flytnow

DRONE
SURVEILLANCE
SYSTEM

Professional drones in the space of surveillance and security have the capability to disrupt a wide range of industries. However, until the recent COVID-19 pandemic, drone surveillance had been at a nascent stage, but the pandemic showed the world the effectiveness of drones in enforcing a lockdown, which in turn has given the sector a much-needed boost.

In industries where hazards constantly loom, drones can save lives by providing vital information in emergency situations. Even for public safety, drones have proven to be an important tool. Recently, DJI, a leader in drone hardware, announced at AirWorks 2019 that drones were responsible for saving 279 lives.

In a study conducted by the European Emergency Number Association, it was found that drones (fitted with visible light sensors) in a rescue mission were able to locate a casualty 3 minutes faster than a traditional mission. Various tests and recorded case studies have repeatedly proven that drones have a tremendous economic impact on businesses and an emotional impact on those whose lives were saved.

Establishing a surveillance system using drones can be complex, which is why FlytNow has designed its cloud-based application to address the unique requirements of such operations.

How Does Drone Surveillance System Work?

Drone surveillance refers to the act of keeping a visual track of an individual, a group, objects, or a situation for the purpose of thwarting any kind of threat.

An effective surveillance system using drone fleets requires seamless integration between reliable hardware and intelligent automation software. Below are the generic components of such a system.

Drone Hardware

This refers to drones that are capable of performing surveillance patrols, for example:

DJI Inspire 2

Max Speed	: 94 kph
Approx. Weight	: 3.4 kg
Temperature Range	: −20° to 40° C
Flight Time	: 27 minutes

DJI Mavic 2 Enterprise

Max Speed	: 72 kph
Approx. Weight	: 1.1 kg
Temperature Range	: −10ºC to 40ºC
Flight Time	: 31 minutes

GAIA 160 Elite 2000W Hybrid Drone

Max Speed	: 50 kph
Approx. Weight	: 13.5 kg
Temperature Range	: −10° to 40° C
Flight Time	: 4.5 hrs

RHEA 160 Hexacopter

Max Speed	: 50 kph
Approx. Weight	: 28 kg
Temperature Range	: −10° to 40° C
Flight Time	: 90 minutes

DJI M210 RTK

Max Speed	: 82 kph
Approx. Weight	: 4.40 - 5.15 kg
Temperature Range	: −20° to 45° C
Flight Time	: 32 minutes

DJI 300 RTK

Max Speed	: 82 kph
Approx. Weight	: 9 kg
Temperature Range	: −20°C to 50°C
Flight Time	: 55 minutes

Impossible US-1

Max Speed	: 72 kph
Approx. Weight	: 8 kg
Flight Time	: 70 minutes

Condor

Max Speed	: 57.76 kph
Approx. Weight	: 10 kg
Flight Time	: 26-70 minutes

Note: The FlytNow solution is compatible with all PX4, Ardupilot, and DJI drones.

Drone Fleet Management Software

This refers to a cloud-connected software solution like FlytNow that is capable of automating the launch, patrol, and landing cycle of a drone fleet.

FlytNow enables security users to use off-the-shelf, as well as custom drones to rapidly setup and deploy an aerial surveillance system. It provides a web-based dashboard to control a fleet of drones, powered by integration with third-party

software for UTM and compliance, and the ability to share high-quality video feeds with remote stakeholders, in real-time.

Onboard Drone Software:

Drones deployed for surveillance often require a companion computer (eg. Nvidia Jetson Nano, DJI Manifold 2, Raspberry Pi 3B+/4) with an operating system to enable 'edge intelligence', including AI-powered object detection and autonomous navigation in companion with a system like FlytNow.

FlytCAS
(Collision Avoidance System)
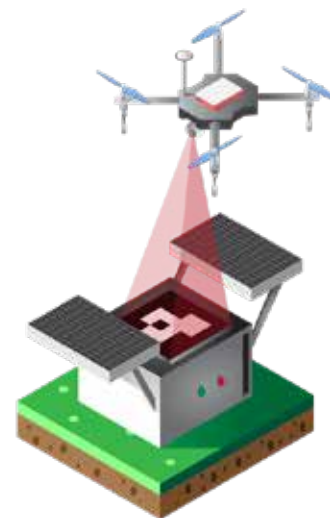
FlytDock
(Autonomous Precision Landing)

We have our own 'edge level' operating system called FlytOS with capabilities such as:

- Autonomous Precision Landing and Hover (see FlytDock): An important feature to automate the landing of a drone on a charging pad.
- Collision Avoidance (see FlytCAS): Surveillance operations require drone patrolling. With collision avoidance, a drone can safely maneuver over a geofenced area.
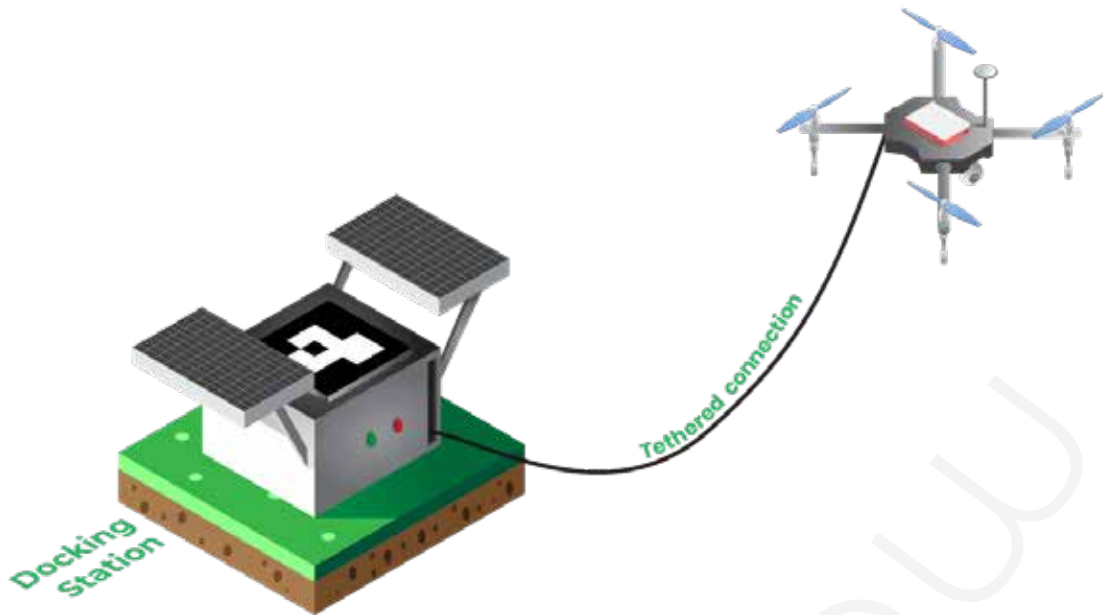- Gimbal control for effective camera movement.
- Connectivity over 4G/LTE/5G.

Drone-in-a-Box (DiaB) Hardware:

These are physical components such as a docking station, charging pad, launching, and landing systems, grippers, etc. They are required to automate the cycle of launching a drone and docking it when it returns from a security and surveillance mission without human interference.

FlytNow Enterprise edition offers seamless integration with DiaB APIs for remote management over the cloud. Below are the supported Drone in a Box/ charging pad solutions currently available:

- Airscort (https://www.airscort.me/)
- Skysense (https://www.skysense.co)
- WiPo Wireless Solution (https://www.wipo-wirelesspower.com/)
- WiBotic (https://www.wibotic.com/)

Some DiaBs offer a Tethered system as well, which drastically increases the flight time of a drone. For security and surveillance missions, having a Tethered system means a drone can fly longer which translates into more protection time from a single drone.

UTM Integration:

Integration with services like AirMap, Unifly, Altitude Angel, etc. helps FlytNow customers comply with airspace regulation, which is crucial for BVLOS & extended visual line of sight (EVLOS) drone operations.
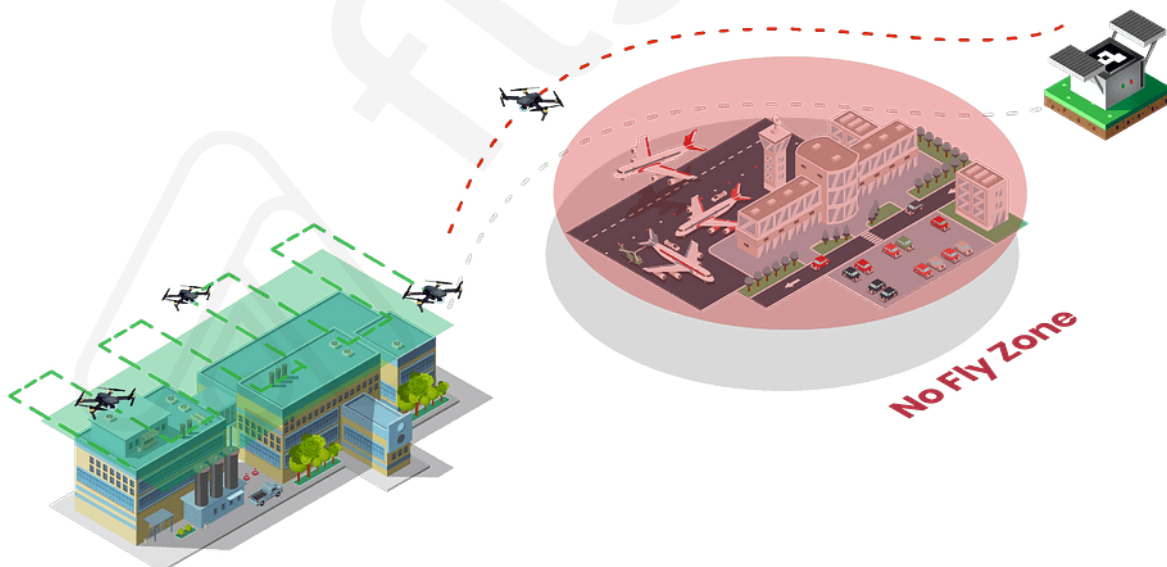
Learn about the FlytBase partnership with AirMap here.

> **Note:** FlytNow can be integrated with any 3rd party private or government UTM API services.

Special Payloads:

FlytNow Enterprise offers the ability to control an array of sensors that can enhance aerial surveillance capabilities, such as:

- **Wide-angle camera:** These are cameras with a small focal length that has a wider field of view than conventional cameras and can capture a lot more visual data from a single position.
- **Thermal camera:** Also called a thermographic sensor that can convert infrared radiation into visible light. These types of sensors are useful in night-time surveillance since it can detect warm objects in pitch-dark situations.
- **Lidar:** It stands for Light Detection and Range. It emits pulsating lasers to find the range to an object.

Advanced Fail-safes:

In the event of emergencies such as drone hardware failure, computer failure, inclement weather, or dynamic airspace restrictions enforced by local aviation bodies, a reliable solution must have in place recovery protocols for the safety of people as well as the system itself. Such fail-safe features are included in FlytNow, for example:

- Return to Home function (RTH).
- Emergency Landing Point (ELP).
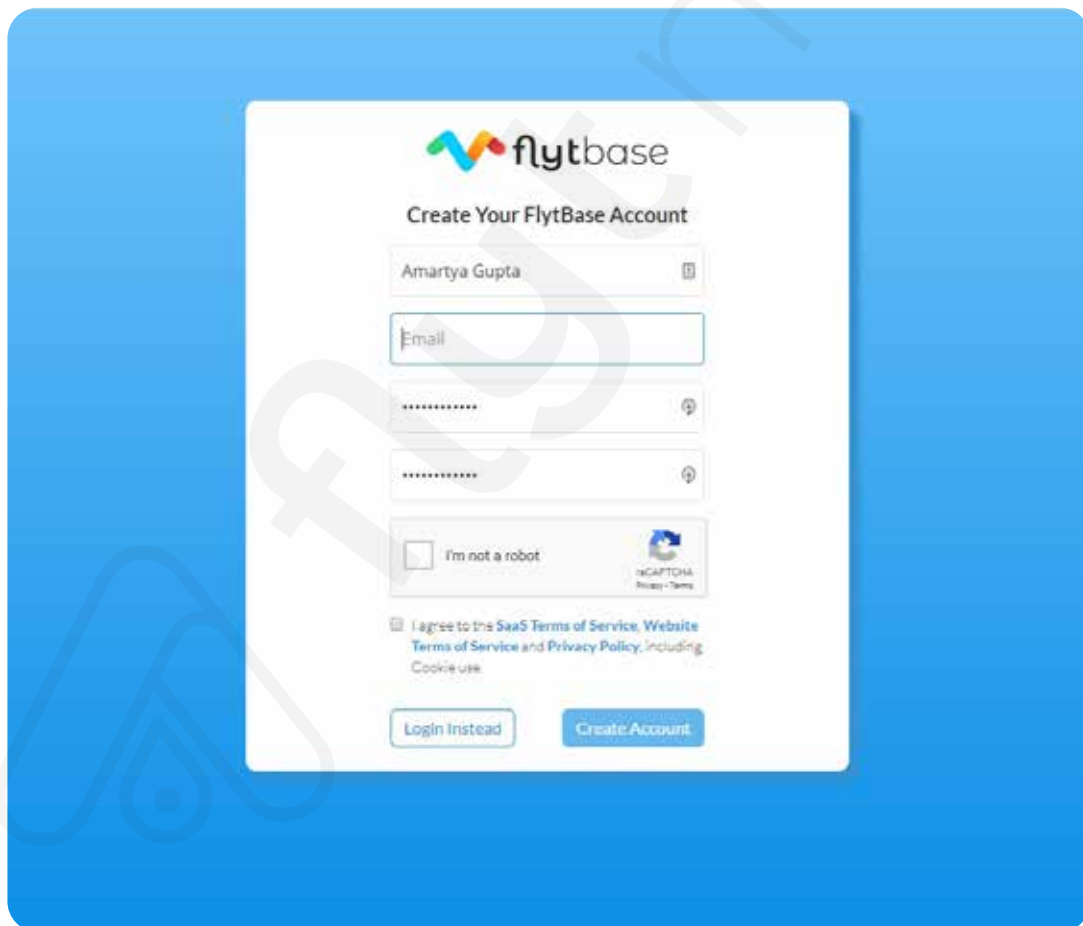- Advanced geofence with the support of polygon geofencing

Use FlytNow Pro to Quickly Validate a Drone Based Surveillance System

FlytNow Pro is a cloud-based SaaS solution, which has fewer features than the enterprise version, but it is suitable for quickly validating a drone surveillance system via a proof-of-concept (PoC). After a successful PoC, the user can upgrade to FlytNow Enterprise which can be customized to suit the specific needs of each customer.

Get Started with FlytNow Pro for Drone Surveillance PoC

Step 1: Sign up for a 28 days free FlytNow Pro account.

Sign up here: my.flytbase.com/accounts/signup/?next=https://app.flytnow.com

Step 2: You will receive an email with a link to validate your email address. Verify your email address.

Step 3: Log in to your FlytNow dashboard using your credentials. Here you can create a flight mission, add drones, set a geofence, and create a pre-flight checklist.
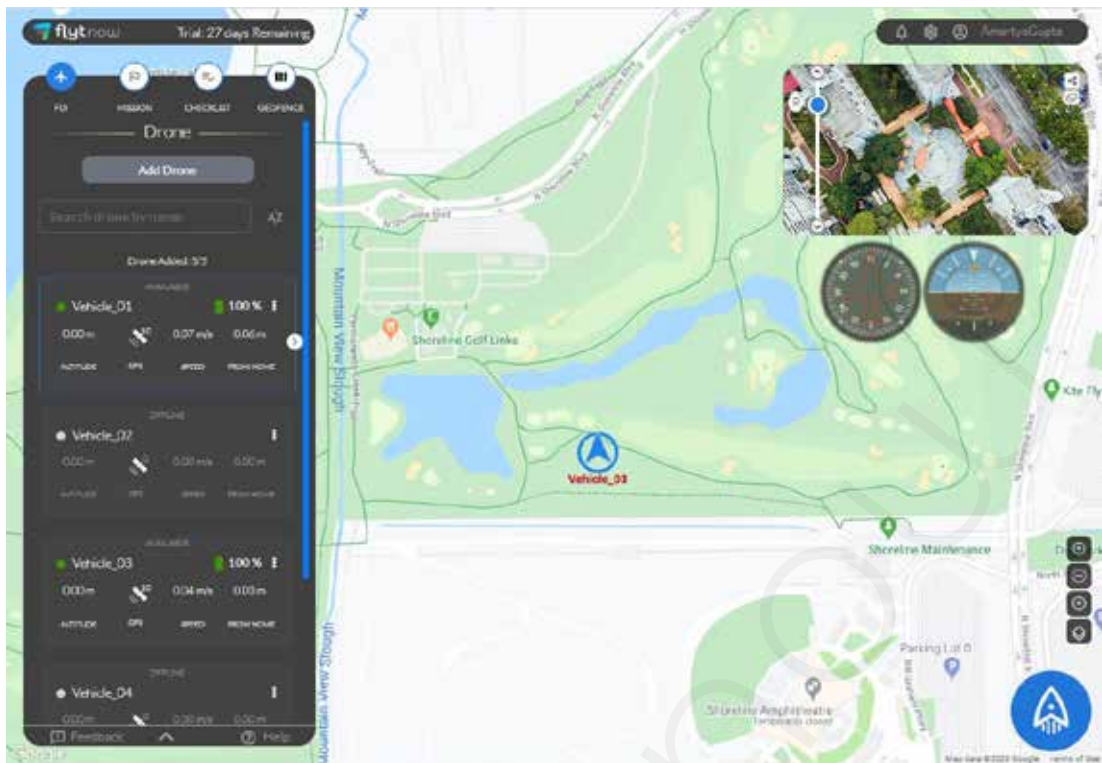
Step 4: Add your drones using our Getting Started Guide.

Step 5: This is an optional step. If you don't have real drones then you can add a virtual drone. Your free account allows you to add one virtual drone. For adding a virtual drone you will need access to FlytCloud APIs. Please follow the instructions written in this guide.
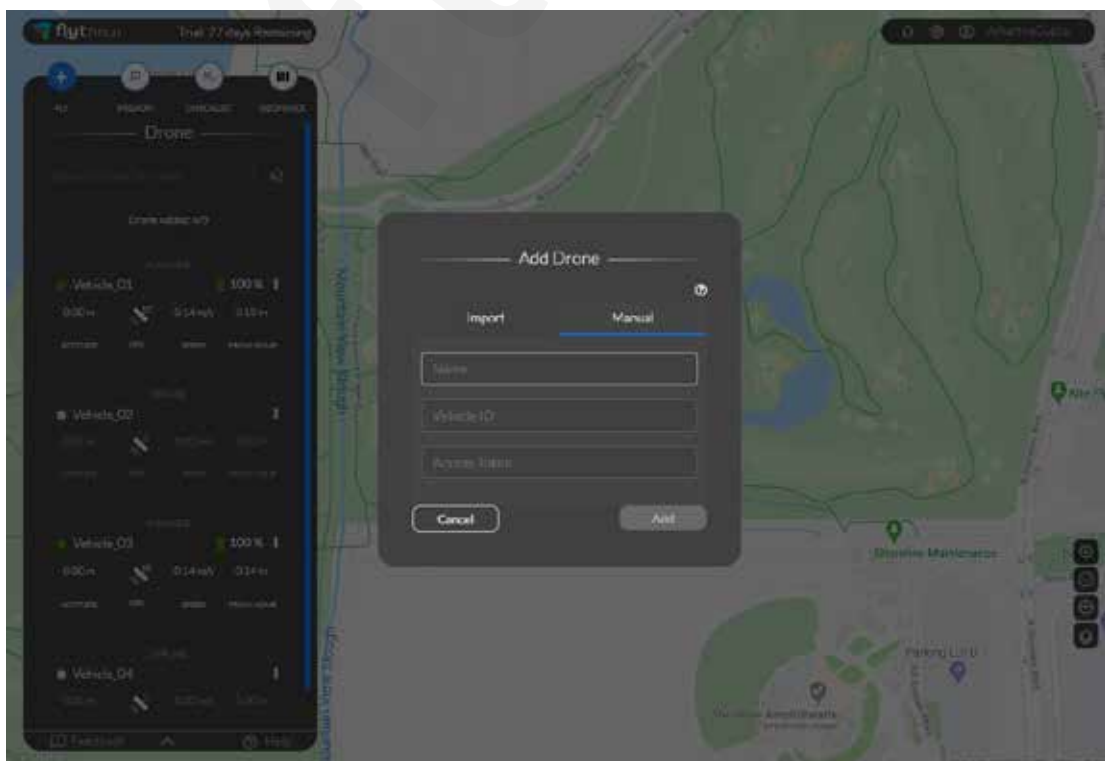
Once you are granted access to the FlytBase cloud APIs, you will get a vehicle ID and token that you can use to add the drone in FlytNow.

Step 6: Create a mission plan. A mission plan will allow you to define a path for your drone. Once you execute a plan, a drone will follow the path autonomously. You can use mission plans to define your patrolling routes.

To create a mission plan, go to **Mission > Add Mission**. Give a name to your mission and use the **Add Waypoint** button to drop pins on your map. This way you can define a route, and use it to initiate a drone patrol mission.

Note: While setting up a mission, you can set the altitude of each waypoint and limit the overall speed of the drone.
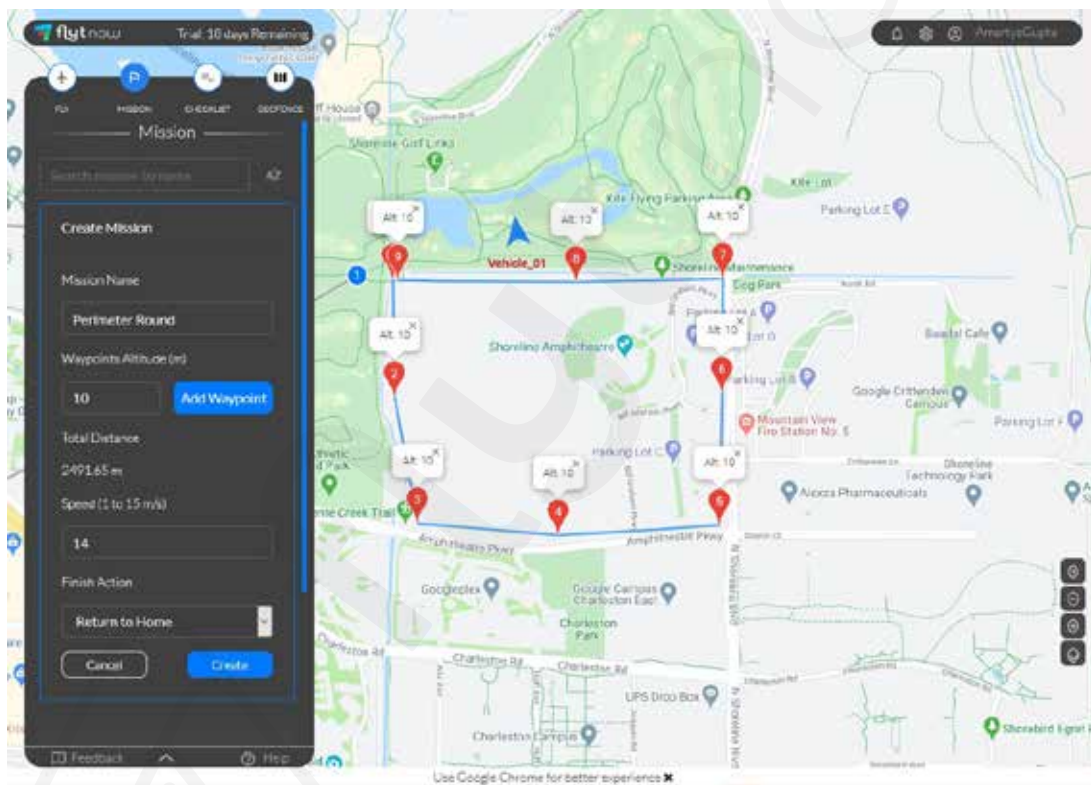

In the above image, we have created a mission and set the finish action to Return to Home. It is compulsory to set a finish action and you can select from the below options:

- Hover
- Land
- Return to Home

> *Note: Return to Home function tells a drone to return to the location from where it started its mission, not the first waypoint.*

Step 7: Create a preflight checklist that will prompt a list of questions to a user when he/she tries to execute a mission. We provide a default list, to add a new checklist item go to **CHECKLIST -> Add to Checklist.**
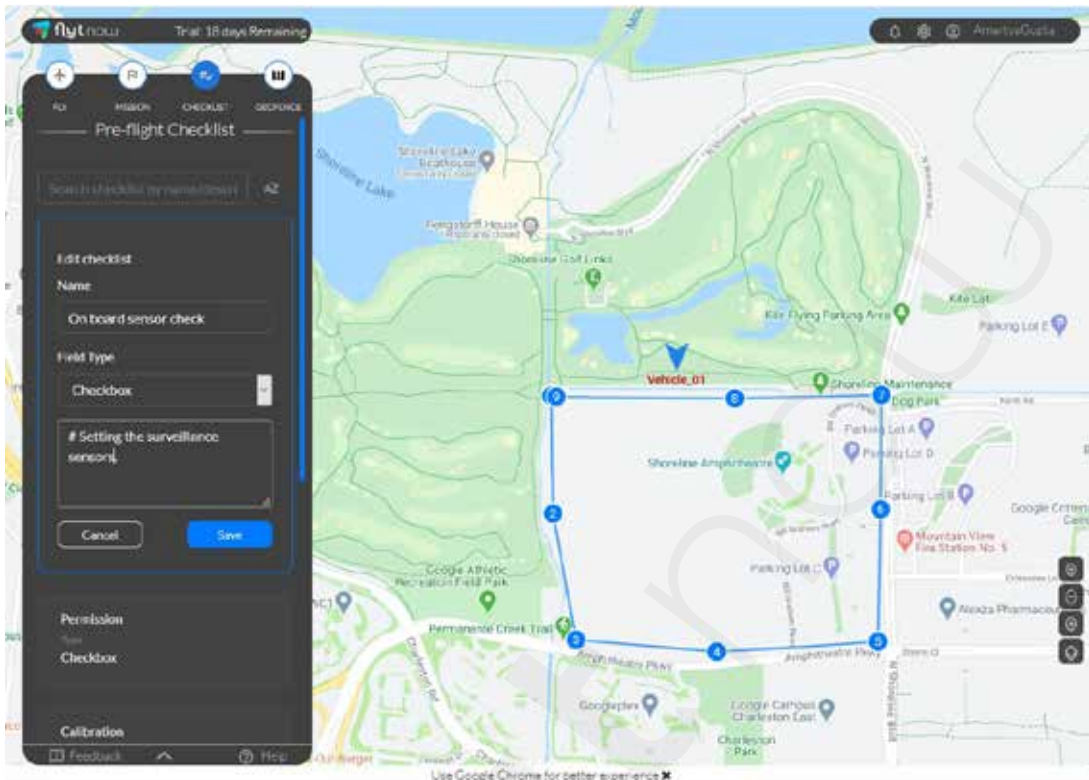

A checklist ensures that all the calibration and precautionary measures are taken care of before launching a drone.

Step 8: Set up a geofence that restricts the area where your drones will fly. This is an important feature since surveillance operations are generally limited to a certain area. Please refer to this blog to learn how to create a geofence.

Note: *In the Pro version of FlytNow, only a circular geofence is supported. Polygon geofence is supported in the enterprise version.*

When you create a geofence, two concentric circles are created, with the area between is the warning zone and the outer circle is the no-fly zone.

Step 9: Turn on the video streaming feature for monitoring. In a surveillance operation, you are more likely to use more than one drone. With the streaming feature, you can view the live video feed from all your drones on a single dashboard. You can even share the live feed using an email address with anyone who is not on the FlytNow system.
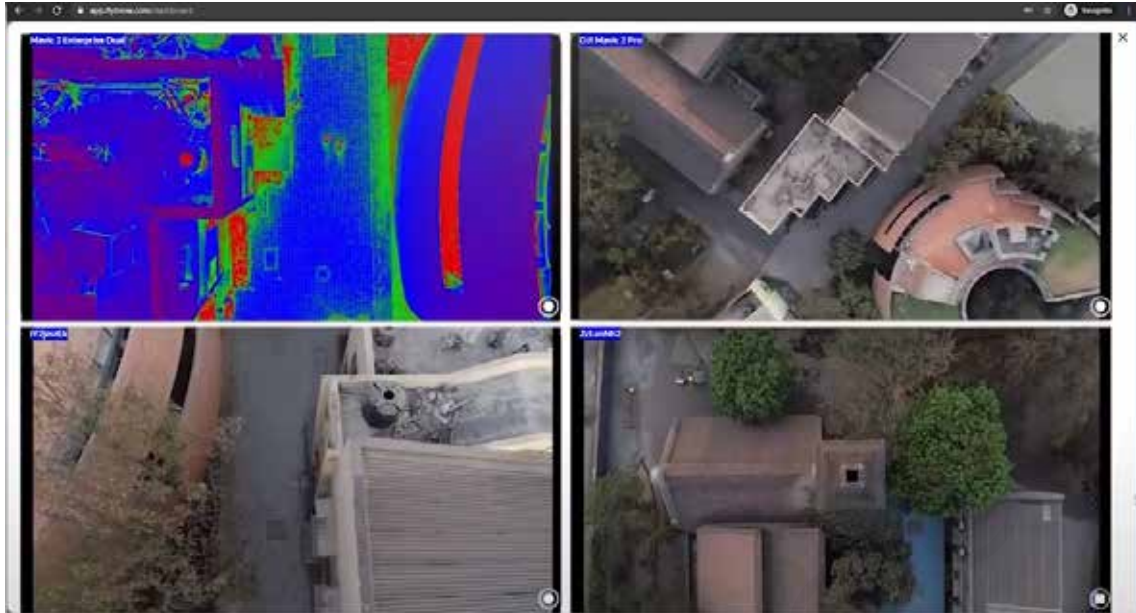
To learn how to enable live video and live share, please read this guide.

# Launch your First Aerial Surveillance Operation

Once you are done with the setup, it's time to launch your first surveillance operation. Consider a situation where you are about to initiate a routine patrolling using a drone to check the perimeter of a facility.

Step 1: Select a drone under the FLY tab from the dashboard and click on the launch in the bottom right corner.
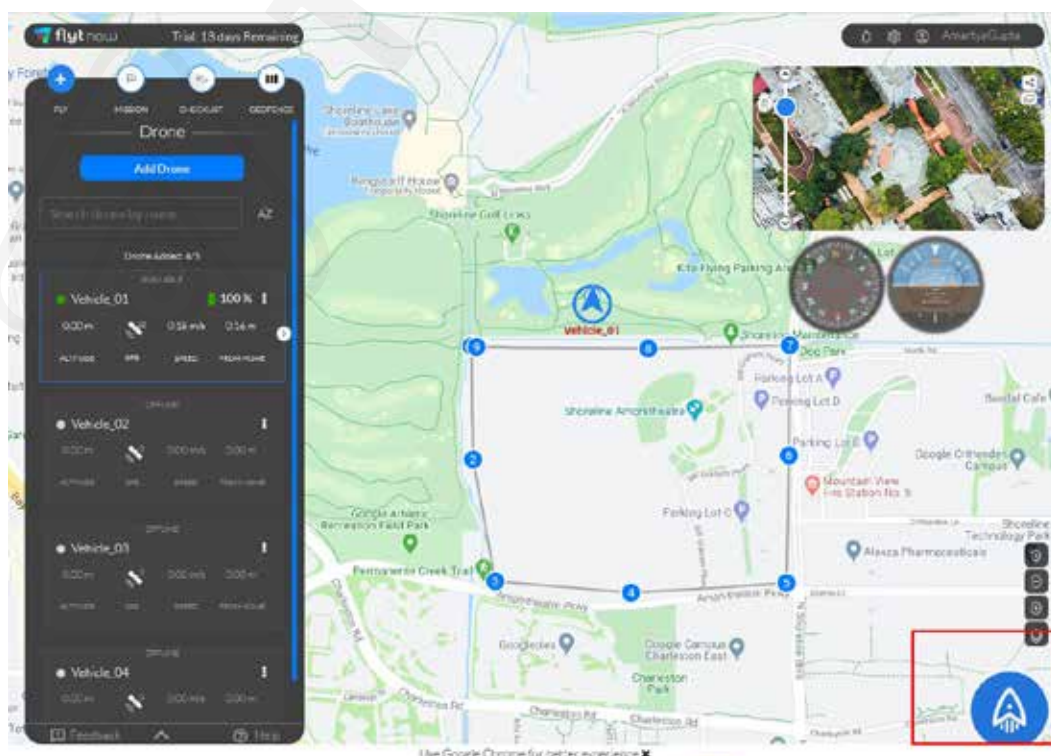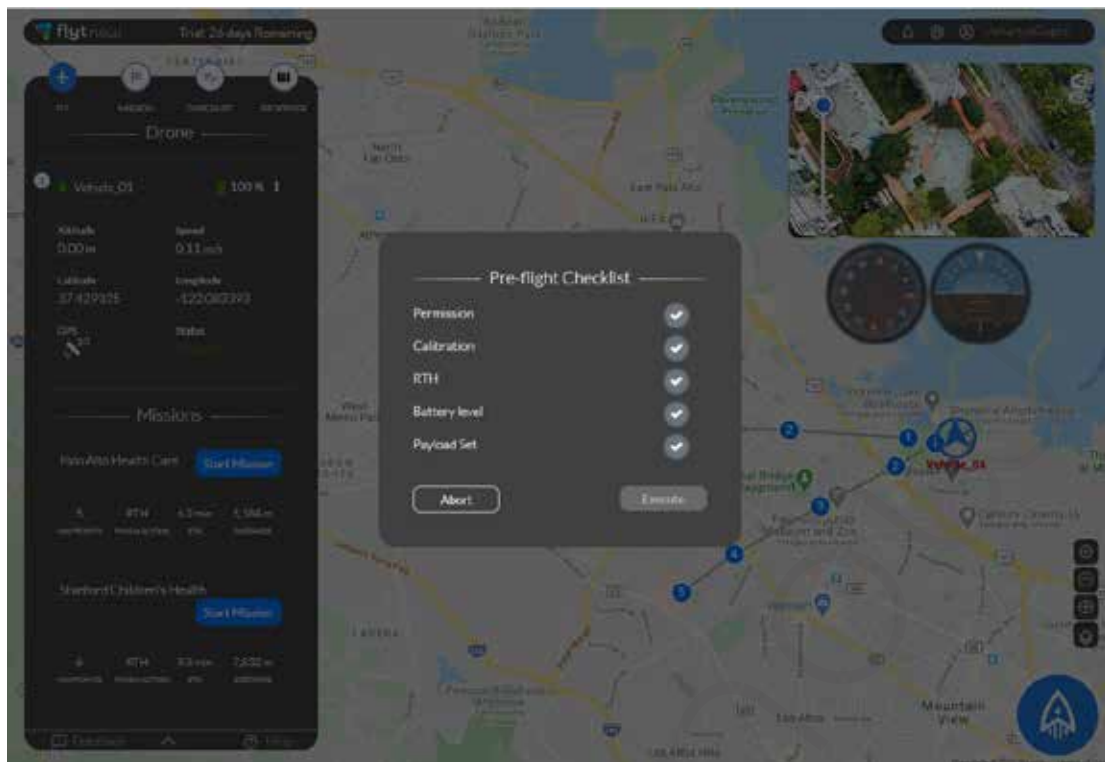
Step 2: You will be asked to complete a pre-flight checklist. Once you are done with that click on Execute. Your drone mission has started.
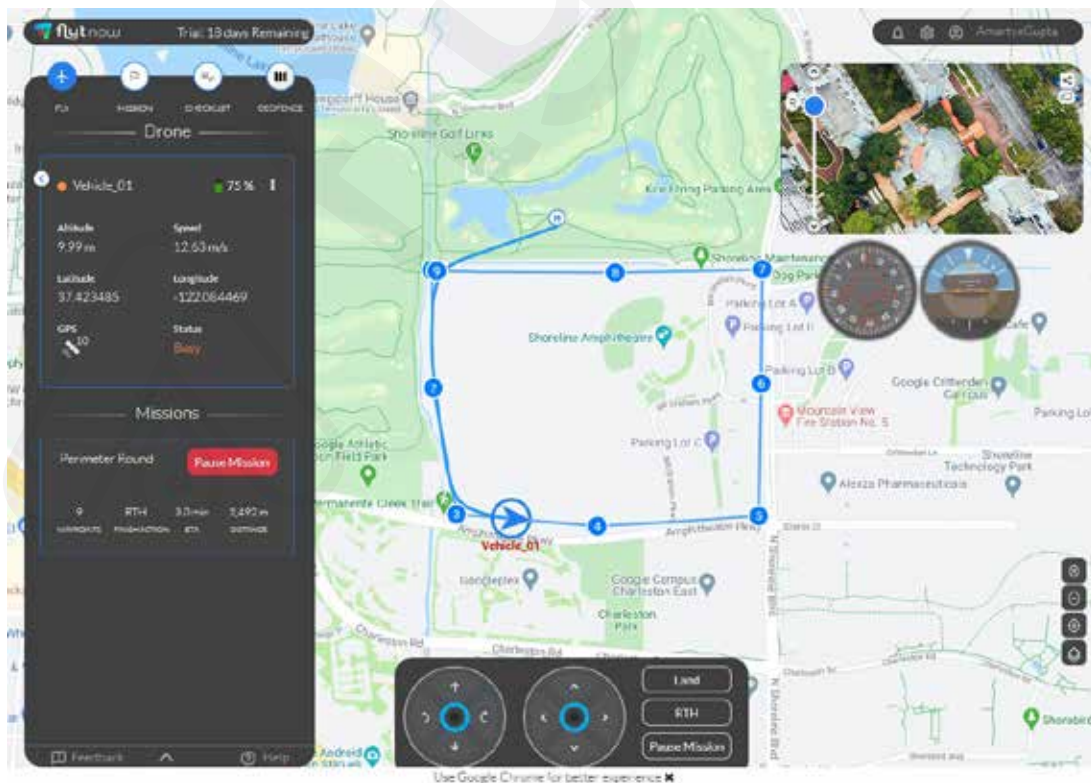
What's the Next Step?
Scaling Deployment of Drone Surveillance and Security Operations.

FlytNow Pro, as discussed before, offers limited features that are suitable for PoC and demo purposes. For a large scale, enterprise-level deployment you can upgrade to the Business or Enterprise version.

FlytNow Business provides standard features suited for system integrators and drone operators involved in public safety, emergency response, and security & surveillance operations. Some of the features are as follows:

- Live video streaming and recording.
- Support for a thermal camera.
- Support for DJI payloads (useful in surveillance operations) for M2E.
- Multiple videos feed on a single dashboard.
- Map annotation and a mission log book.
- Support for custom drones based on PX4 and Ardupilot through SBC integration.
- Integrates with DJI enterprise drones especially M210, M300, and M600. Our SBC integration supports DJI flight controllers: A3 & N3.

FlytNow Enterprise is a solution that provides end-to-end automation, with the added benefit of customization, that helps in scaling drone operations including security and surveillance. It provides features like:

- Team management
- Precision landing on a computer-generated tag. A must-have feature, if you
- have charging pads.
- Custom geofence – support for polygons.
- Easy integration with charging pads or DiaB.
- Unlimited mission and advanced mission planner.
- Integration with third-party UTM services like Airmap.
- Language Localization.
- Integration with Dronelogbook.
- Object detection using AI – a useful feature to detect intruders.

Both FlytNow Business and Enterprise support our SBC Cloud Connect Software that can be installed on companion computers, which can be integrated into enterprise drones from DJI and drones based on PX4 and Ardupilot. This companion computer

helps connect the drone to FlytNow over 4G/LTE/5G networks. The Enterprise version also provides precision landing integration with drone-in-a-box solutions and charging stations.
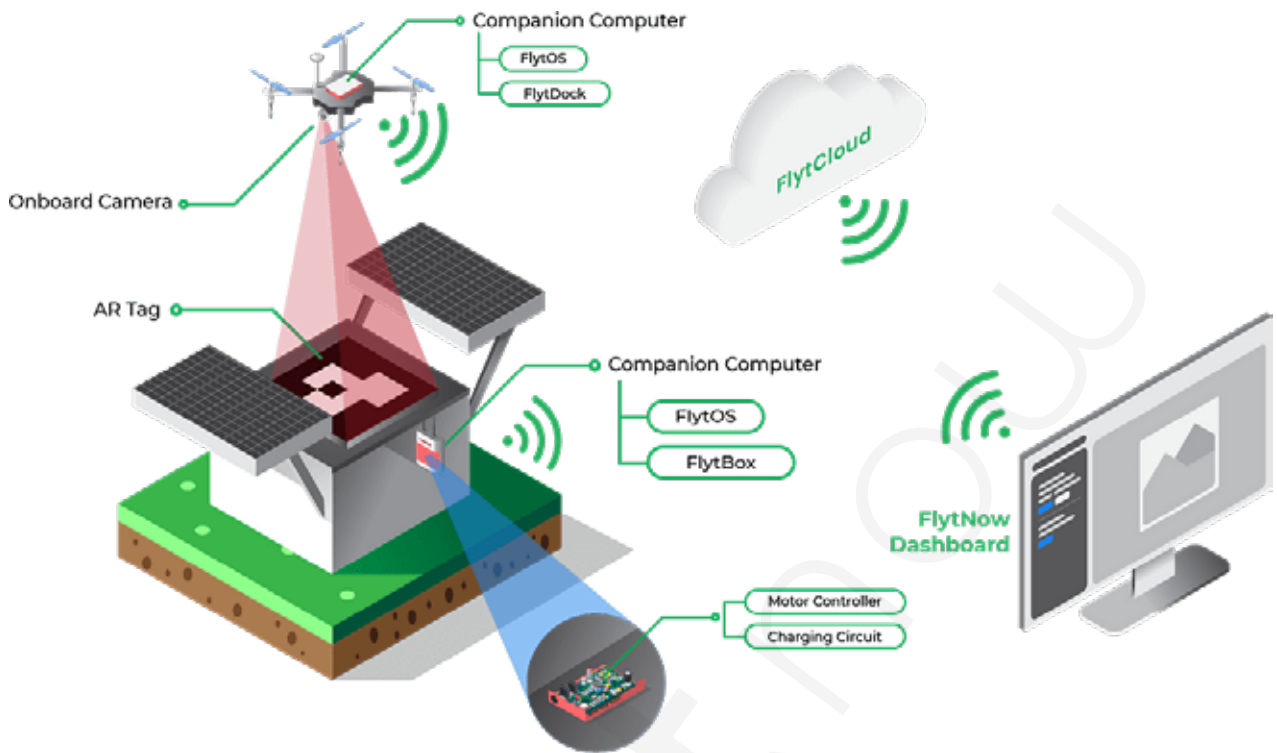
Schedule a 30-min free consultation with our expert to learn more about the FlytNow Drone Delivery Software Solution, contact us at https://flytnow.com/contact/

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