

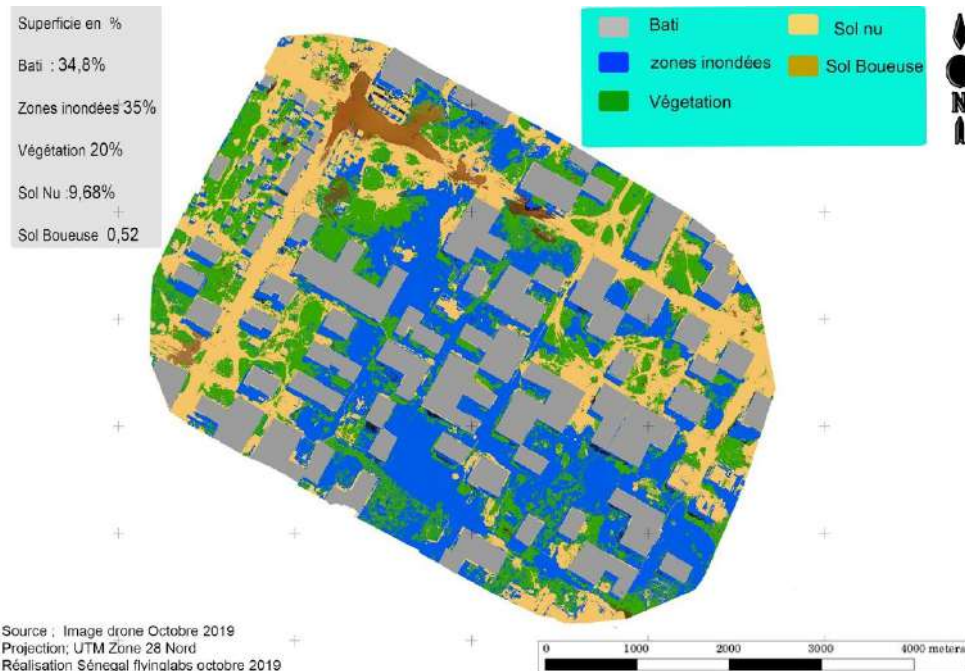
Flood mapping using drone data in Keur Massar



*Aerial view of the flooded area
(Keur Massar)*



*Senegal Flying Labs team planning
the automatic flight*



Map of land use classes

OVERVIEW	
Flying Labs	Senegal Flying Labs
Geographic area	Keur Massar, Dakar (Senegal)
Date	October - November 2019
Sector program	AidRobotics

SCOPE	
Stakeholders (clients)	Senegalese Red Cross Society
Challenge	Lack of up-to-date spatial information of Keur Massar in Dakar made it difficult for emergency response teams to plan their interventions. With difficult or no direct access to the affected areas, it was challenging to assess the extent of damages and number of houses touched by the flood.
Scope	The scope of the project included mapping the flooded areas of Keur Massar with centimeter-level precision. An ultimate goal was to find a method to assess the extent of damages in a timely manner and produce data, which could be used as a proof necessary to obtain emergency funding from the International Committee of the Red Cross.
Outcome	<p>The methodological approach is divided into four parts:</p> <ol style="list-style-type: none"> 1) Community engagement + volunteers briefing 2) Site visit 3) Flight mission planning 4) Drone data acquisition 5) Data processing and analysis <p>The data analysis provided useful directions for the Red Cross teams and facilitated the intervention in the affected areas. It allowed for a rapid damage assessment through a pixel based land cover analysis, rapid analysis of damaged infrastructure and visualisation of accessible roads. The use of supervised classification led to gaining time during prioritization of interventions.</p> <p>The community engagement included informing the inhabitants about the scope of the project, its objectives and flight area to build awareness and ensure safety. It was crucial to also brief the volunteers on the further use of the aerial data.</p>
Next steps	Building the capacity of the Senegalese Red Cross Society to allow them to integrate drone (aerial) data into their workflow and superpose it with ground data collected by volunteers to add a higher level of detail and a better visual context.

DATA ACQUISITION	
Size of area	3 ha (0.03 km ²)
Drone	DJI Phantom 4
Sensor(s)	RGB camera
Flight plan software	Pix4D Capture
Flight height	60 m above ground level
GSD (Accuracy)	2.63 cm/pix
Number of images acquired	112

Number of flights	1
Time invested in data acquisition	1 day
Georeferencing	Onboard GPS

DATA PROCESSING & ANALYSIS

Processing software	Pix4Dmapper
Processing time	1 day
Data products	Orthomosaic, DSM
Analysis tools	ArcGIS Pro, Picterra
Analysis outputs	KML orthomosaic, map of land use classes
Final outputs shared with stakeholders	KML orthomosaic, map of land use classes, presentation, raw images
Data sharing	Soft copies, Google Drive