HELP.NGO FOUNDATION
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COLOMBIA FIRE RESPONSE 2024

5 EXPERTS
deployed

≈900 HECTARES
mapped

≈500 HECTARES
of fire identified

≈60 GB DATA
collected

CONTENTS

EXECUTIVE SUMMARY

During the recent forest fire crisis in Colombia exacerbated by the El Niño phenomenon, a crucial support mission was conducted to address the emergency. This mission focused on the strategic use of drones to provide vital assistance in managing and mitigating fires.

The primary objective was to provide operational support by implementing drone technology to map affected areas and conduct real-time overflights of fire hotspots. This enabled detailed information for more effective and rapid decision-making.

ACTIONS TAKEN

DETAILED MAPPING

Precise mappings of affected areas provided critical geospatial data to assess the extent and severity of fires.

REAL-TIME OVERFLIGHTS

Drones conducted direct overflights above fires supplying real-time images and videos crucial for assessing fire dynamics.

INTERINSTITUTIONAL COLLABORATION

Close coordination with local authorities and response teams ensured efficient distribution of collected information.

EXECUTIVE SUMMARY

IMPACT AND BENEFITS

INFORMED DECISION-MAKING

Real-time information allowed authorities to make informed and strategic decisions for resource management and the resilience of at-risk areas.

OPERATIONAL EFFICIENCY IMPROVEMENT

Drone overflight technology facilitated a faster and more efficient response, optimizing resource mobilization and firefighting team deployment.

HUMAN RISK REDUCTION

By providing a clear, real-time view, the risk to response teams was minimized, allowing them to address critical areas more effectively.

In conclusion, the drone support mission played a fundamental role in responding to forest fires, demonstrating the utility and effectiveness of technology in combating natural disasters. The experience gained lays the groundwork for future emergency management strategies in similar contexts.

MISSION OBJECTIVES

PRECISE MAPPING OF AFFECTED AREAS
Obtain detailed geospatial data to assess the extent and severity of forest fires in Colombia.

REAL-TIME OVERFLIGHTS ON FIRE HOTSPOTS
Provide real-time images and videos of fires using drones, allowing continuous and detailed monitoring.

INFORMATION FOR EFFECTIVE DECISION-MAKING
Supply critical data to local authorities and response teams to facilitate strategic decision-making.

INTERINSTITUTIONAL COORDINATION
Establish effective collaboration between local and national entities and response teams to ensure efficient distribution of collected information.

RESOURCE OPTIMIZATION AND RAPID RESPONSE
Improve operational efficiency by using technology for quick and strategic assessments in critical areas.

HUMAN RISK REDUCTION
Minimize the risk to response teams by providing a clear and real-time view of fires, allowing safer and more effective intervention.

DEMONSTRATION OF TECHNOLOGY UTILITY
Validate and demonstrate the effectiveness of technology in natural disaster management, setting the stage for future applications in similar situations.

METHODOLOGY

1 PRELIMINARY ASSESSMENT

A detailed analysis of the situation was conducted, identifying critical areas and approximately determining the scale and magnitude of the fires.

2 DRONE SELECTION AND PREPARATION

- Appropriate drones were selected based on:
  - Terrain topography
  - Distances to the fire point
  - Climatic conditions
  - Approximate flight duration
  - Flight autonomy
  - Mapping capacity
- Proper functioning and battery charging for drones were ensured.
- The use of a generator in isolated areas without electricity for battery recharging and to complete mappings was considered.

3 ROUTE PLANNING AND FOCUS AREAS

- Efficient flight routes were designed for mapping, considering that the distance from the burned area was 3.5 km from the chosen takeoff point.
- Areas and critical points for a detailed analysis were prioritized.

4 COORDINATION WITH GROUND TEAMS

During real-time surveillance flights, effective communication was maintained with Bello's firefighters and the municipality's transit department to coordinate the response and real-time data reception.

5 DRONE DEPLOYMENT

Drones were strategically deployed to cover identified areas, considering terrain and fire distances. Real-time flights were deployed based on needs, airspace restrictions, and coverage.

METHODOLOGY

6 DATA COLLECTION AND PROCESSING

- Geospatial data, images, and videos of fires were collected using drones.
- Data were processed in the cloud using WebODM to obtain updated maps.
- Real-time data processing provided immediate and relevant information.

7 RESULTS COMMUNICATION

The obtained information was provided to the Colombian National Natural Parks authorities and Bello firefighters in real-time, facilitating decision-making.

8 POST-MISSION

- Collected data were analyzed in detail for subsequent reports.
- Remote support was provided to Colombian National Natural Parks personnel regarding map and platform utilization.

9 FINAL REPORT AND RECOMMENDATIONS

A final report was prepared, presented to Colombian National Natural Parks authorities, and involved AWS personnel. The report highlighted results, lessons learned, and recommendations for future similar missions.

METHODOLOGY - THERMAL CAMERAS

Help.NGO pilots have successfully utilized two types of advanced drones: the Mavic 3T and the M30T, both equipped with thermal cameras, integral components crucial for effective fire response strategies.

The use of thermal cameras on drones for firefighting provides various crucial benefits that significantly enhance operational effectiveness and safety, such as:

EARLY DETECTION OF FIRE HOTSPOTS

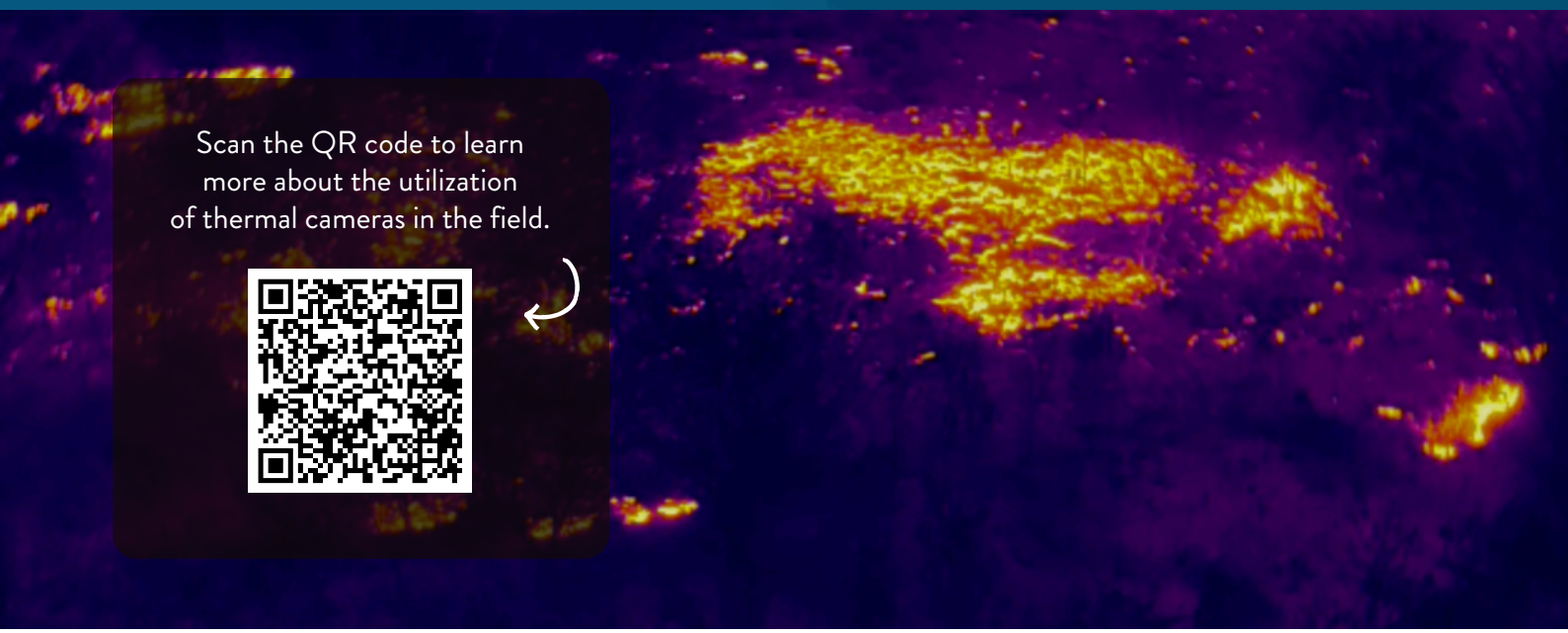
Thermal cameras on drones enable early detection of fire hotspots, even in low-visibility conditions like dense smoke or during the night. This facilitates a rapid response before the fire spreads, which is crucial for containing and controlling the fire in its early stages.

PRECISE MAPPING OF HOT AREAS

Thermal cameras can accurately map affected areas, identifying high-temperature zones that may indicate the presence of underlying fire or hotspots. This detailed mapping helps response teams better understand the extent of the fire and make strategic decisions on how to address it.

CONTINUOUS REAL-TIME MONITORING

The ability of drones equipped with thermal cameras to provide continuous real-time monitoring is essential. This allows response teams to monitor the fire's evolution, assess the effectiveness of extinguishing strategies, and adjust their approach as needed.



AWS SUPPORT

Amazon Web Services (AWS) has played a significant role in the social and humanitarian response sector through various initiatives and services. AWS, Amazon's cloud services platform, has provided technologies and solutions that support Help.NGO.

Some key aspects of its role in this sector include:

DATA STORAGE AND PROCESSING

AWS offers scalable storage and processing services that enable organizations to efficiently manage large amounts of data. This is crucial for collecting, analyzing, and sharing real-time information during emergency situations.

APPLICATION AND PLATFORM DEVELOPMENT

The AWS platform facilitates rapid development and deployment of applications and platforms that are critical for coordinating responses and providing humanitarian assistance. These applications can address needs such as supply tracking, shelter management, and communication in crisis situations.

CONNECTIVITY AND COMMUNICATIONS

AWS contributes to improving connectivity and communications during emergencies through services that enable data transmission and real-time communication. This is essential for effective coordination among response teams and humanitarian agencies.

DATA ANALYTICS AND ARTIFICIAL INTELLIGENCE

AWS's ability to process large datasets and its integration with artificial intelligence (AI) and machine learning (ML) tools facilitate rapid analysis of critical information. This helps make informed decisions and optimize resource allocation.

COLLABORATION WITH HELP.NGO

AWS has collaborated with Help.NGO by providing credits, technical support, and resources to help leverage technology in addressing social and humanitarian challenges.

MISSION DETAILS

During the forest fire support mission in Colombia, three missions were carried out, each presenting unique challenges and significant achievements:

EL COCUY NATIONAL PARK

- Two days were spent on foot and horseback to reach the fire site in the park. Operations included camping in tents and establishing an overnight camp without access to electricity.
- Successful mission completion in four days considering the lack of electricity. The team established a camp with their own connectivity and electricity to keep Colombian National Parks authorities informed.
- Fundamental support from El Cocuy National Parks Natural staff and indigenous community leaders was provided.

IGUAQUE RESERVE

- The closest point to the Iguaque Reserve was reached, conducting overflights to assess the affected area both inside and outside the reserve.
- Detailed information was obtained about the extent of the damage.

MISSION DETAILS

BELLO, MEDELLÍN

- Collaboration with firefighters to assess and analyze the fire's real-time behavior in Bello, Medellín.
- Strategies and tactics were established for personnel safety and rapid extinction:
    - Precise evaluation of fire behavior.
    - Real-time tactical strategy establishment.
    - Effective collaboration with local firefighters.

COMMON CHALLENGES

- Management of remote situations and difficult weather conditions.
- Dependency on power generators to charge equipment in areas without electricity.
- Logistic coordination for mobilization and camping in challenging terrains.
- Each mission highlighted adaptability and collaboration, emphasizing a commitment to operational effectiveness and effective mitigation of forest fires.

DATA AND STATISTICS

DATA	SIERRA NEVADA DE COCUY NATIONAL PARK	IGUAQUE RESERVE	BELLO, MEDELLÍN
	434 hectares	230 hectares	230 hectares
	6.761674°N -72.340566°W	5.61741°N -73.50695°W	6.33176°N -75.54589°W
	7	5	14
	180 minutes	150 minutes	340 minutes
	4,300 meters above sea level	2,627 meters above sea level	1,440 meters above sea level
	22.9 kilometers	5.5 kilometers	2.63 kilometers
	379 hectares	110 hectares	4.28 hectares

CONCLUSIONS

SUCCESS IN ACHIEVING OBJECTIVES

The drone-supported forest fire mission in Colombia, focusing on strategic drone utilization, successfully achieved its main objective: providing vital assistance in managing and mitigating fires.

EFFECTIVE USE OF DRONE TECHNOLOGY, SATELLITE CONNECTIVITY, AND CLOUDING

The implementation of these interdependent technologies proved to be an effective tool for detailed mapping of affected areas, enabling more informed and strategic decision-making.

FUNDAMENTAL INTERINSTITUTIONAL COORDINATION

Close collaboration with local authorities, response teams, and community leaders was essential for the mission's success, ensuring efficient distribution of collected information.

RISK REDUCTION AND OPERATIONAL EFFICIENCY IMPROVEMENT

Drone overflight technology not only provided valuable real-time information but also contributed to reducing risks for response teams and improving operational efficiency in resource deployment.

ADAPTABILITY TO COMMON CHALLENGES

Despite common challenges like difficult weather conditions and lack of access to electricity, the mission demonstrated adaptability and resilience in managing remote situations.

MEASURABLE IMPACT IN AFFECTED AREAS

The collection of detailed data on the area and extent of fires provides a solid foundation to assess the crisis's impact and plan future management strategies.

LESSONS LEARNED AND BASIS FOR FUTURE STRATEGIES

The experience gained lays the groundwork for future emergency management strategies in similar situations, highlighting the importance of technology and interinstitutional collaboration.

VALIDATION OF TECHNOLOGY UTILITY

The mission not only fulfilled its objectives but also validated the utility and effectiveness of drone technology in managing natural disasters, opening new possibilities for future applications.

In summary, the mission not only effectively addressed the forest fire crisis but also left valuable lessons learned and set a precedent for using advanced technology and interinstitutional collaboration in environmental emergency management in Colombia.

RECOMMENDATIONS

1 REINFORCEMENT OF TECHNOLOGICAL CAPACITIES

Local institutions are recommended to continue investing in the training and acquisition of advanced technologies, including drones and real-time data processing systems. This will strengthen response capabilities in future similar missions.

2 ESTABLISHMENT OF COORDINATION PROTOCOLS

Implement clear coordination protocols between government entities, local authorities, and response teams to ensure smooth communication and efficient distribution of information in emergency situations.

3 IMPLEMENTATION OF CLOUD DATA PLATFORMS

Continue using cloud data platforms for efficient and accessible processing of collected information. Integrating systems like WebODM allows more effective management and analysis of geospatial data.

4 EXPLORATION OF STRATEGIC COLLABORATIONS

Seek opportunities to establish strategic collaborations with technology companies and organizations specialized in disaster management. These partnerships can provide additional resources and specialized knowledge.

5 CONTINUOUS TRAINING OF PERSONNEL

Ensure continuous training of personnel involved in missions, both in drone operation and geospatial data interpretation. Ongoing training will optimize effectiveness and safety in the field.

6 DISSEMINATION OF RESULTS AND LESSONS LEARNED

Share results and lessons learned widely with other government entities, disaster management organizations, and affected communities. This will foster a learning and collaboration network to address similar challenges in the future.

Scan the QR code to see
more photos from this mission.

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