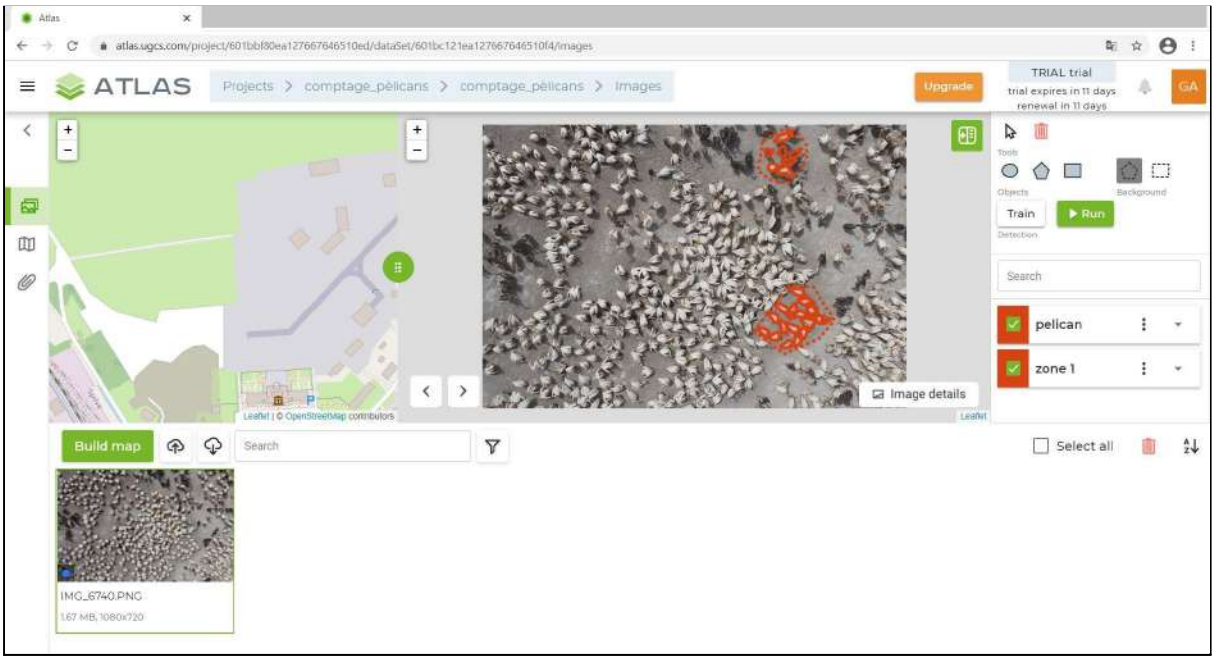
International waterfowl counting day in Djoudj Bird Park

Nesting box for the pelicans

The pelicans



Screenshot of ATLAS - data processing

OVERVIEW	
Flying Labs	Senegal Flying Labs
Geographic area	Djoudj Bird Park, Saint-Louis, Senegal
Date range	6 - 16 January 2021
Sector program	EcoRobotics
Main SDGs	GOAL 13: Climate Action GOAL 15: Life on Land

SCOPE	
Project stakeholders	Ministry of the Environment and Sustainable Development
People impacted	National Parks Branch (DPN) and Directorate of Marine Protected Areas (DAMP) in Senegal
Number of people impacted	N/A
Challenge	Low reliability of bird population estimates and inaccessibility of some sites of interest in Djoudj Bird Park.
Scope	The general objective of the project was to participate in the International Water Bird Count Day (January 15th, 2021) and prove the potential of emerging technologies - namely drones and Artificial Intelligence - in bird counting. The team mapped several bird sites in the Djoudj Park to enable and validate accurate bird counting. The next step was to identify areas of difficult access and map them as well. Finally, the team tested different platforms to find out which one would be ideal for the mapping, monitoring and evaluation work in the park. Methodological approach to solve the challenge: ● reconnaissance mission, ● planning and data acquisition, ● data processing and analysis.
Outcome	A training seminar with the DPN and DAMP departments of the Ministry in March 2020 and a co-creation workshop in November 2020 demonstrated and validated the importance of using drones and AI in bird counting. The mapping activities performed within this project provided a proof-of-concept for this solution, proving the potential of drones and AI in this application and confirmed the assumption. Resources produced: photos and videos of bird sites.
Impact	Reliable count results and access to hard-to-reach areas will facilitate decision making regarding bird protection and monitoring. For example, these results can help conservationists to redefine hunting areas and target species.
Next steps	Workshop on the return of results.

COMMUNITY ENGAGEMENT AND STAKEHOLDER SUPPORT	
Consent for data acquisition	The consent was part of the partnership between Senegal Flying Labs and the Ministry of Environment and Sustainable Development
Activities to engage with the community	Preparatory meeting for the International Waterbird Count on 6th January, 2021
Community groups engaged with	Government officials, non-governmental organizations
Community attendance	3 meetings with more than 20 people per meeting
Community feedback	Djioudj National Park is a World Heritage Site and therefore the local population lives outside the park perimeter. The activity carried out on the site did not involve the local community.
Stakeholder support	Training and capacity building on the use of drones and Artificial Intelligence.

DATA ACQUISITION	
Size of area	Nichoir: 0.45 ha Grand Lac: 3000 ha Lac Lamatin: 400 ha
Drone	DJI Phantom 4 Pro, Anafi Parrot, Mavic Mini
Sensor(s)	RGB
Flight plan software	Pix4Dcapture, Free Flight 6
Flight height	Autonomous flight mission: 50 meter above the ground Bird photos and videos: 10 - 120 meter above the ground
GSD (Accuracy)	1.61 cm/pix
Number of images acquired	635
Number of flights	8
Time invested in data acquisition	4 days
Georeferencing	Onboard GPS

DATA PROCESSING & ANALYSIS	
Processing software	Pix4Dmapper
Processing time	Pix4Dmapper processing of the dataset from Le Nichoir des Pélicans: 2 days Data analysis using ATLAS: 7 days Data analysis using Picterra: 3 days
Data products	Orthomosaic
Analysis tools	ATLAS, Picterra, ArcGIS Pro
Analysis outputs	Orthomosaic, map of inaccessible sites, final count results, Picterra processing reports, map showing a division of the working area
Final outputs shared with stakeholders	Mission report and framework for the use of drones and AI in bird counting, Picterra processing reports, images and videos
Data sharing	USB key