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DRONES FOR
FIRE FIGHTING

How Firefighters Can Manage Emergency
Situations Using Drones

Drones are eyes in the sky for firefighters. They can serve as an essential firefighting tool for people in the fire services, especially in and around urban centers, where a deadly inferno might occur in a highrise building.

Drone for fire fighting can equip fire officials with the latest technology, and add complementary capabilities to the existing resources such as fire trucks, ladders, specialized suits, etc. Firefighters can now acquire aerial information in a quick, cost-effective manner.

In 2016, a tragic fire broke out in a warehouse in Oakland, California. The warehouse had been converted into a living space called Ghost Ship. The fire, which claimed the lives of 36 people, is one of the deadliest in the history of Oakland. Drones, equipped with a thermal camera, were used by firefighters to identify hotspots and search the unsafe-building after the fire was extinguished.

The effectiveness of drones is rapidly catching on, as agencies around the world begin to adopt this technology. In the US, more than 900 state and local agencies related to the emergency services are using drones one way or another; out of them, approximately, 186 is believed to be related to fire and emergency medical services.

Can Drones (UAVs) Put Out a Fire?

This is a common question that people often ask. A short answer is No, drones are more useful in acquiring situational awareness about the fire and its surroundings. Firefighters can use this information to control the fire and ultimately put it off. However, there are a few companies that are equipping drones with water hoses or fire extinguishing materials.

How Are Drones Used During Firefighting?

| Situational awareness | Reach difficult places | Thermal assessment | Search and rescue |
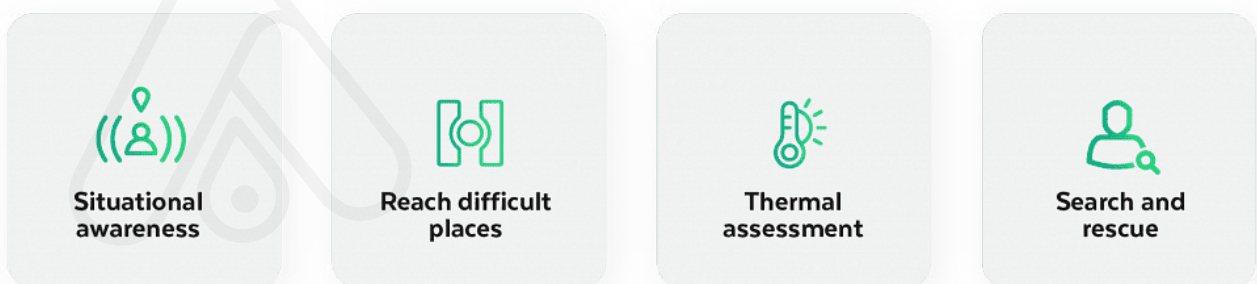
Situational awareness: In a typical scenario where a fire has broken out in a building, firefighters arrive at the spot and begin their operation with limited information about the extent of the fire and damage it has caused to the structure. Instead, with a fleet of drones, firefighters can begin with an aerial assessment of the scene and know the extent of the fire before starting their rescue operation.

Reach difficult places: Drones are efficient in going to tight spaces since they are nimble and agile, and deploying them first avoidings putting humans in unsafe situations.

Thermal assessment: In a firefighting situation, firefighters work against the clock to save the lives and integrity of the structure. That is why it is important to direct their efforts towards the source of a fire. Drones equipped with a thermal camera can assist firefighters to identify hotspots inside a blazing structure. Accordingly, firefighters can direct their efforts to bring the situation under control.

Search and rescue: Firefighters are actively involved in search and rescue missions. A thermal camera drone can do the job of 100 people by scanning a large area and identifying people in distress. During a natural calamity like an earthquake, thermal camera drones can fly over fallen structures and identify trapped individuals, and even identify dangerous leakages.

What Kind of Drones and Payloads are Commonly Used During Firefighting?

Drones come in all shapes and sizes, but not all of them are suitable for firefighting operations. The more suitable ones are off-the-shelf drones from the likes of DJI and custom drones based on open source stacks mainly PX4 and Ardupilot. Here are some of the drones that are considered fit for such kind of tasks:

- DJI Inspire 2
- DJI Matrice 300 RTK
- DJI Matrice 210 V2
- DJI Mavic 2 Enterprise
- Parrot ANAFI Thermal

Drones are not usable without the appropriate payloads. For firefighting purposes, these are some common payloads that are used:

- Zenmuse XT2 (a thermal camera for DJI drones)
- Zenmuse Z30 (a normal camera with 30x zoom for DJI drones)
- Zenmuse H20 (A hybrid camera that combines a wide-angle camera, 23x optical zoom camera, thermal camera, and laser rangefinder for DJI drones)

How FlytNow Can Make Drone Operations a Lot Smarter for the Firefighters

Traditional Challenges in Using Drones for Firefighting

The conventional way of using drones, during firefighting, is a pilot controlling a drone using the remote controller (RC). Here, the pilot becomes the relay point of all the information collected by the drone. This method of using drones may be simple, but is not very effective, since multiple pilots are required to control multiple drones. On top of the human resource requirement, there are several other disadvantages, as follows:

- It becomes difficult for a drone pilot to share the data with different agencies and ground personnel, which hinders coordination.
- Difficult to archive flight data, which makes it problematic for the future analysis of an emergency situation.
- Data collected from multiple drones cannot be stitched together for better situational awareness.
- Sharing live data becomes difficult, more so when multiple drones are involved.
- Drone response can't be automated since they can't be integrated with emergency response systems like the 911 operations centers.

## How FlytNow Helps in Overcoming the Traditional Challenges

FlytNow is a fleet management system that helps public safety officials to overcome challenges in using drones for firefighting. FlytNow is a cloud-based application that provides a unified dashboard to control a fleet of drones. It has two versions (Business and Enterprise) that cater to two different use cases.
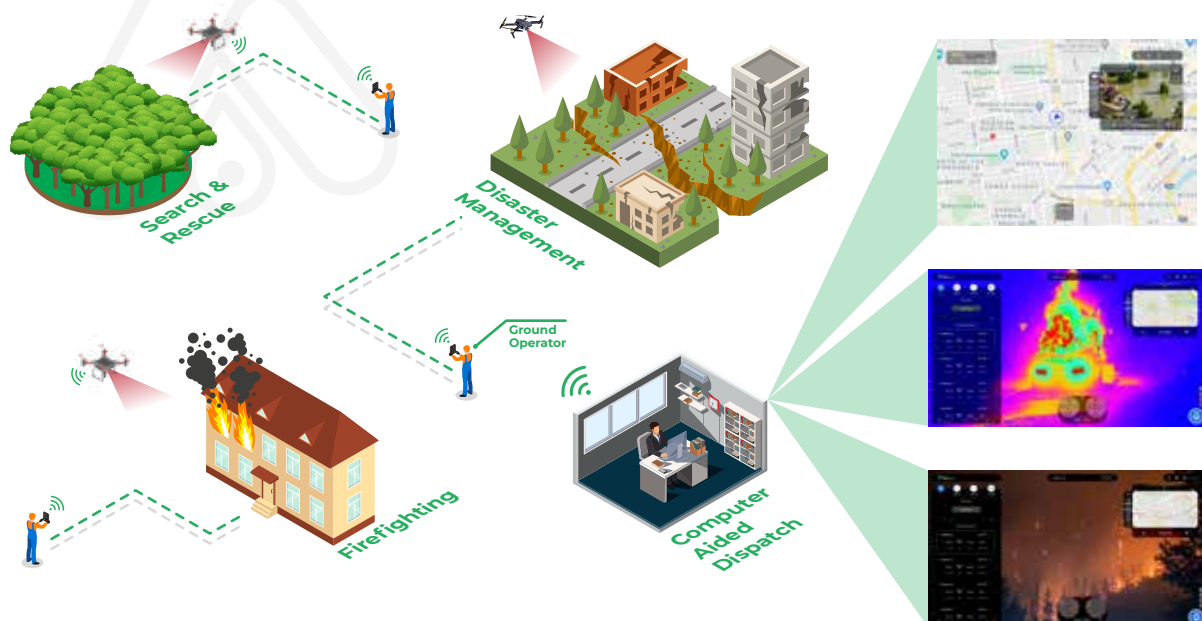
How Drones are Connected to the FlytNow Cloud Application

FlytNow is a hardware-agnostic cloud platform meaning it supports different kinds of drones. Users using DJI drones can use the FlytOS mobile app to connect the drones to the cloud application.

In the case of custom drones, a single board computer loaded with the FlytOS operating system can be attached to the flight controller of the drone, to facilitate communication with the FlytNow application over a 4G/LTE/5G network.

FlytCloud

FlytNow Dashboard
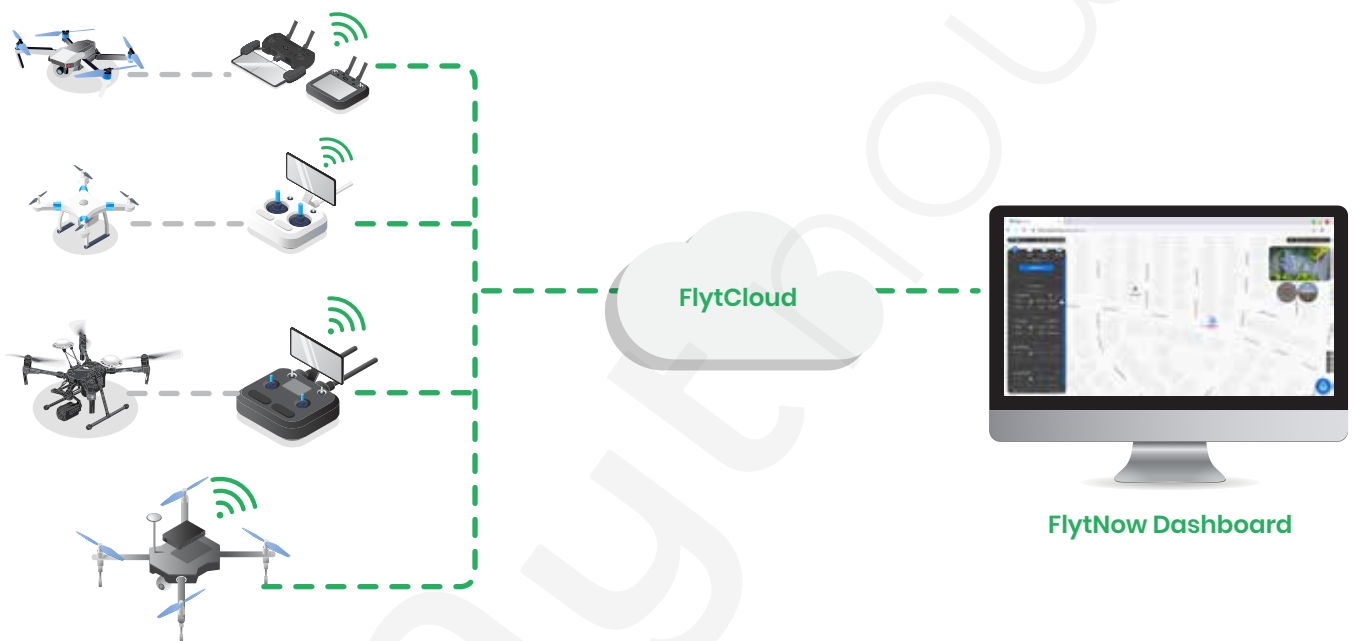
FlytNow Business

FlytNow Business is a standard offering that provides out of the box features in the form of SaaS (Software as a Service). This version is useful in establishing a quick command center, locally, for a particular response to manage the drones in operation.

Some of the unique features and benefits that it provides are as follows:

- It provides a web based dashboard with an integrated map to control a fleet of drones. Using this feature, a single operator can control the movement of multiple drones, thus saving cost and time.

- The dashboard offers live telemetry and visual data from all connected drones, with dual control from both the RC and the web dashboard. This allows for coordinated drone operations where data from multiple drones can be stitched together and shared for better situational awareness.

- The Business edition has out of the box support for live video-streaming from multiple drones that can be shared with anyone using their email address.

- A viewer can switch between 'normal' view (RBG) and 'thermal' view (IR) if the drone is equipped with an IR sensor. In the case of **DJI Mavic 2 Enterprise Dual** and **DJI M210 V2 Dual**, the FlytNow dashboard provides the **MSX** view that shows the lines and edges, along with the contrast, to differentiate between regions with different temperatures.

- Along with MSX, FlytNow gives the option to switch between different color pallets like Rainbow, Hotspot, Gray, Isotherms, Hotmetal, and Coldspot for the M2E Dual.

- Thermal imaging allows firefighters to identify hot spots and see whether they are hitting the fire. In a post-fire situation, a thermal drone can carry out an inspection of the outer facades of the building, and send the live footage using FlyNow to a structural engineer sitting hundreds of miles away for a better assessment.
- The business version has out of the box support for DJI payloads (eg. Dual Camera, Spotlight, etc) for drones such as Mavic 2 Enterprise and the Matrice 200 series. These payloads are specially designed for emergency operations.

Loudspeakers   Spotlights   Beacons
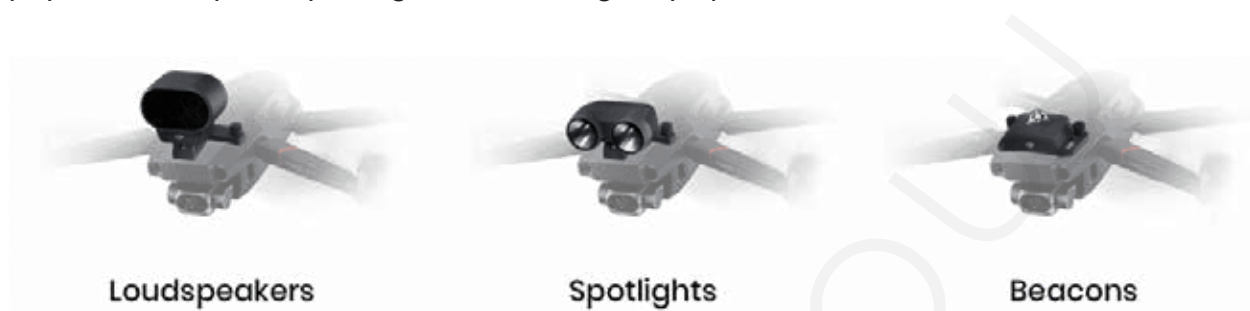
- Apart from DJI payloads, it supports remote control of the gimbal, on which the camera is attached, via the web dashboard. This allows a remote viewer to control the camera angle for a better visual.

FlytNow Enterprise

The Enterprise version adds customization and addons to the Business edition. This version is ideal for setting up a drone-based emergency response system with the following capabilities:

- A system that is integrated with a dispatch system like the 911
- Integration with a decentralized network of drone stations supported by Drone-in-a-Box hardware, which allows for automated dispatch of drones.
- A unified dashboard that can be part of a command center, which allows for the control and management of the drones over 4G/LTE/5G.

With respect to fire fighting, the Enterprise version offers advantages such as:

- AI-based features like object detection to help identify people trapped under debris or lost in a forest.
- The ability of public safety officials to maintain detailed flight-record of each and every drone flight, to comply with airspace norms. All these legal requirements and complexities are solved

using FlytNow Enterprise's native support for DroneLogbook (a flight data recording service) and Airmap (a UTM service).

- Support for custom maps, so that operators can adjust to the terrain over which drones are flying.

Summary

In this blog, we discussed the importance of drones for firefighting and how they can be used to save time, resources, and lives. We also touched upon the kind of drones and payloads used for fire fighting operations. Finally, we ended by showcasing the benefits that FlytNow provides by allowing the usage of drones at scale with data availability for proper coordination.

If you (plan to) use drones for public safety, then FlytNow is the right software platform to allow you to leverage cloud technology for better management and transparency of your drone operations. You can get started with our 28 days of a free trial. You can also contact us at https://flytnow.com/contact/

Try for free