Geog270

Research Paper

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sUAS Wildfire Management

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Introduction

Wildfires are reoccurring emergency events that can be put at high risk of life, property, and natural resources in the U.S. State and many countries around the world. Wildfires have affected millions of acres across the United States. Last year, California news reporters estimated 8.8 million acres that were blackened due to wildfires. Every year millions of acres of forest are lost because of wildfires. Forest fires can be divided into two broad classes: wildfires and prescribed fires. Wildfires are either caused by accidental or malicious acts of humans which is almost 90% of wildfires in the U.S or by nature (lightning, etc.) which is around 10% of wildfires in the U.S. (Aydin para.1) If the wildfires are in remote areas and pose no threat to any people or property, the sUAS can simply gain information on how either the fire was started or find out if the fire will be moving at a rapid or slow pace, so they can prevent further damage that might happen. There are many ways that drones can be beneficial when it comes to wildfire management. Most importantly drones are being equipped with different resources to be able to extinguish wildfire fighting, as well as protect the environment and make it safer. Drones can monitor wildfires from the air putting firefighters' risks to halt.

How drones are beneficial to helping aid Wildfires from occurring

The massive and out-of-control wildfires that have been in the far west, such as California, have provided benefits to drones and other unmanned aircraft systems. Drones and other sUAS's can provide fast response and recovery operations with up-to-date visuals. It only takes a few seconds from when the fire starts, to when the fire gets to be out of control. Response teams must be fast so they can prevent the damage and plan future steps. Having drones manage wildfires helps us gather situational awareness

in a short time. UAS are very cheap to run, whereas using helicopters can be a very expensive cost. Drones can be equipped with thermal sensors and autonomous sensing, which use infrared radiation to help first responders locate heat signatures in fire hotspots that show where the fire could eventually spread. A website called usda.gov talks about Xiaolin Hu, a director of Georgia State University's Systems Integrated and Simulation lab develops drones to collect data about wildfires, including the fire front data and wind data in the wildfire area. This is very beneficial to the first responders and the firefighters by providing the fire location and the fire spread information. Hu states, "The ultimate goal is to support the decision-making of fire managers and improve safety for firefighters on the ground. An important aspect of this project is to develop collaboration where fire managers and firefighters work together with drones in collaborative tasks" (Hu 2021). Overall, the autonomous drones help find the location of the fire and predict the fire spread, under the supervision of humans and control stations at which they are stationed at.

Drone resources that are being used to extinguish wildfire fighting

There are many different types of drones in which all are mostly similar, but the high-tech drones are being used to combat millions of wildfires that are occurring around the world. Drone are acting as tools such as using artificial intelligence to survey (map) and deliver real-time information about wildfires, either in the day or even at night. On a website called globalnews.ca, CEO Cole Rosentreter stated "We're saving firefighters hours of walking around in muskeg up to their belt looking for a hot spot to put out" (Chacon 2021). When it comes to putting people's lives at risk, drones could use their resources to be able to mitigate those risks for people. Many

beneficial resources are being adapted for drones with are being used to extinguish wildfire fighting.

Environmental Safety

There are ways for us humans to help protect our environment from wildfires. If we use our resources such as drones, it will make it even easier to protect our environment. More importantly, drones can play a major role in this as well. For people, a couple of ways to protect our environment would be to obey local laws regarding open fires, including campfires, keep all flammable objects away from fire, and make sure you drown all fires. As for drones, I stated some of these earlier, but UAS has helped map fires and determine which direction it might go. The drones have been developed to find a fire's hottest spots with infrared equipment and strategically set controlled fires that eliminate potential wildfire fuel. UAS can also help the firefighters determine where a wildfire might spread through tracking and mapping photography. There are many benefits of drones that help protect our environment like accessing aerial footage, getting in places where it might be hard for something else, and contributing to safe infrastructure maintenance and management.

Conclusion

Concluding my topics, I think it is very beneficial for drones to help manage our environmental mistakes. Drones are coming more and more popular as the years go on. It mitigates the risk for the firefighters when it comes to fighting wildfires. With drones helping manage our wildfires, I feel like it would help our firefighters out with being able to travel with inexpressive costs as well. Drones will provide high aerial footage which

can help dictate where the fire is and where it might go. Drones have many resources when it comes to extinguishing wildfires, as I stated earlier in my paper. Lastly, drones become helpful in ways that make our environment safer. Overall, I think drones are very reliable to use when it comes to managing wildfires and other environmental sciences.

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