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DRONES IN DISASTERS

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AGENDA

- Wildfire Challenges: Present and Future
- Proactive Measures: Drones in Prevention
- Crisis Management: Drones During Fires
- Post-Event Restoration: Drones in Recovery
- On the Horizon: R&D Initiatives
- Key Takeaways and Conclusions



WILDFIRE CHALLENGES: PRESENT & FUTURE



- Global warming and climate-driven droughts, often intensified by human activities, fuel more frequent & severe wildland fires
 Extreme heat, human carelessness, natural phenomena like lightning
- Extreme heat, human carelessness, natural phenomena like lightnin strikes & inadequate land management practices contribute to the growing crisis
- Wldfires leave a trail of destruction that claims lives, jeopardize public health & cause extensive property damage



WILDFIRE CHALLENGES: PRESENT & FUTURE

- 150 years ago,
- and cobalt.



• The likelihood of wildfire occurrence has quintupled compared to

• The August 2023 Maui wildfire, fueled by drought and powerful winds, wreaked havoc on Lahaina, resulting in 115 fatalities, the destruction of over 2,000 homes, the displacement of 7,200 residents, and the deposition of toxic ash laced with arsenic, lead,

WILDFIRE Challenges: Present & Future

• Fire emissions can lead to various health issues, while also exacerbating environmental degradation by releasing significant quantities of carbon dioxide into the atmosphere.

PM 2.5

Microscopic particles known as PM 2.5 can penetrate deep into the respiratory system, potentially triggering various health issues

HEALTH IMPACTS

Short-term effects: irritations to the eyes, nose, and throat; longterm exposure can worsen preexisting conditions such as heart disease and asthma.



VICIOUS CYCLE Released carbon dioxide accelerates climate change, which subsequently leads to an increase in the frequency and

intensity of wildfires.

PROACTIVE MEASURES: DRONES IN Prevention

- Firefighters increasingly utilize drones for wildfire prevention.
- These uncrewed aircraft, equipped with advanced multi-spectral sensors, survey potential wildfire hotspots & gather crucial data on forest health, soil characteristics, topography & environmental conditions.
- The collected information enables precise identification of high-risk areas for more effective land management & fire prevention efforts.



PROACTIVE MEASURES: DRONES IN PREVENTION



- Drone-collected information guides strategic controlled burn recommendations to reduce vegetation & mitigate fire risks.
- Equipped with plastic sphere dispensers (PSDs), drones can precisely initiate controlled burns via fireball igniters.
- This approach enhances safety and reduces the financial burden of conducting controlled burn operations.



CRISIS MANAGEMENT: Drones During Fires

- Drones identify nascent fire spots and track fire progression, enhancing rapid response capabilities..
- Equipped with thermal FLIR cameras, drones provide critical insights by detecting heat signatures and living beings, even in lowvisibility conditions.
- These aerial tools can also contribute to containment efforts by deploying fire suppressants and strategically igniting controlled burns across expansive areas.



POST-EVENT **RESTORATION:** DRONES IN RECOVERY



- initiatives & flood mitigation.
- structural integrity of buildings & infrastructure.
- locating and reuniting lost pets with their owners.



• Drones play a vital role in various aspects of post-fire recovery, including search & rescue operations, structural assessments, reforestation

• Drones provide efficient means to evaluate fire damage & inspect the

• In the aftermath of the Maui wildfire, volunteer drone operators aided in

ON THE HORIZON: R&D INITIATIVES



- drone applications in wildfire scenarios.
- The ACERO project, led by NASA, enables 24/7 wildfire operations, leveraging advanced aviation technologies & enhancing shared situational awareness.
- safety.



• Federal & state agencies are spearheading R&D efforts to optimize

• Portable air traffic management systems provide real-time alerts to drone operators during prescribed burns to improve airspace

KEY TAKEAWAYS & CONCLUSIONS

 As wildfire threats escalate, drones are becoming essential tools in tackling these complex challenges, offering innovative solutions for prevention, monitoring, and firefighting efforts.

PREVENT & RESPOND

Drones can play a vital role in preventing wildfires & improving response & recovery efforts across a range of situations.

EFFICENCY & DATA

Drones deliver high-quality realtime data, serving as safer and more efficient extensions of first responders.



BRIGHT FUTURE

Future advancements in ATM & sensor technologies will further enhance drones' capabilities & effectiveness during wildfires.

QUESTIONS & CONTACT

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