Erosion mitigation using drone data

Orthomosaic output

Stakeholders on the site to perform sample drone flight

OVERVIEW	
Flying Labs	Nigeria Southwest Flying Labs
Geographic area	Benin City, Edo State, Nigeria
Date	December 2020
Sector program	AidRobotics
Main SDGs	Goal 8: Decent Work and Economic Growth Goal 11: Sustainable cities and Communities Goal 13: Climate Change

SCOPE	
Project stakeholders	World Bank, Nigeria Federal Ministry of Environment, Edo college
Who benefits	Edo state
Challenges	This project was conducted as part of the Nigeria Erosion and Watershed Management Project (NEWMAP). The NEWMAP aims to address watershed sustainability through a series of initiatives. One initiative is to identify landslide prone urban areas and implement remediation. The challenge is to be able to identify areas adversely affected by erosion, assess the extent of the damages or potential risks, and finally treat the problem.

Scope	The scope of the project included mapping the eroded areas of Edo College with high precision. The goal was to generate outputs that would facilitate further spatial processing such as hydrological analysis and watershed delineation. This included: i. Acquisition of very high-resolution aerial imagery of the area of interest. ii. Generations of mosaic imagery that would facilitate further spatial processing. iii. Sharing orthomosaic, 3D and 2D output with the client.
Outcome	A drone demonstration was followed by image acquisition over the area of 50 hectares. Pix4Dmapper was used to process the data and produce the required outputs and data formats as in orthomosaic imagery while development of 3D format of the topography was carried out in ArcScene. An Orthomosaic Imagery of the area of interest, data acquired by the drone and a detailed report was delivered to the client.
Impact	Improving sustainability and resilience of the community. Edo college is fundamental for the education of Benin City students and therefore to the economic wellbeing of the city. Reducing the impact of landslides improves long term economic outcome, reduces poverty and improves resilience.
Next steps	Getting to replicate the result in a bigger area of interest

COMMUNITY ENGAGEMENT AND STAKEHOLDER SUPPORT	
Consent for data acquisition	Held a meeting with Nigeria Erosion and Watershed Management Project (NEWMAP) staffs and Edo college staff
Activities to engage with the community	Project inauguration meeting and brief area reconnaissance for accurate result
Community groups engaged with	Edo College staff
Community attendance	7
Community feedback	“It’s a great idea that will give a pictorial representation of the area and which gives room for questioning and analysis in order for prompt actions to be taken”
Stakeholder support	-

DATA ACQUISITION	
Size of area	50 ha
Drone	DJI Phantom 4 Pro
Sensor(s)	1-inch 20MP
Flight plan software	Control DJI
Flight height	80 meters above the ground
GSD (Accuracy)	2.24 cm/pix
Number of images acquired	2015
Number of flights	6
Time invested in data acquisition	2 days
Georeferencing	Onboard GPS

DATA PROCESSING & ANALYSIS	
Processing software	Pix4Dmapper, SiteScan
Processing time	7 days
Data products	Orthomosaic, point cloud, 3D textured mesh
Analysis tools	-
Analysis outputs	-
Final outputs shared with stakeholders	Orthomosaic, point cloud, 3D textured mesh https://cloud.pix4d.com/dataset/805037/model?shareToken=cec104a0-b0c0-4b48-ad55-40c782d67a01 

	  
Data sharing	Google drive, AWS3