INDONESIAN BUILDING TAKES FLIGHT

IN THE SECOND OF TWO ARTICLES, **ISHVEENA SINGH** LOOKS AHEAD TO FUTURE USES OF UAVS IN THE CONSTRUCTION INDUSTRY IN INDONESIA

Growing at 7-8% every year, the building and construction sector in Indonesia is in the midst of a sustained boom. The government's efforts to prioritise infrastructure development in the country were buoyed when the World Bank identified an infrastructure deficit of US$500bn in Indonesia in 2017. The construction law ecosystem has also undergone its first major overhaul in almost two decades, putting a major emphasis on security and safety on construction sites.

As such, there has never been a better time for Indonesia to adopt UAVs. These not only mitigate the risks associated with construction site safety but also improve efficiency and productivity.

Before beginning any building activity, it is imperative to evaluate a construction site for vitally important information such as the precise topography and slope changes. All over the world, data from UAVs is making site exploration more accurate than ever, but in Indonesia, UAVs now have a special importance, by facilitating land surveying in a much shorter time.

Dolly Saputra, project manager at Terra Drone Indonesia, says, "A UAV can collect high-fidelity survey-grade data from a 4ha site in 10 minutes, while a field survey of the same would easily take 16 hours because of Indonesia's challenging topography." All at a fraction of the cost.

Construction simulation models

With high-fidelity UAV data, project managers get access to a precise snapshot of the construction area without any scope of human error. A UAV-obtained digital elevation model providing accurate geographic details of the terrain can be used to conduct watershed analysis as well as produce a virtual 3D model of the project – which, in turn, can prove vital for rendering weather models, such as sunshine hours or flood inundation at the site. With landslides and floods a regular occurrence in the tectonically complex Indonesia, identifying the nature and severity of flood hazards at potential building sites cannot be understated.

A realistic 3D model of the terrain also facilitates better decision-making in terms of ground levelling, foundation pouring and other preparation work for contractors.

Construction site monitoring

UAVs enable project managers to monitor and review construction sites with ease, even from remote locations. There are several ways in which UAVs can be used during the actual build phase of a project:

- UAV point clouds and digital terrain models can provide precise volume calculations of earthwork and stockpiles quantities.

- Orthomosaics across various dates can be compared to track progress precisely.
- If scans of the site differ from the projected models, intervention for rectification can be made quickly.
- Periodic, nondisruptive LiDAR scans of infrastructure projects can check the structural integrity of buildings.
- With UAV imagery and video capturing all assets on the site at regular intervals, inventory management can be simplified.
- Since UAV data can be transmitted in near real-time, all stakeholders can be kept informed about the on-ground developments at all times.
- High-resolution UAV videos and stills also make for impressive marketing material and keep investors happy.

Reconstruction activities

Once construction is completed, a LiDAR model of the structure can be archived for future use. 3D models of large infrastructure projects and buildings prove especially useful during reconstruction activities, such as in case of damage from earthquakes, floods or other natural calamities.

Challenges of using UAVs

Up until a few years ago, high-accuracy UAVs were not only expensive, the personnel operating them and those processing the acquired data required significant amounts of training. Today, however, extremely user-friendly and intuitive UAV data processing software is available.

According to Supatra, the pushback against UAVs in Indonesia today is centred on a lack of understanding of the value UAVs bring to construction projects.

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But he is positive it is only a matter of time before the construction sector begins to recognise UAVs for their clear and comprehensive view of the past, present, and future of infrastructure projects.

"UAVs can improve safety, reach inaccessible areas, and gain efficiencies from higher-quality data. The building sector in Indonesia is also noticing this and will surely reap the benefits of this cost- and time-effective technology in the near future," he concludes.

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