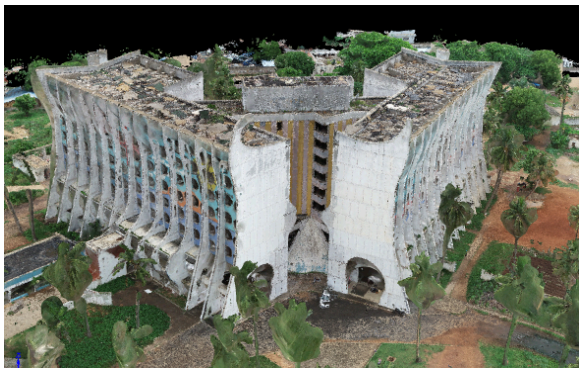
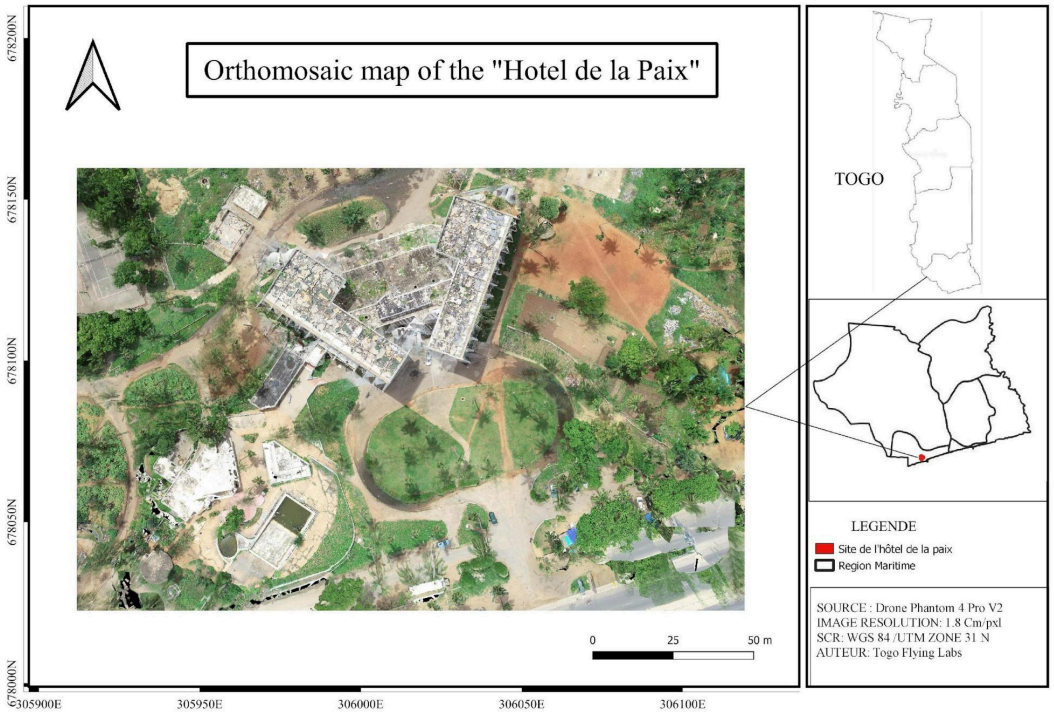
Using Drones to Safeguard Heritage: 3D modeling of the "Hotel de la Paix"



3D model of the hotel's front

3D model of behind the hotel



OVERVIEW	
Flying Labs	Togo Flying Labs
Geographic area	OCAM street, Lomé-TOGO
Date range	May -June 2023
Sector program	DevRobotics
Main SDGs	GOAL 9: Industry, Innovation and Infrastructure GOAL 11: Sustainable Cities and Communities

SCOPE	
Project stakeholders	Mitsio Motu Company
People impacted	Local community.
Number of people impacted	300
Problem	The Hotel de la Paix, a famous hotel complex in Lomé, will soon be demolished after decades of neglect. This emblematic establishment, built in the 1970s, was once a symbol of luxury tourism in Togo. It is currently the property of the Togolese State, which wishes to preserve this historical and cultural site using digital tools.
Project objectives	• This initiative also aims to raise public awareness of the importance of preserving cultural and architectural heritage. • The three objectives were to create a 3D model of the hotel site, make an exhibition and presentation for the peace festival, and save digital heritage files.
Scope	• Using drones, digital data was collected to create a detailed 3D model of the building. This process captured every architectural aspect of the Hotel de la Paix, to preserve its appearance and history for future generations. In addition, this modeling can serve as a basis for a possible reconstruction. • This 3D model will be of immediate use during the Peace Festival, where it will be exhibited. Visitors will be able to virtually experience the hotel as it was in its heyday, immersing itself in its luxurious ambience and re-living its history. • As part of our project, we captured high-resolution images of the Hotel de la Paix site with the assistance of Mitsio Motu. Subsequently, we processed this data using the PIX4Dmapper software to generate the 3D model and orthomosaic of the site. • Finally, the data was shared among relevant entities for the preservation of the architectural heritage in the event that the demolition takes place.
Outcome	The direct result was the high resolution orthophoto and video of the 3D models.
Impact	This project has played an important role in sensitizing government agencies and raising local awareness regarding the preparation of a digital dataset to support the reconstruction and safeguarding of heritages. Also, it illustrated that drones can be used for all kinds of future conservation and tourism promotion activities.
Challenges	We overcame all these challenges thanks to the authorisation of the Ministry of Defence, which put in place a team of law

	enforcement officers to ensure the smooth running of the mission. Finally, we unlocked the DJI NFZ (DJI no fly zone) to continue our activities.
Next steps	The next steps are to; • Educate the authorities on the benefits of safeguarding the country's heritage through drone mapping and thought of creating a database for the 3D map. • Make an exhibition of the 3D model during the peace festival.

COMMUNITY ENGAGEMENT AND STAKEHOLDER SUPPORT	
Consent for data acquisition	Firstly, the idea was put forward by Mitsio Motu to Togo Flying Labs (TFL) on the basis of a future collaboration, then TFL supported Mitsio Motu for the authorisations, planning, data collection, and processing.
Community engagement activities	Interaction with the local community through the law enforcement officer.
Community groups engaged with	Government Representative and Mitsio Motu Organization.
Community attendance	As it is a neglected site there were about fifteen people who played football nearby who were curious to see the drone activities.
Community feedback	The question for most people was the purpose of the activity and whether the site will be renovated.
Stakeholder support	We supported the stakeholders in creating a 3D model of the building through cartography. This 3D model will be preserved to bring back the history and review the architectural plan of the hotel. This project will enlighten the government officials present during the exhibition to make decisions for the preservation of the state's heritage.

DATA ACQUISITION	
Size of area	2,45 ha (0,0245km^2)
Drone	DJI Phantom 4 Pro V2
Sensor(s)	RGB
Flight plan software	PIX4Dcapture
Flight height	40m
GSD (Accuracy)	2,16 cm/pix
Number of images acquired	373
Number of flights	2 flights

Time invested in data acquisition	1 day
Georeferencing	GPS onboard the Phantom 4 Pro V2, No GCP installed.

DATA PROCESSING & ANALYSIS	
Processing software	PIX4Dmapper
Processing time	07h 40min
Data products	3D model and orthomosaic
Analysis tools	n/a
Analysis outputs	n/a
Final outputs shared with stakeholders	Raw data, 3D model of hotel shared with Mitsio Motu company
Data sharing	Google Drive, and hard drive