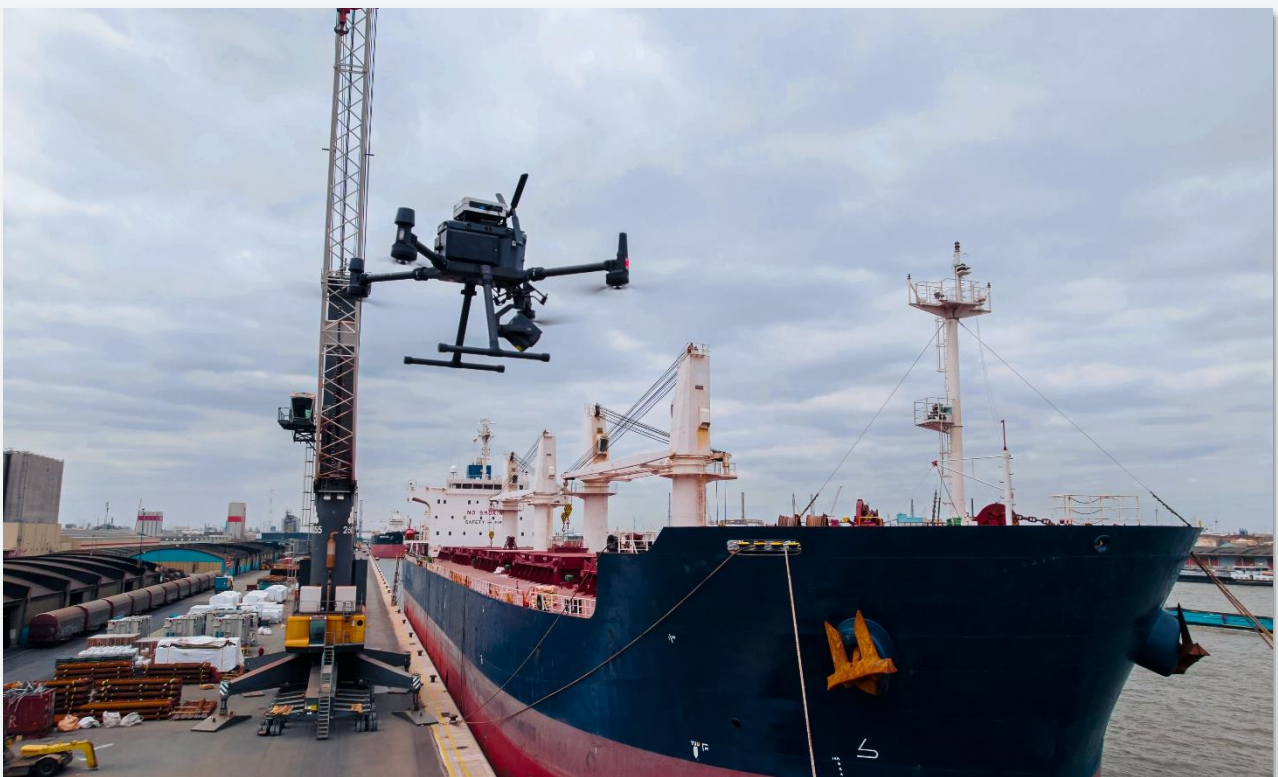
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Robots, 5G and EDGE: The Perfect Marriage

As the world becomes increasingly automated, robots and drones are rapidly becoming ubiquitous in many industries. By 2026, more than 152,000 robots are projected to be deployed, reaching a total market value of USD 58.56 billion with a CAGR of 33.21%. Additionally, the drone market is expected to grow at a 7.8% CAGR between 2022-2030¹, indicating the potential for air robotics to become another vibrant industry for years to come. However, simply having a large number of robots is not enough. The key challenge is to connect these robots and orchestrate them to achieve impactful use cases that provide value to end users.

This document presents Unmanned Life's vision to become the leading software platform for the seamless orchestration of autonomous robotics. Our approach involves orchestrating robots over mobile networks, enabling them to be located anywhere. Achieving this goal requires unique mobile network resources and edge capabilities. As an Edge-Native application, our solution brings data processing closer to the source, providing a more efficient and effective orchestration of autonomous robots. In the following sections, we will delve deeper into the technical aspects of our solution and its potential impact on the robotics industry.



¹. <https://www.technavio.com/report/industrial-robotics-market-industry-analysis>

Unmanned Life's platform, as an Edge-Native application, has specific key requirements to enable the development of advanced use cases in various industries. These include autonomous drone surveillance, asset inspection, smart logistics, last-mile delivery, and emergency response. The platform is designed to deliver significant value to end-users in each of these applications.

- **Ultra-Low latency:** Required to ensure timely and effective communication and coordination between the robots and to respond quickly to changing conditions and requirements in real-time environments. In other words, you need to be able to transmit commands to your robots as fast as possible.
- **High Bandwidth:** Autonomous robotics generates a massive amount of data that needs to be transmitted to the platform for processing and analysis. This data can include sensors, video feeds, and other environmental data. In other words, high bandwidth enables quick data transfer, which is crucial for real-time decision-making in autonomous robotics.
- **Service continuity:** To be more reliable, flexible, and resilient, which can ultimately improve safety, efficiency, and productivity in real-world scenarios. Put simply, you need to always keep the line of communication open.
- **Security & Privacy:** to protect the robots, the data they generate and collect, and the systems and networks they interact with, from malicious attacks and unauthorized access. Said differently, you want this communication to be safe and cyber-secure.

Watch our autonomous outdoor surveillance at Telefonica's HQ in Madrid:
<https://www.youtube.com/watch?v=bJSe4MYNUgM>



In this context, 5G standalone and Edge Computing are key enablers of Unmanned Life applications.

Benefits For Robotics At Scale

5G Standalone

Because it provides the low latency, high bandwidth, and high reliability that are necessary for the effective communication and coordination of autonomous robots in real-time environments.

5G networks were designed to support many devices that are expected to be connected in the future, and provide a more secure environment than the previous generation.



Some of the key benefits of 5G for our applications:

- **High Speed and low latency:** 5G technology offers faster data transfer rates and lowers latencies compared to previous generations of cellular networks.
- **Network slicing:** where different parts of the network can be dedicated to specific uses, which provides a higher level of security and improved performance, as the application can operate in an isolated environment.
- **Improved security:** 5G networks use advanced encryption algorithms to protect the user plane communication.
- **5G technology enables edge computing:** which means that the processing of data can be done closer to the source of the data, rather than transmitting all the data to the cloud application for processing.

And 5G rollout is now a reality. It is in progress in many countries around the world, with varying degrees of deployment and coverage. According to the GSMA¹, consumer connections surpassed one billion at the end of 2022 and will increase to around 1.5 billion this year – before reaching two billion by the end of 2025. As of January 2023, there were 229 commercial 5G networks globally. This momentum confirms 5G as the fastest generational roll-out when compared to 3G and 4G.

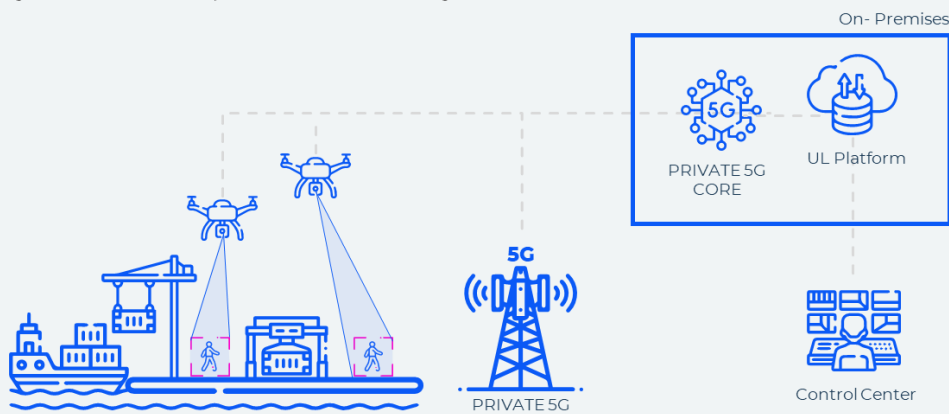
¹. <https://www.gsma.com/newsroom/press-release/second-wave-of-5g-30-countries-to-launch-services-in-2023/>

- **DevOps:** Cloud-native applications are typically developed and deployed using DevOps practices, which emphasize collaboration and automation between development and operations teams. DevOps helps to ensure that applications are deployed quickly, reliably, and with minimal downtime.

Based on these key enablers and the flexibility of the Unmanned Life platform, we can work on different deployments models:

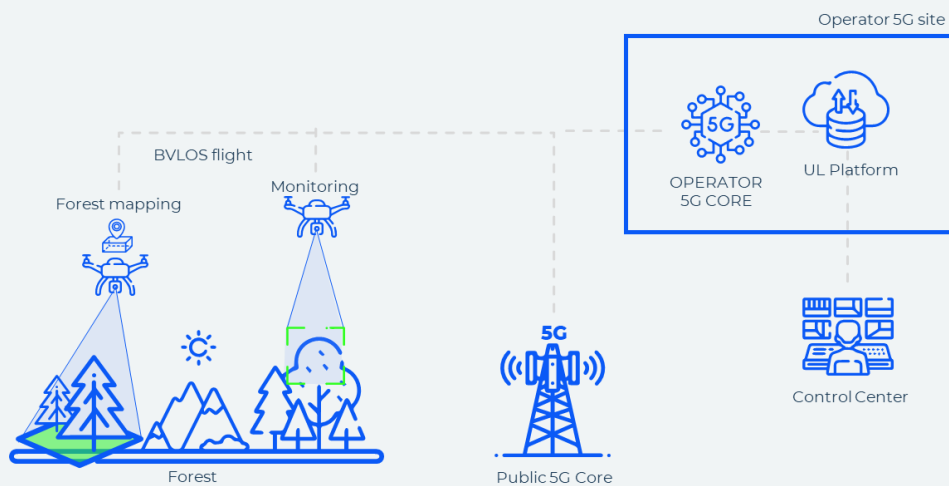
- **Private 5G deployments + Local edge server**

Typically deployed to support industrial, commercial, or critical applications where a 5G public network is not available or in deployments where it is mandatory to have improved security.



- **Public 5G deployments + On-Site Edge servers**

In environments where 5G standalone is available, we can make use of it plus the combination of any Edge infrastructure on-site where we can leverage the Telco Edge infrastructure or the Public Cloud Zones on the 5G site.



Edge Computing

While 5G can provide the highest requirements on the radio side, the combination with Edge Computing is a key enabler to close the loop in our deployments.

The combination of 5G and Edge, provides us:

- **Low Latency:** By processing data at the edge, near the source of the data, the latency or delay in processing and transmitting data is reduced.
- **High Bandwidth:** the application traffic doesn't need to leave the 5G site, reducing the data that is transmitted over external networks.
- **Better Privacy:** By processing data locally, edge computing can reduce the amount of personal or sensitive data that is transmitted over the network.

A significant number of companies participate in the ecosystem of edge computing, from hardware vendors, and software companies to applications developers and system Integrator companies and Unmanned Life has been recognized as been leading in the sector as one of top 100 companies globally .

How Unmanned Life Is Deploying Its Platform

Unmanned life platform has been designed using cloud-native principles to be deployed in any kind of cloud or edge infrastructure and has adopted several techniques to allow connections from robots on different networks. The key principles to our success are:

- **Microservices architecture:** our application has been designed to run into small, independent services that can be deployed and scaled independently. This approach allows for greater flexibility and scalability than traditional monolithic applications.
- **Containerization:** Containers are lightweight, portable units of software that provide a consistent and isolated runtime environment. Containerization allows for easy deployment and scaling of applications and enables applications to run consistently across different environments.

In this kind of deployment, we are also adopting the integration with the Telco Open Gateway platform where telecoms are going to expose a set of standardized APIs that the developers will be able to use to implement use cases with special network capabilities. In our case, this technology will be very useful to develop cutting-edge use cases allowing to increment the quality of service of the mobile connection for a specific robot that is performing a critical task.

Conclusion

In conclusion, robots will make our lives safer, easier, and more cost-effective. We call this the AUTONOMOUS EVERYTHING: it will be the moment when society will have reached progress thanks to the development, adoption and integration of AI and autonomous robotics across society. This, with the right ethical checks and balances, can deliver huge advances to society.

To deliver the “Autonomous Everything”, we need a robust and solid technical infrastructure. This is why we believe that robots, 5G and Edge constitute the right marriage and we, at Unmanned Life, will leverage the network to deliver autonomous robotics at scale for the next decade.