

Multipurpose Alpha Drone for Smart Cities

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You can't talk about advancing the society without a progressive government. To progress it has to adopt new technological solutions and keep on innovating. And drones are becoming inevitable for such progress. There are numerous uses of drones from agriculture to environment monitoring, in construction projects to surveillance system.

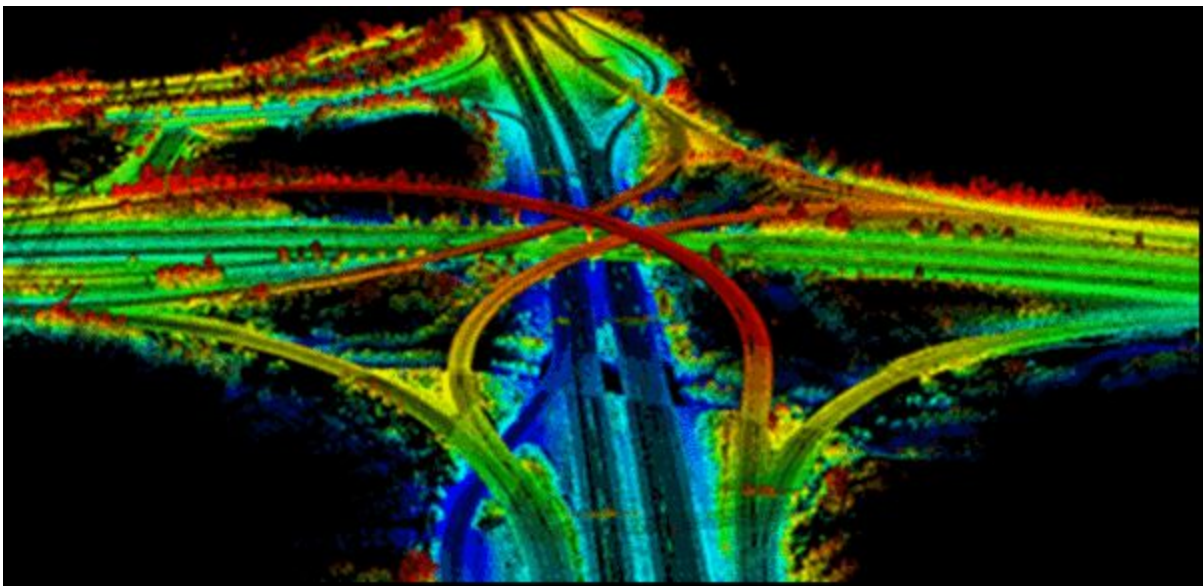
Of interest are not only these machines (drones), but their broader applications, such as in the ability to capture unprecedented levels of data. Here are some of their uses -

1. **Revolution in Agriculture** - for spraying pesticides, monitoring health of crops through AI and Computer Vision.

A lot of testing is going on for precision agriculture and the results show that using drones can increase harvest output by 8-10% using less inputs.



2. **Search and Rescue Operation** - search operations in inaccessible terrains (will help in reducing response time of rescue teams), public announcements using drones during emergency using drones, etc
3. **Environment Monitoring** - Using drone based sensors for collecting weather data is the right and the best way to do it. More and more countries like China, US, South Korea, and many european countries are progressing towards using this new technology.



Thermal Image of a highway to check temperature levels, captured by a drone

4. **Mining** - Drones are currently being tested and implemented mostly in open-cast mining, where they are replacing labour-intensive methods of inspection, mapping and surveying, as well as ensuring safety on the extraction site. We are also observing further developments in underground mining. Drones are able to detect erosion, track changes in vegetation and search for defects in mining infrastructure that may endanger the environment, more easily, and definitely faster, than people on foot or manned aircraft can. Some countries use drones for surveillance.

5. **Journalism and Entertainment Industry** - For many years now, these sectors have been using drone cameras for getting better pictures and recording videos.
6. **Construction Projects** - With increase in large infrastructure projects, data collection from drone can save time, money and resources. They can not only collect minute details but also process them in real time and provide effective reports with 3D-Modeling and AI via photogrammetry. Many countries also use these devices to monitor railways and bridges to check infrastructure condition and damages over time. **Insurance companies** are also using drones to collect accurate data of physical assets.



7. **Security** - Drones could be used for various security applications, ranging from supporting guards, policemen and firefighters during interventions, to monitoring goods and sites, preferably autonomously. Because human involvement will always be required, drones won't be a disrupter. Instead, they're more likely to be an additional support tool. In the case of a fire, a drone equipped with a thermographic camera could go in ahead of the firefighters to provide an overview of the situation and locate people who need rescuing, helping increase the efficiency of the operation and mitigate risks



Our Design - The Alpha Drone for All

We are designing a single vehicle structure **for the use of Urban Local Bodies (SmartCities) with the Alpha Drone Kit and App**. This provide a cheap and effective solution to various problems faced by the local bodies and Municipalities like Inspection of infrastructure projects, announcements during emergency, surveillance, environment monitoring, etc.

1. It will consist of a Base body of a quadcopter which can be attached to 3 different Quad Kits.
2. It will have a chip with flytOS running on it with an internet connection (recommended 4G/LTE) and an Internet Connection on your Ground Station
3. The drone can be controlled using a Mobile app - Alpha Drone App from any location and a live data feed will be provided.
4. The 3 Quad Kits will be for the following three purposes -

A. Inspection of Infrastructure Projects - Drones are faster and allow a more complete, comprehensive and accurate view of the installation. Footage of the assets can be analysed in detail, on the spot or afterwards, which isn't possible with human inspections. Drone inspections also minimise downtime. Human inspection may require an installation to be turned off, which causes inconvenience. Drones allow inspections without downtime. In addition to having a camera for taking pictures and videos, drones can also be equipped with a sensor to detect gas leaks or a thermal imaging camera to check faulty solar panels.

B. Surveillance, emergency announcements, traffic monitoring and Search operation - In case of any natural calamity drones prove to be very effective for prodining information. Drones can help

in search operations and Traffic monitoring during special events.

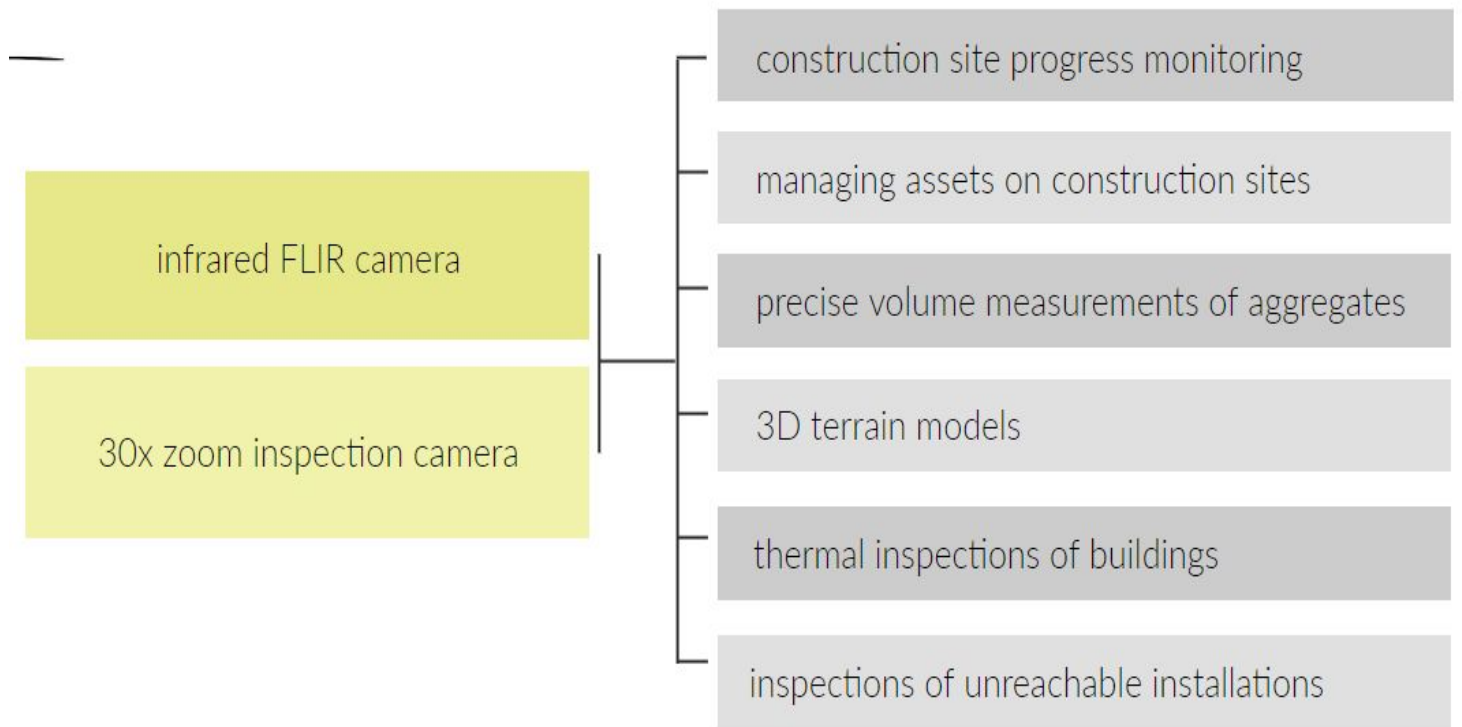
C. Environment Monitoring - Environment is one of our greatest concerns - global warming and pollution have raised to alarming levels. It is difficult to provide comprehensive weather report and pollution in Industrial areas and roads for a particular location as monitoring station can be built at a few points. They have a maintenance cost as well as data collection is limited. The Alpha Drone will help in environmental monitoring and effective compliance by Industries on pollution norms.

Alpha Drone - Base model with battery and cellular connection box

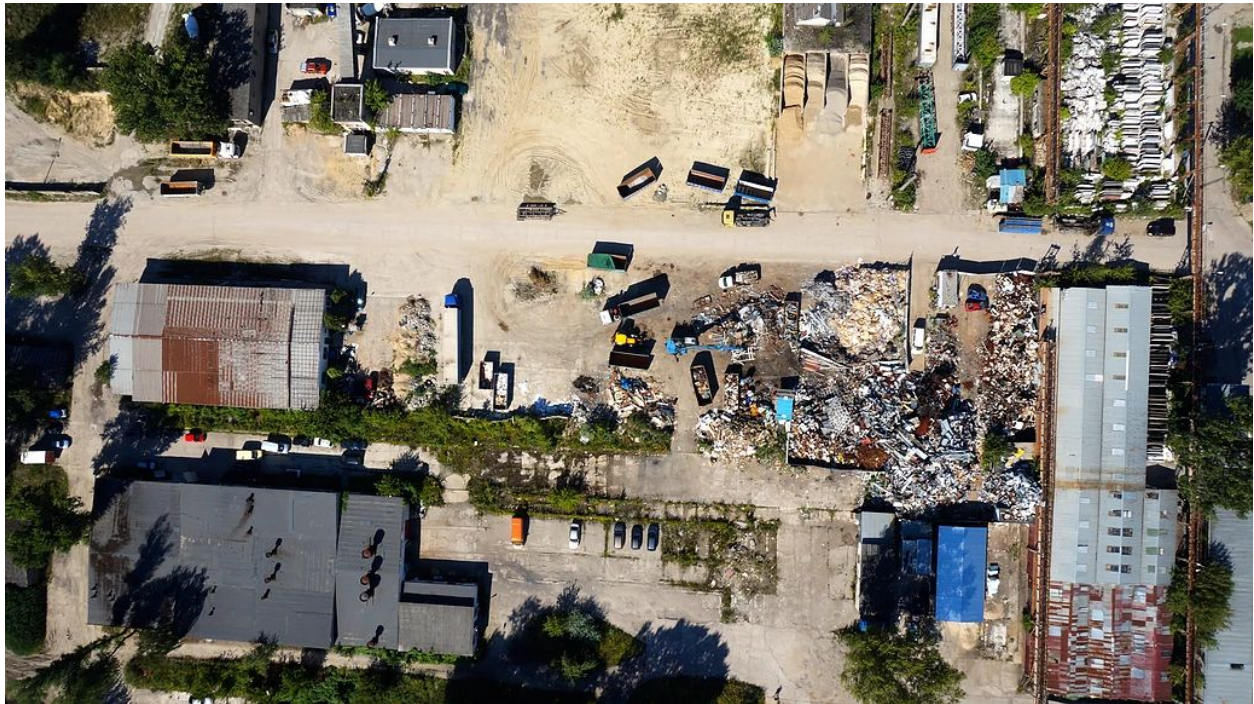


Quad Kits for Alpha Drone

Quad Kit 1 - 3D camera with infrared sensing. The collected data will be used for AutoCad for 3D Modelling. The images of infrastructure(bridges, metro lines, monuments, pulls, roads) will be analyzed by the software we will built a Machine Learning on Image processing model to identify damages.



Images taken from a drone for Inspecting Construction activities



Quad Kit 2 - A high precision thermographic night vision camera (for emergency search and rescue operation, traffic control, fire fighting

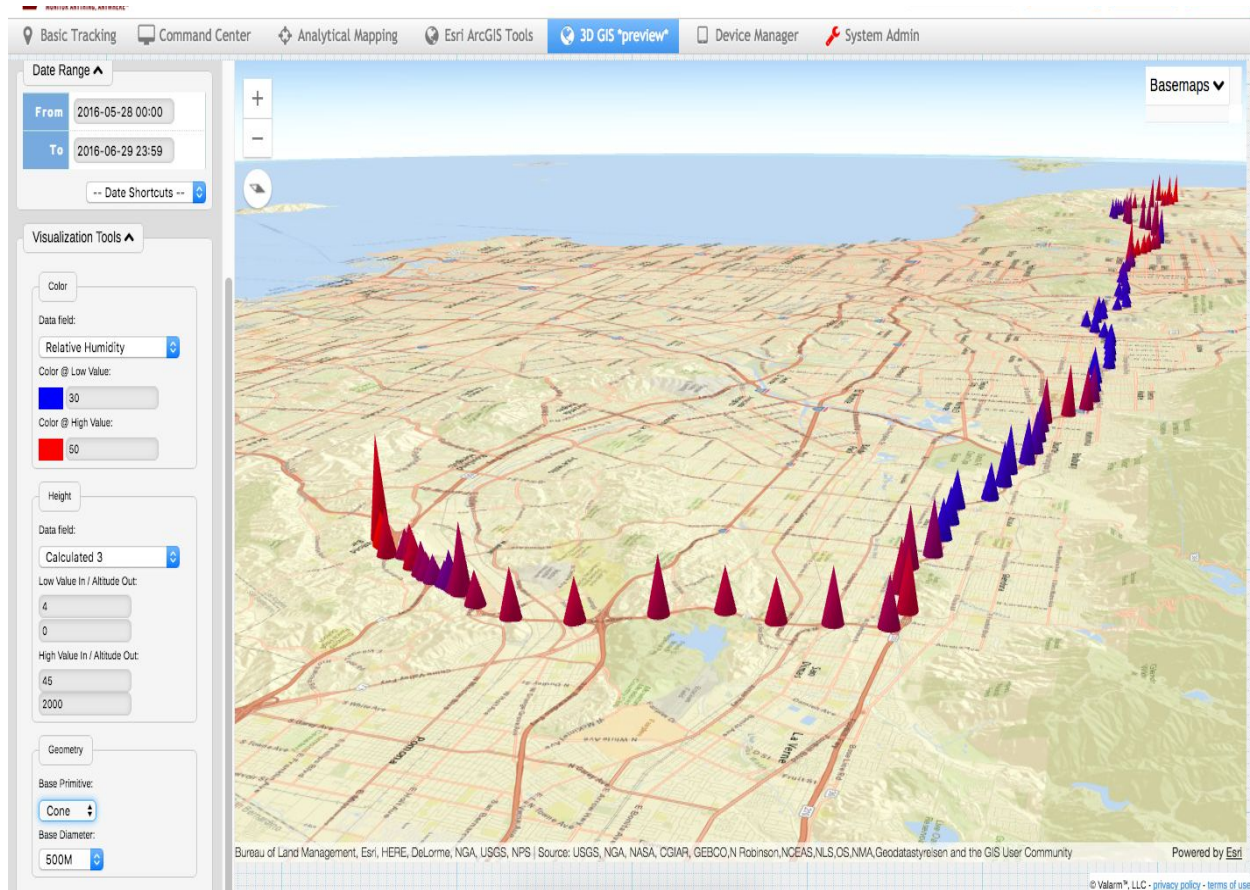
operation) with loud speaker (mic transmitting from the user's phone) which can be used by a phone through the **Alpha Drone App**.



Qaud Kit 3 - To monitor environment in the city it will comprise of -

1. Air pollution sensors - high precision 3D air pollutant mapping using seven precision onboard gas sensors to detect eight pollutants simultaneously: VOCs, CH4, NO2, O3, CO, SO2, PM1.0, PM2.5 and PM10.
2. Water Level Sensor
3. Pressure Sensor
4. Temperature Sensor

You will get an automatically generated detailed geographical report on the **Alpha Drone App** every day and indicate the red zones in Industries as well as the overall city report over time. This will help them to formulate better policies and proper implementation.



Data collected by Alpha Drone generates a detailed report for analyzing.

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