

Drone application in forestry.

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Everything this world has to offer to us environmentally is thanks to the vast systems of forests that we have. Without these places for plant life to grow and thrive, we would not have the world as we know it. With this being such a crucial part of our ecosystem we need to research how to properly protect and extend the life of these life-giving forests, and drones can play a huge factor in this equation. Drones bring a bright future into the forestry industry through the countless applications, to the cost, and everything else that the flexibility of a UAS has to offer.

Some of the challenges that we have in forestry have to do with the planting, maintaining, science, and upkeep of the forest ecosystems. One of the biggest challenges to the forestry industry is deforestation and urbanization. This hurts the ecosystem because with forests being chopped down for cities to be built there isn't anywhere for trees to be planted cutting down on the positive benefits that forests give the world. Not only is there a lack of oxygen going back into the air but there are also taking away the homes of many forest creatures such as squirrels, deer, bears, and countless others, making them be more susceptible to be out on roads or in cities where they can cause problems. You hear on the news more often than we would like to hear about a bear getting into someone's trash can and ripping it apart searching for food, this would be mitigated with the proper treatment of the limited resource of forests that we have. Another challenge that we have with forestry is the monitoring and observance of growth, this is hard to do because we as humans can only see ground-level growth. While this is an important step to maintaining the forest, this is not the only piece to the puzzle that we need. We also need to cover percentages and heights of the trees and this is where drones can play a good part in putting data together. Instead of flying helicopters and taking pictures with those, we can just fly a drone in

the air and take pictures with those, this is not only a cost-savings to flying a helicopter it also saves on fossil fuel consumption and greenhouse gas emissions coming from the helicopters.

Another huge aspect of the forestry industry with drones is the monitoring of wildlife. Drones can help evaluate an area and monitor for diversity within the animal kingdom and see possible biodiversity issues within an area for the animals. For instance, if there is not enough grass in an area scientists can determine this and plant more of something to enhance the growth of the forest for the better for both animals and the plants living there.

Along with the many benefits to drones being involved in the forestry industry, there are also some disadvantages. With drones being so small there is a very limited amount of things that you can do, this can limit the quality and the number of cameras and storage that they can have on board. If they carry a bigger camera with more storage the user will also sacrifice battery life on the drone itself. Batteries have come a long way since drones have initially come to market but the life span of a drone battery under strenuous use is still capped around that one-hour mark. This means that a user needs to carry more batteries along with them when they go out and take pictures, this also limits the area which they can survey at one time.

Weather is also a consideration that needs to happen before you go and fly a drone in the forest. Wind and poor visibility are a couple of examples that can be very bad for drone users. Wind is very tough to fly a drone in because with how light drones are, it does not take much to knock them off their intended flight path. Poor visibility with fog or low clouds is also very bad for this application of drone use, this is because you simply could not get good pictures for what you need, and you could lose the position of your drone in flight and possibly crash it into someone or a building. Another issue with drone use is the security issues that arise from drones flying over flying people's homes. This is an issue because many people do not like having the buzz

of a drone flying over their homes taking pictures of it. Obtaining the permits necessary for doing the forestry work can be a challenge too, with all of the regulations and rules that go into the forestry industry.

In conclusion, drone use in the forestry industry can be very beneficial both to us as humans and to the animals and forests alike. Forests help keep us breathing through all of the greenhouse gasses emitted each year and keeping these alive would benefit us the most. The best part of using unmanned aircraft in the industry is the ease of access and cost ratio in comparison to traditional means such as flying aircraft or helicopters to take the same pictures and mapping of an area. This reduces the greenhouse gasses within the industry and makes the world better as a whole.

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