



# ULTIMATE GUIDE TO DRONE AUTONOMY



BVLOS Data Security Drone Docks On-prem BVLOS Data Security  
UTM ADS-B 5G Apps Sense & Avoid AI UTM ADS-B 5G



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# WHERE IS THE INDUSTRY HEADED

Drones have progressed significantly as a technology and industry, transitioning from recreational flights and photography to widespread commercial adoption. Their versatility and wide range of applications have made them indispensable in everything from search and rescue missions to inspections.

However, as these operations scale and require round-the-clock performance, autonomy becomes a critical factor.

Just as cameras were instrumental for the early adoption of commercial drones, DiaB (Drone-in-a-Box) systems have emerged as a critical enabler for the widespread deployment of autonomous drones.

## ENABLER OF DRONE AUTONOMY

### ENABLER OF DRONE APPLICATIONS



Drone

+



Camera

+



Dock

# KEY STEPS TO GET STARTED WITH AUTOMATED DRONE OPERATIONS

## Step 1:

Is Dock a Good Fit for  
Your Use-Case?

## Step 2:

Select Suitable  
Hardware Options

## Step 3:

Setup Remote  
Command Center

## Step 4:

Identify Apps &  
Integrations

## Step 5:

Apply for BVLOS:  
SORA Approvals

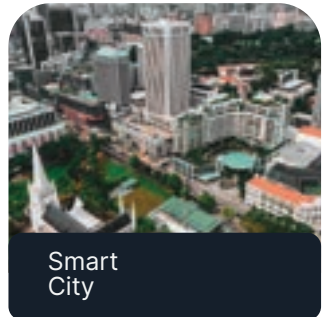
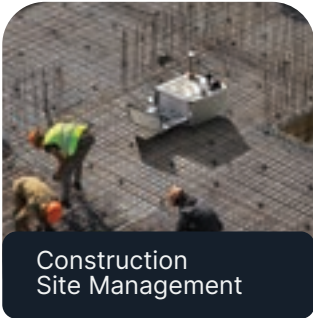
## Step 6:

Prepare for PoC/Pilot  
& Deployments at Scale

## STEP 1: IS DOCK A GOOD FIT FOR YOUR USE-CASE?

Each use-case is unique and complex. Before deciding to deploy drone docks, several key factors must be considered. These would typically include the type of asset being monitored or inspected, the frequency with which operations are performed, the distance or area to be covered, the current technologies used, event-based response requirements, and the time required to complete one operation.

Some popular use-cases of drone-in-a-box solutions include:



# IS DRONE-DOCK A GOOD FIT FOR YOUR USE-CASE?

Fill the following checklist and send the picture to [contact@flytbase.com](mailto:contact@flytbase.com) for a free consultation and RoI calculation.

## Application

- Security Patrols
- Work Progress Monitoring
- Asset Inspection
- Emergency/Event-based Response
- Surveying & Mapping
- Other \_\_\_\_\_

Approx. time taken to complete one full operation WITHOUT drone

\_\_\_\_\_

Approx. time taken to complete one full operation with drone

\_\_\_\_\_

## Type of asset

- Linear  
[Eg: Pipelines, Highways, Rail yards]
- Vertical  
[Eg: Facades, Poles, Towers, Wind turbines]
- Area Coverage  
[Eg: Solar, Warehouses, Construction Sites, Mines]
- Other \_\_\_\_\_

Current technologies utilized (select all that apply):

- Drones
- Sensors
- Manual inspection
- Robotic inspection
- Other: \_\_\_\_\_

## Frequency of operations

- Hourly
- Daily
- Monthly
- Quarterly
- On-demand
- Other \_\_\_\_\_

Event-based response required

- Alarms
- IoT Sensors
- CAD (911 equivalent) systems
- Not required
- Others \_\_\_\_

Distance or area to be covered

\_\_\_\_\_

Annual operations budget: (e.g: Inspection budget, Security & Safety budget)

- <USD 50,000
- USD 50,000 - 100,000
- USD 100,000 - 500,000
- USD 500,000 - 1,000,000
- >USD 1,000,000

## STEP 2: SELECT SUITABLE HARDWARE OPTIONS

Each of the use-cases listed above requires a specific type of drone and payload/s to ensure effectiveness. Similarly, docking stations must also be tailored to the needs of each particular use

For instance, when infrequent interventions are needed, a charging station may suffice. However, for high frequency and continuous operational scenarios, a battery-swapping dock would be more suitable, as it allows for quicker turnaround times & continuous operation.



## DJI DOCK FOR M30 SERIES

The DJI Dock is a reliable & robust drone charging station that is specifically designed for the Matrice 30 series enabling it to execute automated & scheduled missions seamlessly for a wide range of use-cases regardless of the location or weather. The dock is available for continuous use 24x7, with the drone capable of traveling up to 7 kms while



## HEISHA FOR M300 AND MAVIC 2/3 SERIES

Heisha Tech offers enhanced security and durability with its sturdy designs. The **F50** is a portable drone charging system with several useful modules and add-ons such as a weather station with digital sensors, surveillance camera, extended range antenna, and loudspeaker and works seamlessly with smaller sized drones such as the DJI Mavic 2/3 series.

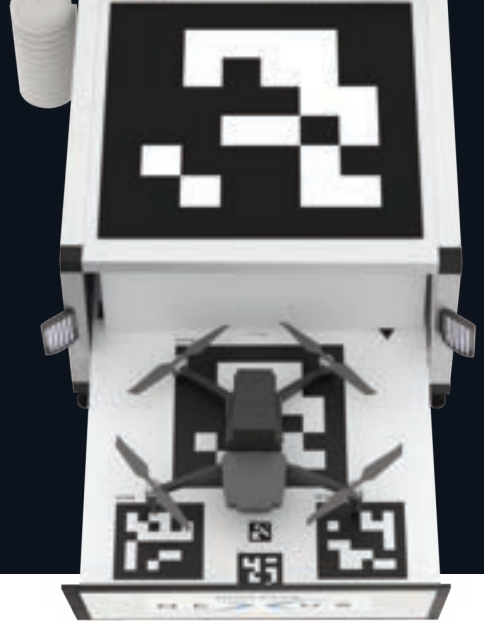
The **F135** variant is built for the DJI Matrice 300 series and features a reliable, steady, and autonomous drone charging station with a built-in air conditioner and a canopy-like construction that gives it a solid and durable exterior that allows it to work in harsh environments and remote control capability.





## IDIPLYER NEXUS FOR DJI MAVIC 2/3 SERIES

The IDIPLYER docking station offers an affordable and streamlined solution, featuring a lightweight design that eliminates mechanical complexities. This robust system enables businesses of all sizes to benefit from complete drone autonomy. The IDIPLYER is exceptionally lightweight, packed with features, and offers IP55 (pending) weather resistance.



## HEXTRONICS ATLAS FOR DJI M300 RTK

This rugged, weather-resistant docking station provides a fully air-conditioned and climate-controlled environment for optimal drone operations. With a brief downtime of less than 4 minutes, it ensures efficient and streamlined processes. Moreover, the advanced battery-swapping mechanism boasts a lifespan of over 2000 cycles, making it suitable for use in the harshest conditions. This versatile docking station is specifically designed to be compatible with DJI Matrice 300 RTK drones.

# HOW TO SELECT AN APPROPRIATE DRONE DOCK?

## Application

- Security Patrols
- Work Progress Monitoring
- Asset Inspection
- Emergency/Event-based Response
- Surveying & Mapping
- Other \_\_\_\_\_

## Flight time required

- <20 mins
- 20-30 mins
- >30 mins

## Type of Operation

- Routine
- Event-based

## Acceptable Drone Downtime

- < 5 mins
- 25-30 mins
- 30-60 mins
- >60 mins

## Operating Environment

- Remote
- Urban
- High Wind Areas
- Cold Regions
- High Temperature Regions

## Truck/Vehicle Mountable

- Yes
- No

## Budget

- <USD 10k
- USD 10K-20K
- USD 20K-35K
- >USD 35K

Can't decide on the hardware? Take a photo and email it to [contact@flytbase.com](mailto:contact@flytbase.com). We'll assist you in determining the best hardware for your drone operations.

## STEP 3:

# SETUP REMOTE COMMAND CENTER

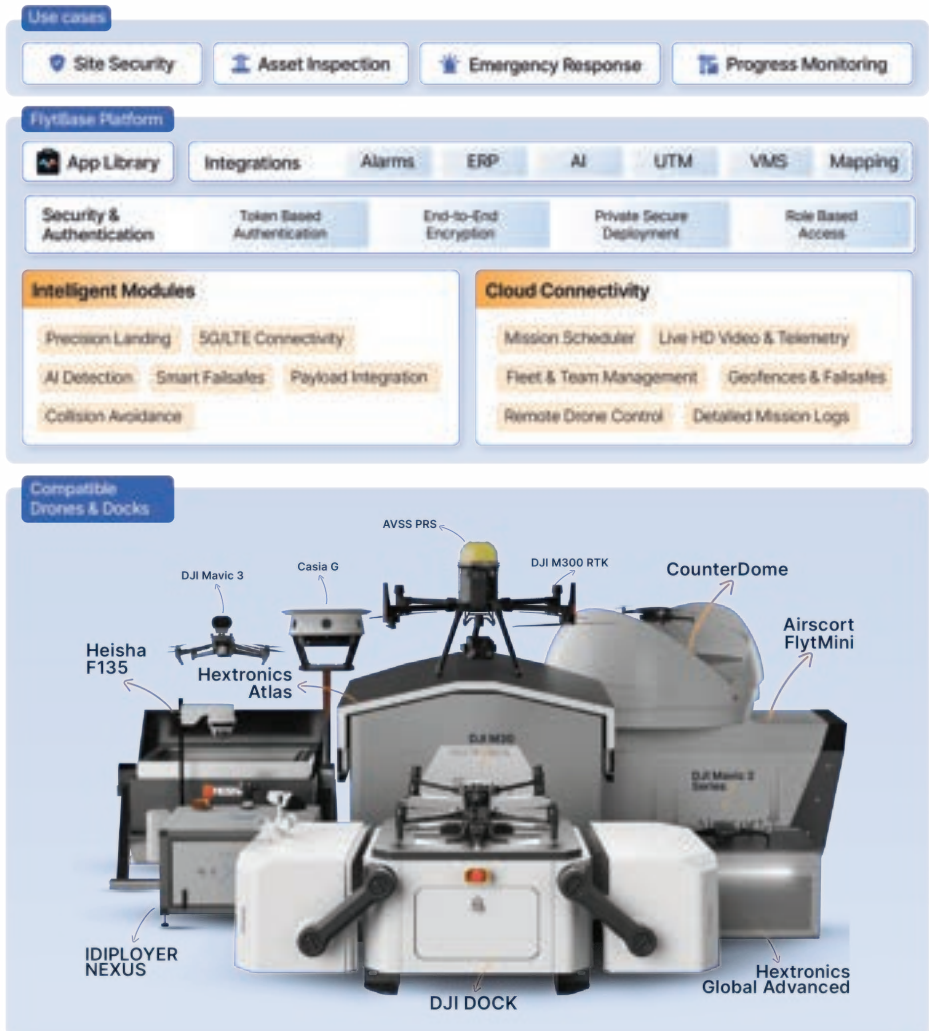
After finalizing the hardware selection, the next step is to implement a reliable, enterprise-grade software solution that automates operations. Establishing a remote drone operations command center will enable efficient management and monitoring of the entire drone fleet and docking stations, ensuring seamless and coordinated functioning.



# ENTER FLYTBASE: ENTERPRISE DRONE AUTONOMY SOFTWARE PLATFORM

FlytBase is an enterprise-grade software solution that fully automates aerial data collection workflows. Users can conduct scheduled and repeatable BVLOS drone flights straight from their remote command centers with little to no human intervention.

FlytBase allows users to remotely control and manage a hybrid and geographically distributed fleet of drones and docks from anywhere in the world via 4G/5G/LTE.



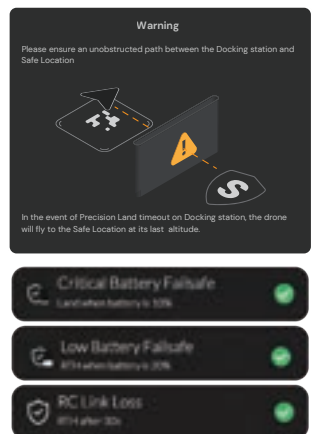
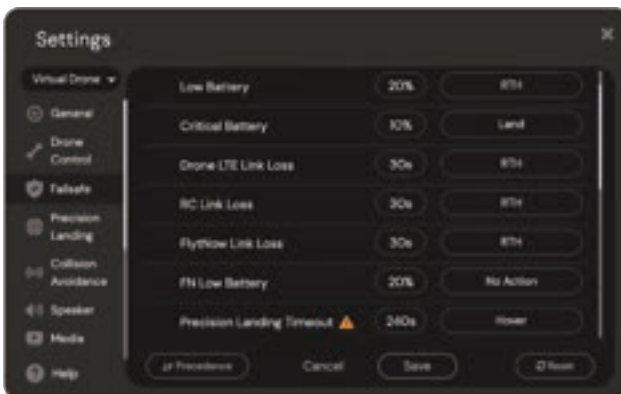
# BUILT FOR ENTERPRISE USERS

As a scalable enterprise-grade software solution, FlytBase enables users to manage a fleet of drones and docking stations. Its cloud platform is highly reliable with redundant nodes for each operation. The system monitors drones and dock through independent, parallel systems. Here are some key reasons why FlytBase is designed for enterprise-deployments:

## SAFETY-FIRST APPROACH

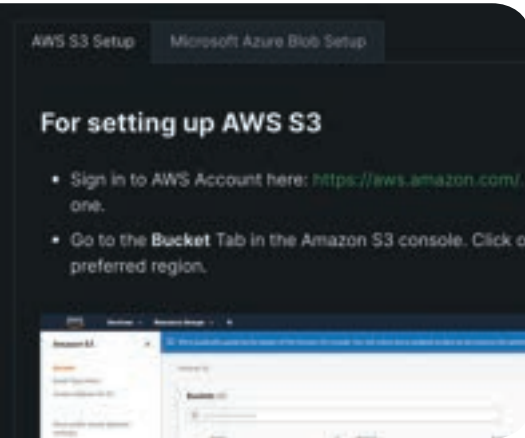
FlytBase has been built with a number of safety and fail-safe features to ensure the highest levels of operational safety at all times.

In the event of a low battery, RC link loss, LTE link loss, weather changes among others, FlytBase's advanced failsafes ensure that appropriate fallback mechanisms are triggered and the drone lands safely in a predetermined safe location.



## DATA PRIVACY AND PRIVATE CLOUD STORAGE

FlytBase allows the operator to integrate their own private cloud storage for archiving drone videos and images. FlytBase does not maintain any copies of the user's drone videos and data to ensure



## FLEXIBLE DEPLOYMENT OPTIONS

FlytBase offers flexible deployment options to suit the varying needs of enterprises. The multi-tenant solution is the default option, which is secure and completely managed by FlytBase and can be set up in minutes.

For large strategic deployments, users can choose between a sole tenant deployment option, in which FlytBase is deployed on a dedicated AWS server for enterprise customer, or an on-premise deployment option, in which FlytBase is deployed on a

### PRIVATE CLOUD

Integrate with your private cloud storage, enjoy consistent, hassle-free maintenance managed by FlytBase.

### HYBRID

Ensure data privacy by hosting drone media on local servers, while maintaining a secure connection to multi/sole tenant servers for command and control.

### ON PREMISE

Deploy FlytBase on fully private server for highly secure government customers.

## END-TO-END SECURITY

FlytBase offers end-to-end encryption and follows industry standard security practices. FlytBase's cloud servers are hosted on AWS - compliant to ISO/IEC 27011 security certifications.



SOC 2 Type II



## ENTERPRISE TEAM MANAGEMENT

FlytBase's advanced roles and permissions give users control over who can access and the level of access to conduct remote flights and drone data. This customizable access provides efficient and secure drone operations, ensuring data privacy and security for users.



## ENTERPRISE SUPPORT AND SLA

From seamless implementation support to real-time troubleshooting, FlytBase is committed to helping users scale, and optimize drone operations.

- Onboarding and training
- Technical consulting
- Priority email, chat & phone support



Brought to you by **FlytBase**

# DESIGNED FOR BVLOS OPERATIONS

FlytBase let users fly drones beyond-visual-line-of-sight with complete peace of mind. With an array of safety features, several software & hardware integrations, FlytBase is designed to operate with minimal human involvement.

## REGULATION READY

Regulatory bodies such as the FAA, BCAA, JCAB, CAAM, ANAC, and GCAA have granted our customers & partners waivers and approvals to conduct BVLOS drone operations with FlytBase.

This includes applications like solar farm inspections, pipeline inspections, and thermal power plant inspections among others.



## ADVANCED SAFETY FEATURES

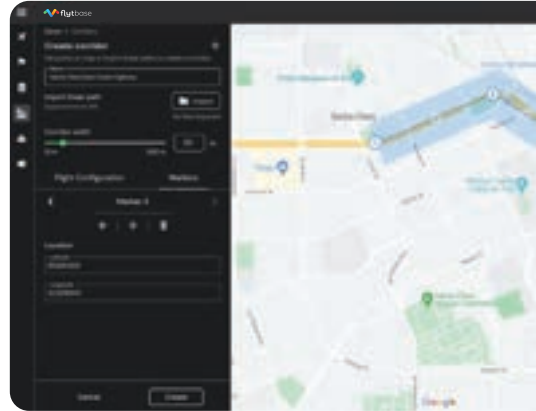
With advanced safety features built-in the app, FlytBase ensures remote safe operations. This includes:

- **No Fly Zones (NFZ) with Dynamic Path Planner:** Remote operators can also upload/create NFZ on the FlytBase dashboard to avoid the drone from entering into a restricted or prohibited airspace.

Once the NFZ is set and the drone needs to return to the docking station, instead of using a straight path back home, FlytBase creates a smart path in which the drone returns while avoiding the NFZs.



- **Corridor Fly zones:** The Corridor feature enables drones to conduct linear missions along pipelines, roads, and railways while staying within a designated path. Operators can simply input the destination on the dashboard and the drone stays within the corridor to reach the destination.



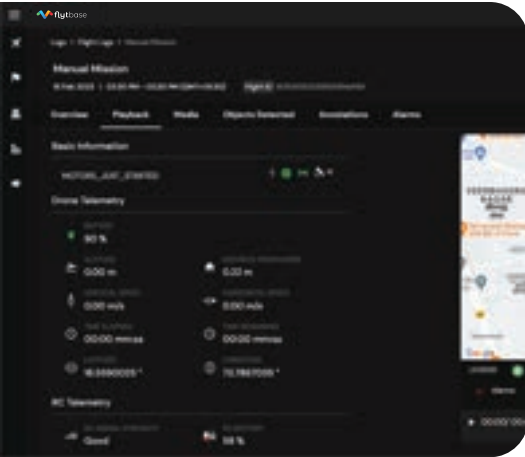
- **Geofence:** Geofences in FlytBase are a crucial feature for preventing flyaways and ensuring drone safety. They help set virtual boundaries for drones, limiting their distance from the operator and helping to avoid accidents and comply with local regulations.





## DATA LOGS AND REPORTS

Creating a thorough safety case is crucial for BVLOS approvals, and detailed data logs are an integral component of it. FlytBase offers exhaustive logs that can be conveniently downloaded in PDF format for future reference and filing purposes.

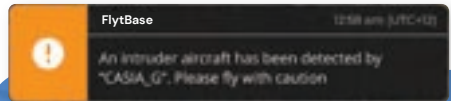


## INTEGRATIONS FOR BVLOS ENABLEMENT

FlytBase offers comprehensive software and hardware integrations to facilitate large scale BVLOS operations. These integrations include:

### Detect-and-Avoid (DAA) with Casia-G

Casia-G is a ground-based surveillance system from Iris Automation to continuously monitor airspace and ensure UAS operations are safe from intruder aircraft. The sensors employ Iris' patented AI and computer vision technology to provide a full optical, 360° field of view for detecting and alerting to any cooperative or non-cooperative aircraft within a 2.8 km radius of the sensor's location.



## CERTIFICATION PROGRAM

FlytBase offers comprehensive certification program to elevate our partners' skills and knowledge regarding dock systems, ensuring that the safety of operations is never compromised, efficiency is improved, and human errors



Brought to you by FlytBase

## AVSS Parachute Recovery Systems for Flight Safety & Compliance

AVSS's drone parachute recovery system is an innovative safety technology designed for commercial drones. Equipped with internal sensors, it autonomously deploys a parachute when a failure is detected, exceeding safety requirements of civil aviation authorities and third-party testing standards in numerous countries.



## Seamless BVLOS Connectivity with Elsie Halo

Elsie's patent-protected 6th Sense AI link aggregation technology, is specifically designed for uncrewed BVLOS operations. By combining multiple LTE and 5G cellular carriers, RF, and SatCom into a single secure pipeline, it delivers reliable, high bandwidth, real time single bonded link Connection Confidence with over 99.99%



Brought to you by FlyBase

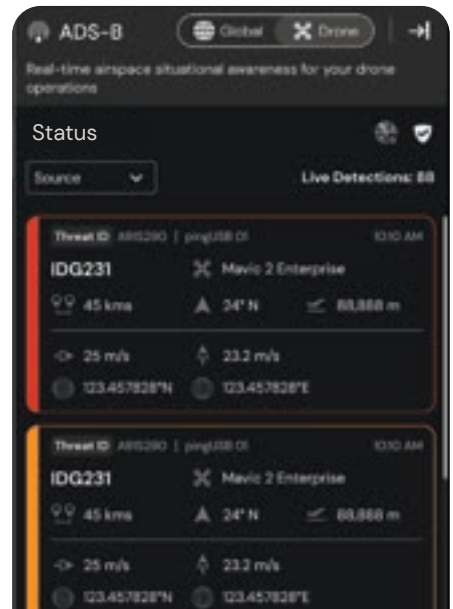
## Airspace Awareness with UTM

Uncrewed Traffic Management (UTM) systems are essential for providing comprehensive oversight of airspace, especially when managing aerial access for drones around critical infrastructure, land, and managed properties for BVLOS operations. One example of a UTM solution is GuardianUTM by Altitude Angel.

## ADS-B Tech for Real-time Aircraft Status

ADS-B is revolutionizing aviation by providing real-time precision, shared situational awareness, and advanced applications to pilots and air traffic controllers alike.

uAvionix's pingUSB ADS-B receiver improves situational awareness for aircraft operations by providing constant status updates on nearby aircraft. This is critical for avoiding potential collisions and other airspace hazards.



# BUILT FOR SCALABILITY & RELIABILITY

## Scalable Architecture

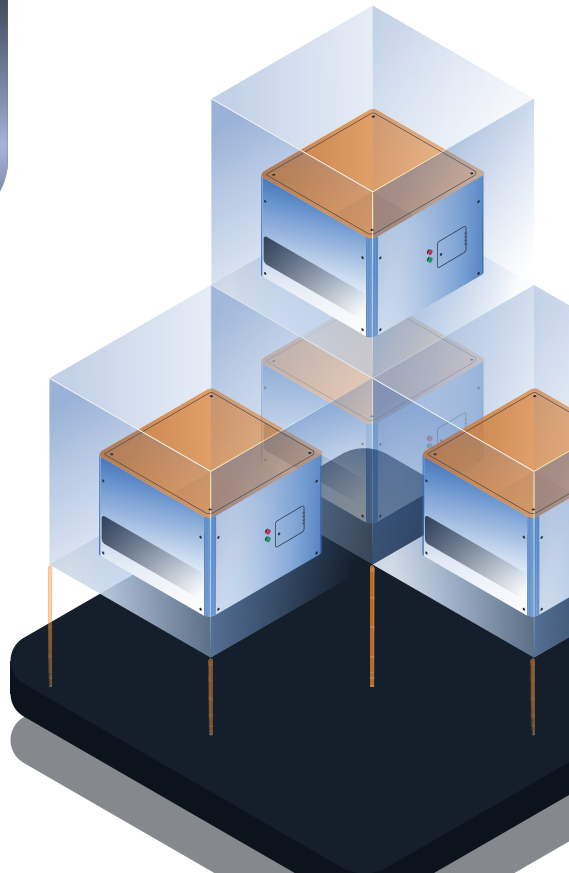
Fly one drone or hundreds of them.  
Manage one docking station or multiple.  
FlytBase's scalable hosting infrastructure  
and enterprise-grade capabilities can meet  
all of your remote drone operation needs.

## Reliable Infrastructure

With redundant nodes for each operation, FlytBase's platform offers the highest levels of reliability. Several independent, parallel systems monitor the key aspects of the drone and box operation to maintain reliability in operations.

## Fault Tolerance & Active Monitoring

The FlytBase backend system provides continuous 24x7 monitoring, identifying faults and automatically redirecting traffic to multiple backup servers. A well defined strategy ensures the faults are identified in time & addressed promptly.



## STEP 4:

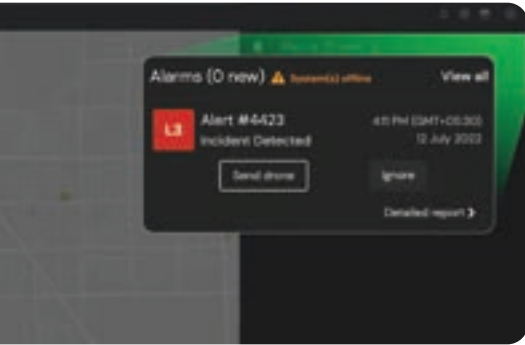
# APPS AND INTEGRATIONS

FlytBase provides easy API access and integrations for businesses to build custom applications on top of the platform. Users can extend functionality for dock deployment use-cases to provide customers with valuable data analytics and business insights.



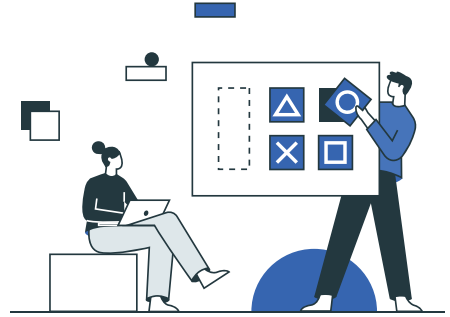
## APIs FOR INTEGRATIONS AND WORKFLOW AUTOMATION

FlytBase's modular architecture allows enterprises to easily integrate their existing ERP or security solutions, such as VMS or alarm systems, for efficient operations.



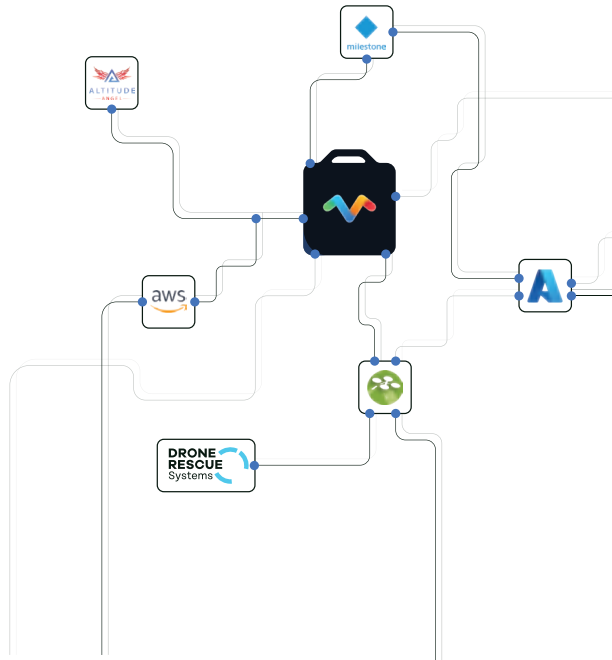
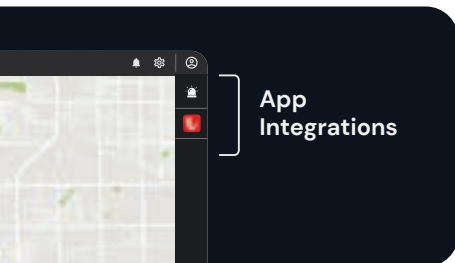
## BUILD YOUR OWN APPS

FlytBase enables operators to use the intuitive App-Builder tool to quickly build and configure custom apps on the FlytBase platform to address specific end-user's requirement.



## FLYTBASE PRIVATE AND PUBLIC APP LIBRARY

FlytBase enables users to integrate 3rd party apps (both publicly and privately listed) for domain specific capabilities. These apps can be accessed through the app drawer in FlytBase.



## STEP 5: APPLY FOR BVLOS - SORA APPROVALS

To deploy drones for full-scale operations, drone operators must develop watertight safety cases that demonstrate their ability to mitigate risks. This involves a step-by-step approach, starting with Visual Line of Sight (VLoS) operations & gradually increasing automation while perfecting safety case reports. Operators can then use these protocols to obtain waivers & approvals for more complex drone operations, ensuring successful integration while minimizing risk.

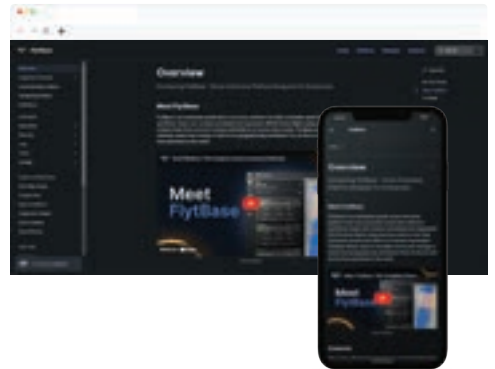
### READY TEMPLATES AND DOCUMENTATION FOR SORA

The FlytBase team assists Drone Solutions Providers with relevant information and documentation to facilitate the process of submitting BVLOS waiver applications.



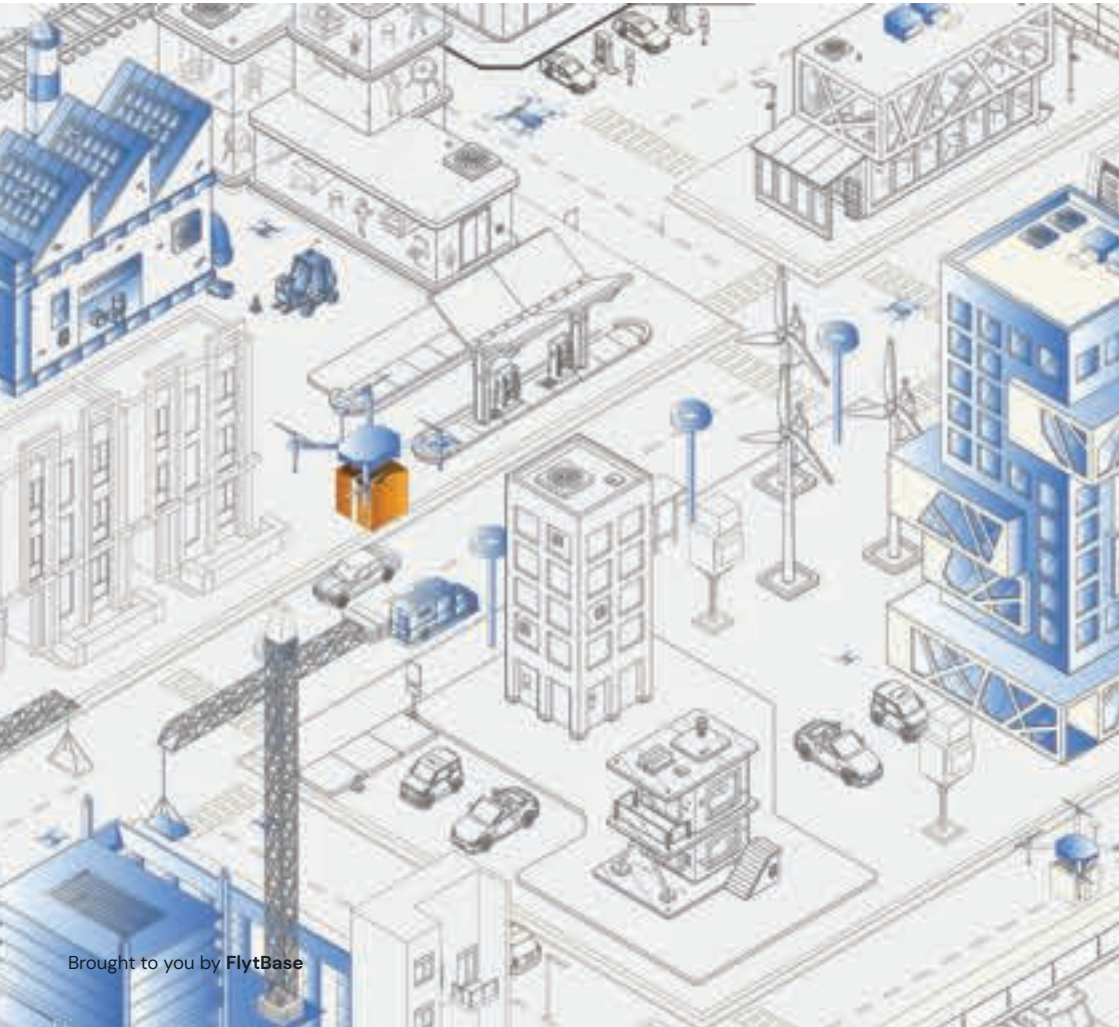
### EXTENSIVE PRODUCT DOCUMENTATION WITH CHATGPT INTEGRATION

Supercharged with AI, we've created an extensive knowledge base where you can access detailed information, guides, and resources on all aspects of the FlytBase platform.



**STEP 6:****PREPARE FOR POC/PILOT  
AND DEPLOYMENTS AT SCALE**

Once a preferred solution has been selected and an initial Proof of Concept (POC) has been conducted, the next step is to scale operations to maximize the Return on Investment (ROI) from the system deployments. To illustrate this process, let's explore some case studies of drone dock deployment.





Pampa Energía, Argentina's largest independent energy company, specializes in the electricity, oil, and gas value chains. Headquartered in Buenos Aires, it engages in intense oil and gas exploration and production activities. It has a presence in 13 production areas and 5 exploration areas in the most significant basins of the

## THERMAL POWER PLANT INSPECTION AND SECURITY

As part of its Digital Transformation strategy, Pampa Energía sought to optimize the inspection routes at the Genelba power plant. Rather than hiring additional employees and drone pilots, they decided to explore the use of autonomous drones to simultaneously carry out maintenance planning, inspections and security operations.



“We decided to employ the **FlytBase** powered autonomous drone-in-a-box solution due to its superior unattended flight technology and affordable price.”

### Marcelo Lopez

Project Manager, Pampa Energia







Headquartered in Oostkamp, Belgium, Citymesh is a pioneer of wireless connectivity with fifteen years of experience in high-end network design, installation, and maintenance. Through the combination of various technologies including drones, 5G, Wi-Fi, smart sensors, and data visualization, they provide B2B smart infrastructure and innovative solutions in a variety of markets that are tailored to the needs of their clients.



## EMERGENCY RESPONSE

Citymesh's Safety Drones help emergency services respond with greater efficiency, providing them with accurate information about emergency scenes within minutes. The drones are autonomously deployed within 15 minutes of an emergency call. They fly from drone docks to the disaster area, capturing images that are transmitted via Citymesh's 5G network to emergency centers and workers. The drones capture high-definition 4K and thermal images. Enriched by AI, the images can detect smoke plumes, fire areas, and even people, providing emergency responders with a comprehensive view of the situation.



“FlytBase is the market-leading BVLOS ops software for remotely controlling drones and docking stations. Highly recommended.”

**Mattis Persoons**

Safety Drone Pilot, Citymesh



# FLYTBASE WALL OF LOVE



“FlytBase is feature packed, highly customizable, intuitive, and easy to learn, allowing us to gain valuable insights without requiring weeks of training.”

## Marcus Jackson

C3 Drones and Robotics, Australia



“With FlytBase we will solve difficult problems related to the response of drones in faster time, available video archive in the cloud in high resolution, monitoring of intruders, and automated missions.”

## George Xomeritakis

ADESCO, Greece



“FlytBase has the optimal solution for our demanding drone-in-a-box requirements, providing our customers an easy Human Machine Interface (HMI), for fast and secure deployment of the drones.”

## Torbjorn Boe

Remote Operations, Norway



“A very intuitive, user-friendly and an aesthetically unique UI is what attracted us initially to FlytBase. A high-level software stack, extreme versatility and possibilities of customization is what made us validate the choice.”

**Elia-Ray Salem**

Dronebase SRL, Italy



“FlytBase has proven itself to be a reliable and scalable drone solution from the very beginning, which has been critical to the success of these projects.”

**Tariq Nasraldeen**

Firnas Aero, Saudi Arabia



“FlytBase is a powerful flight management system for drone fleets. Its integration with alarm systems enabled it to autonomously dispatch drones based on suspicious movement detection, which is a significant step forward for security.”

**Shlomo Peleg**

VHWare, Israel



A one-stop resource platform to discover, browse, and consume on-demand video content including webinars, event recaps, product guides, and tutorials from

[flytbase.com/tv](https://flytbase.com/tv)



Mark your calendars for NestGen'24 - the industry's premier virtual summit dedicated solely to drone autonomy, returning on February 24, 2024.

## Apply to Speak

If you're an industry expert or innovator, apply to speak and share your insights with a global audience by applying at [nestgen@flytbase.com](mailto:nestgen@flytbase.com).

## Apply to Sponsor

If you're looking to expand your reach and support an event that had over 2800 registrants in 2023, email us at [nestgen@flytbase.com](mailto:nestgen@flytbase.com).

# ABOUT FLYTBASE

Founded in 2016, FlytBase is a global leader in drone autonomy software. FlytBase is an enterprise drone autonomy software platform that helps deploy fully automated, cloud connected commercial drones at scale. FlytBase's offerings are compatible with key drone hardware platforms (such as DJI, Ardupilot, and PX4), as well as drone docking stations, and include SDKs, simulators, and APIs for reliable testing and seamless integration. FlytBase was a part of Cisco's accelerator program and was recognized as the Grand Champion at the NTT Data's Global Innovation Contest in 2019. FlytBase also hosts the annual NestGen event — the largest drone autonomy virtual summit in the world.



**THE BOOK  
MAY HAVE  
ENDED, BUT  
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JUST BEGUN.**



[flytbase.com](https://flytbase.com)