Control-centre-based deployment of automated drones

Partner with Frequentis and take the lead in exploring the ground-breaking possibilities and benefits of hangar-based unmanned aerial systems.

- Deploy and control advanced drones at the touch of a button from a control centre
- Automate regular tasks as well as their documentation
- Reduce response time in time-critical applications
- Boost situational awareness
- Cut costs and maximise operational efficiency

Executive summary

Legal regulations in Europe regarding the use of drones have changed significantly in recent years, enabling viable use cases for the automated deployment of drones to support real-life operations at scale. Drawing on our deep experience in Air Traffic Management (ATM), Unmanned Traffic Management (UTM), control centre operations, data fusion and communications in safety-critical markets, Frequentis is seeking partners to join in pioneering automated drone deployment in real environments.

Frequentis has developed and proven all the required technology, and now that both the legal conditions and the experience of authorities are sufficiently developed, we believe that organisations in public safety, maritime, railways, emergency services, border security and defence can take the first steps in unlocking the considerable benefits of automated drone deployment. We invite you to join us as a validation partner.

New opportunities for drone operations

With the ability to provide data from the skies, and to carry and deliver a variety of payloads, Unmanned Aerial Systems (UAS), commonly known as drones, can make existing processes more efficient as well as unlock completely new opportunities across multiple industries, authorities and use cases.

To date, the main obstacles to developing drone operations at scale have been regulatory and organisational issues. The need to ensure safety both in the air and on the ground drove the rapid (and ongoing) evolution of European and national legislation. And based on the initial response to that legislation, organisations so far have operated drones mostly in visual line-of-sight (VLOS) of their pilots. With VLOS operations, the 1:1 ratio of pilots to drones naturally creates significant resource constraints, making it difficult to develop large-scale use cases for drones. This approach also slows down responses to emergency situations and other

time-critical operations, and significantly raises the cost of routine operations such as regular flights to check the maintenance status of physical assets.

Although beyond visual line-of-sight (BVLOS) technology addresses the main challenges here, it has not yet led to the scalable and cost-effective automation of drone operations. Frequentis believes that this is about to change: today, the technology, the regulatory frameworks and the operational experience among both authorities and drone operators have evolved to the point where we are confident that automated "drone-in-a-box" operations at scale will soon be a reality.

Navigating the legal maze

Gaining authorisation for BVLOS drone flights remains difficult, requiring operators to use Specific Operations Risk Assessments (SORAs) to demonstrate that there is no risk for any uninvolved person or property in the air and on the ground. However, as the relevant authorities gain experience in evaluating applications, we are seeing that standards and best practices are starting to emerge, paving the way for large-scale automated drone operations.

Not all use cases are currently feasible or efficient. For example, it is considerably easier to gain clearance in sparsely populated areas than in urban centres, and drone flights near airports or critical infrastructure such as power stations are unlikely to be approved without numerous conditions. Nevertheless, Frequentis has identified several scenarios in which it should be possible to repeatedly run automated drone missions in a scalable and sustainable manner.

In short: we believe that in our safety-critical markets for a considerable number of use cases there is no longer any need for on-site VLOS drone pilots. Our proposed solution combines a deep understanding of the legislation with all the required technology components — so that forward-thinking organisations can work with us to pioneer large-scale, highly automated drone operations.

Benefits of automated drones

Cut response time by as much as 75% in real-life scenarios[1]

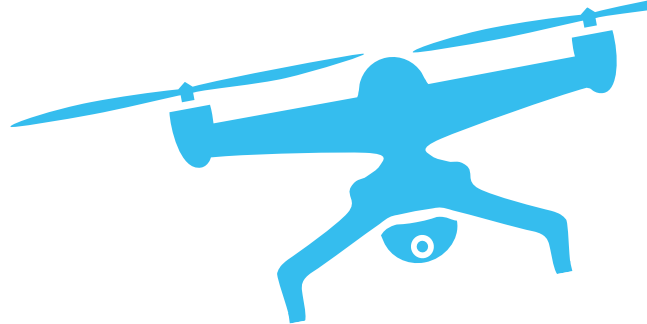Capture and share mission-critical information rapidly and efficiently

Make more efficient use of resources through improved planning and workflows

Boost situational awareness

Avoid putting humans in danger

Reduce organisational complexity

Cut average cost of staff per mission.

Unlock new possibilities

Decoupling pilots from the location of their drones paves the way for the centralisation of drone operations to control centres, and creates exciting opportunities for automation. Across multiple industries, automated drone deployment — under the guidance of qualified operators and with the ability to assume manual control if needed — offers opportunities to increase situational awareness, improve mission management, boost efficiency, reduce costs, cut response times, improve safety. Here are a few of the use cases that Frequentis has already determined to be feasible:

Railways

On-demand flights to:

- provide first-responder presence
- replace remote track marshals with a centralised task force.

Regular automated flights along tracks to:

- check visually for overhanging foliage or obstacles
- use laser measurement devices to check for landslides.

Maritime

On-demand flights to:

- identify inbound ships at seaports
- measure pollution levels in exhaust smoke.

Regular automated flights to:

- monitor water parameters (depth, quality, etc.)
- inspect infrastructure.

Public safety

On-demand flights to support multiple first-responder as well as search and rescue scenarios, such as:

- injured persons
- responding to reports of a fire
- incidents at critical infrastructure facilities
- helping to locate a person at risk of drowning and dropping a lifebelt
- identifying hazardous substances released from accidents.

Regular automated flights to monitor:

- forests at risk from wildfires
- green borders for migration activities.

Military

On-demand flights to:

- respond to alarms
- provide equipment on-site.

Regular automated flights to:

- protect military patrols, bases and critical infrastructures
- monitor green borders.

The Frequentis approach

To enable the centralisation and automation of drone deployment and operation, Frequentis proposes that the drones themselves be stationed in automated hangars across defined areas of interest. Within these areas, Frequentis will help to define possible routes and operational procedures, checking them against the known parameters and restrictions. Frequentis will then support to work with the relevant authorities to gain approval through the SORA-process. Once the approval is gained — and any relevant restrictions understood — Frequentis will help to determine whether the project is operationally feasible and commercially viable.

Assuming the project is feasible and viable, Frequentis will help you optimise the placement of the hangars — which could be potentially shared with another organisation (for example, to enable regular operations for commercial use cases while supporting on-demand services for public safety organisations).

The automated hangars proposed by Frequentis protect the drones from environmental factors while supplying electricity and data. In remote areas, it would be possible to operate drones for weeks or even months at a time without direct human intervention.

For all industries and use cases, the Frequentis solution integrates drone controls and automation into existing control centre software using a standard software plugin, so that a qualified and authorised operator can simply push a button to send a drone to a specified location. Behind the scenes, the solution contacts the relevant ATM/UTM authority, providing all the required information about the route and the mission in order to secure permission. Provided local weather conditions are suitable, the requested drone is launched from a fully automated hangar and routed along the authorised flight path. At all times, the operator in the control centre has a view of the drone's key parameters and its live video feed and data, all integrated into the existing control centre interface.

Frequentis can help to:

|			
Design and analyse drone-in-a-box use cases, ensuring that they are legally feasible and realistic	Design and check flight routes	Design and implement automated procedures to safely manage drone failures	Cut through the red tape to get the required regulatory approval, from both technical and operational perspectives
Design and implement mission-critical communications over wide areas, including integration with public networks	Design and implement sophisticated integration of data from multiple sources	Design and implement the operational workflows	Plan and execute the required organisational change management
Deploy the automated drone hangars and drones, including all sensors and telemetry	Deploy and customise the solution server	Deploy and integrate the control room solution	Maintain regulatory compliance during the full lifecycle of the solution
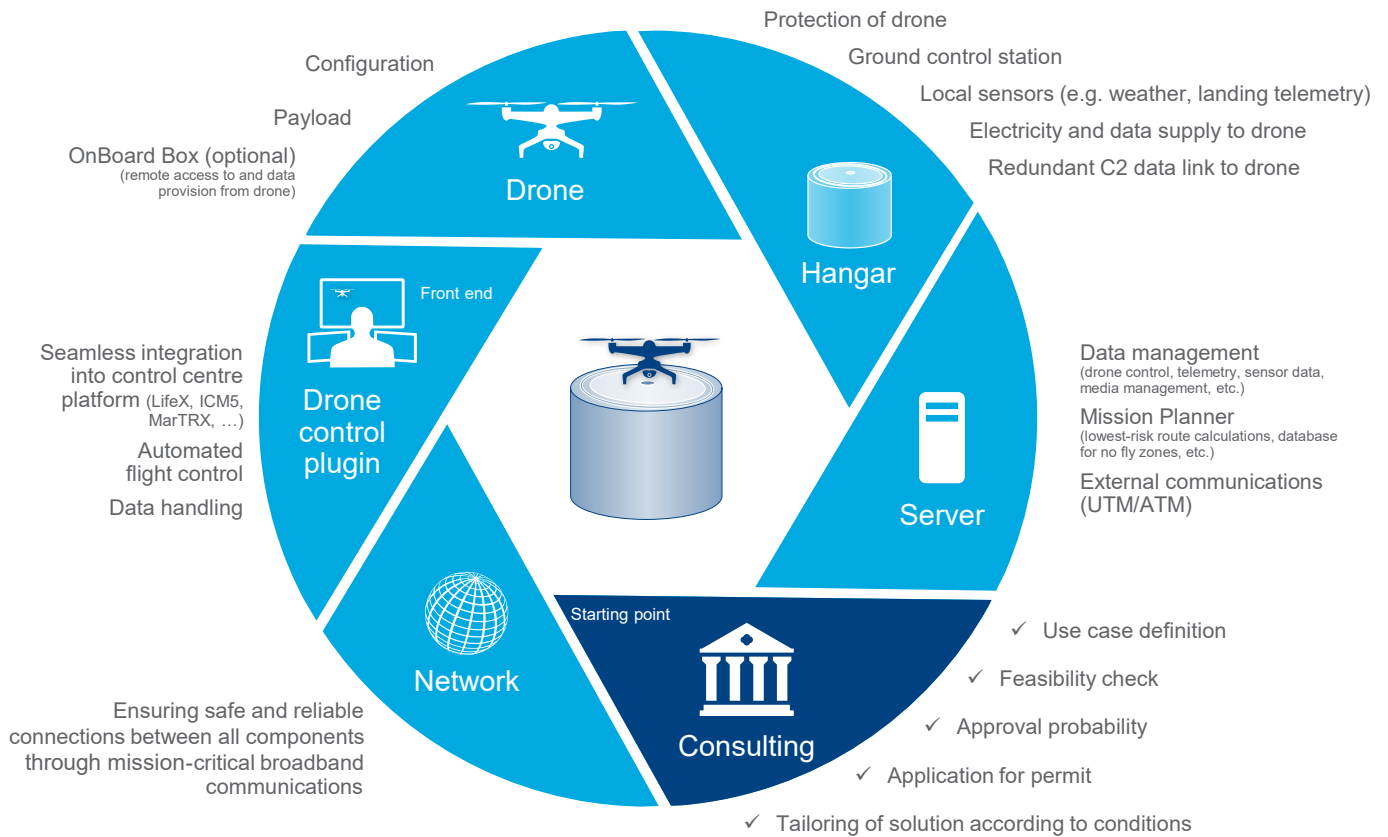
Figure 1: Key components of the Frequentis drone-in-a-box solution

Single-click flight commands make it easy to direct the drone to a given coordinate, and simple manual controls allow relatively inexperienced pilots to conduct operations safely and efficiently. And because the requests for UTM permission and the calculation of flight routes happen automatically in the background, drone operations become a natural extension of the existing control centre tools, rather than a new source of complexity for operators.

Another critical element of the Frequentis solution is that it provides stable, mission-critical communications — not only between the drone and the control centre, but also with other stakeholders. Many use cases for drones will include collaboration with on-site units or external partners, and our experience in delivering uninterruptible voice and data communication means that accurate data can be shared with all relevant parties in real time. By integrating information from multiple internal and external sources, and sharing it with other stakeholders, the Frequentis solution helps make drone missions more effective, efficient and safe.

Why Frequentis?

Drone operators working under EU regulations require an operating permit from the aviation authority, which must be applied for using a Specific Operations Risk Assessment (SORA). Among other things, operators will need to demonstrate: the stability of data communication links, the redundancy of technology throughout the stack, and the implementation of procedures such as automatic return-to-base to manage unexpected situations or malfunctions.

As pioneer and global leader in ATM and UTM, Frequentis offers unparalleled experience and depth of knowledge in both the technology and the regulations. Combined with our market-leading position in delivering safety-critical control centres and critical communications in industries and authorities such as civil and military aviation, maritime, railways, public safety and defence, we have the skills and expertise required to make automated drone operations a reality.

Frequentis offers a true end-to-end solution for automated drone operations, from validating the use cases to gaining regulatory approval, and from designing the operational workflows to maintaining full-lifecycle regulatory compliance.

Join us to lead the way in automated drone deployment

Automated drone deployment clearly has significant potential benefits across numerous industries. Frequentis is actively seeking partners to conduct joint validation exercises to investigate the regulatory constraints and operational feasibility of various use cases. We believe that these validation exercises will help both partners to gain important first-mover advantage in a fast-moving market. Please contact us for more details.

About Frequentis

Frequentis, headquartered in Vienna, is an international supplier of communication and information systems for control centres with safety-critical tasks. Such 'control centre solutions' are developed and marketed by Frequentis in the business sectors Air Traffic Management (civil and military air traffic control, air defence) and Public Safety & Transport (police, fire brigade, ambulance services, shipping, railways).

As a global player, Frequentis operates a worldwide network of branches, subsidiaries and local representatives in more than 50 countries. Products and solutions from Frequentis can be found in over 30,000 operator working positions and in approximately 140 countries.

Founded in 1947, Frequentis considers itself to be the global market leader in voice communication systems for air traffic control with a market share of around 30%. In addition, the Frequentis Group's AIM (aeronautical information management) and AMHS (aeronautical message handling) systems, as well as GSM-R systems for Public Transport are industry-leading global solutions. The shares of Frequentis AG are traded on the Vienna and Frankfurt Stock Exchange under the ticker symbol FQT (ISIN: ATFREQUENT09).

For more information, visit www.frequentis.com