

## Search and Rescue Operation on the Nachtigal Dam, Cameroon



*DJI Matrice 350 RTK*



*Beginning of the SAR mission*



*View of the dam and mission in progress*

OVERVIEW	
Flying Labs	Cameroon Flying Lab
Geographic area	Centre Region, Cameroon

<b>Date range</b>	30th August - 03rd September 2023
<b>Sector program</b>	<a href="#">AidRobotics</a>
<b>Main SDGs</b>	<a href="#">GOAL 3: Good Health and Well-being</a>

<b>SCOPE</b>	
<b>Project stakeholders</b>	Nachtigal Hydro Power Company (NHPC)
<b>People impacted</b>	Nachtigal Hydro Power Company workers
<b>Number of people impacted</b>	6
<b>Problem statement</b>	6 NHPC' workers on duty on the dam went missing ; 5 on a canoe mission and one in an attempt to go search for the others.
<b>Project objectives</b>	The primary objective of the mission was to find and rescue the missing workers as fast as possible.
<b>Scope</b>	To ensure the success of the rescue mission, we first had a meeting with the top management of the company which presented the situation and the danger we might be exposed to. We then reviewed our Standard Operating Procedure (SOP) related to search and rescue operations, delimited the area of interest, prepared the chosen drone for the operation with all the necessary equipment, and went on the field for operation. We scanned the whole area of interest with RGB and thermal captor cameras.
<b>Outcome</b>	Our intervention allowed the company to retrieve 4 persons alive within three days. The fourth person, who went missing in an attempt to rescue the others, slept on a tree during the night and was given snacks by drone the next morning to keep healthy. After more than one week of searching, we only found the life jacket of the fifth one in a remote area. The search and rescue team did not find anything about the last person, and they continue to be missing persons to-date.
<b>Impact</b>	Successful search and rescue of 4 workers of NHPC which also influenced the adoption of drones by the company for search and rescue operations to save lives.

<b>Challenges</b>	<ul style="list-style-type: none"> <li>● The main challenge of the search and rescue operation was that everybody on duty had to have a radio.</li> <li>● It was the team's time in such a situation, so we had to rapidly adapt our SOP in relation to search and rescue to fit the mission especially on a river.</li> </ul>
<b>Next steps</b>	<ul style="list-style-type: none"> <li>● Review and adapt our SOP and checklists to operate above water.</li> <li>● Train pilots to operate more efficiently in such a situation</li> <li>● For the NHPC, they have already integrated drones in their operations.</li> </ul>

<b>COMMUNITY ENGAGEMENT AND STAKEHOLDER SUPPORT</b>	
<b>Consent for data acquisition</b>	We had the approval of the site manager to collect aerial data.
<b>Community engagement activities</b>	We held an official meeting at the beginning and an unofficial meeting everyday to evaluate the operation.
<b>Community groups engaged with</b>	Government officials, top management of the company and local community members.
<b>Community attendance</b>	Around 50 persons attended the meeting.
<b>Community feedback</b>	None.
<b>Stakeholder support</b>	<p>We explained each step of the operation and with images collected in the field, and identified some areas with dangerous specifications for workers.</p> <p>Saving lives with drones is the best achievement we have had.</p> <p>The "Turning Data into Action" program enhanced our comprehension and that is why today, we are so proud of this achievement.</p>

DATA ACQUISITION	
Size of area	150 ha/0.5 km <sup>2</sup>
Drone	DJI Matrice 350 RTK with
Sensor	H20T thermal captor with 200X zoom capacity
Flight plan software	PIX4Dmapper for cartography of potential risk zones
Flight height	200 meters above ground
GSD (Accuracy)	N/A
Number of images acquired	3162
Number of flights	More than 20
Time invested in data acquisition	4 days
Georeferencing	No

DATA PROCESSING & ANALYSIS	
Processing software	DJI Thermal Tool analysis and PIX4Dmapper
Processing time	Not recorded
Data products	orthophoto of zone of interest and multiple images
Analysis tools	DJI Thermal tool analysis
Analysis outputs	Orthophoto and thermal imagery with temperature pics
Final outputs shared with stakeholders	Photos
Data sharing	Hard Drive of 1TB capacity