



**YellowScan**

Designed to Innovate.

## SUCCESS STORY

# Environmental Research

ANTARCTICA 2.0

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*To our knowledge, this was the first time that a LiDAR drone survey has been conducted in Antarctica. The YellowScan Mapper has allowed us to quickly obtain a centimetric resolution of large surfaces which allowed us to accurately analyze and characterize the spaces occupied by penguins in relation to the available but unused ones.*

Lana Lenourry - Student researcher & project member of Antarctica 2.0



INTEGRATION  
DJI M300



SOLUTION  
Mapper

This penguin mapping project is part of an interdisciplinary expedition to Antarctica. This multimonth research expedition on a sailboat covered several themes: climatology, sociology of science, chemistry of microplastics, microbiology, biogeochemistry and ecology of penguins.

This last theme aims to map the breeding sites of the penguins. Lana Lenourry, a student researcher from Juste 2.0°C, wanted to survey penguin nesting sites and map their distribution in this space according to abiotic and biotic parameters. For this, Lana needed to generate a digital terrain model on which we can locate and identify nesting penguins and distinguish between penguin species when they cohabit.

## Mission challenge.

Accurate topographic data being scarce in Antarctica, Lana wanted to try to provide more data in this area, particularly in order to study the spatial distribution of penguins in their environment.

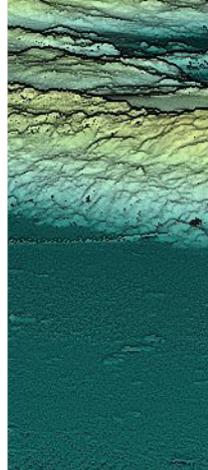
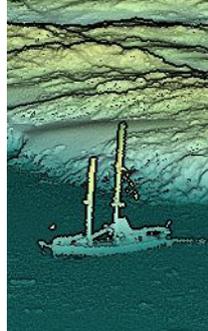
There are digital terrain models that have been generated by satellites that can give a global overview of the penguin habitat, however these models are not very accurate and there are artefacts.



Association: Juste 2.0°C

Website: en.j2d.org

Country: France



# SUCCESS STORY

## Solution

You want to learn more about LiDAR applications ?

Scan this QR CODE



### Objective.

- The first objective is to understand the relationship of penguins to the abiotic parameters of their environment. How they are distributed according to parameters such as slope, gully, proximity to the sea or glacier. Understanding how penguins occupy their space today could help anticipate the changes they will face, as with the pressures of climate change, their habitat is likely to evolve with the rise in sea level, retreat of glaciers, etc.
- A second objective is to understand how penguins are distributed according to biotic parameters. Analyzing the spatial distribution of the different penguin species could help determine nesting trends according to the species studied and thus highlight potential competition for access to breeding spaces.

### Acquisition.

The YellowScan Mapper used by Lana allowed for easy acquisition of the information needed for this research project. With the CloudStation license it was possible to check the data acquisition in the field directly after the flight. Moreover, with the YellowScan CloudStation, the processing and export to a digital terrain model (or DEM) was intuitive and fast. The orthophoto acquisition can also be used to complete the information taken on the ground (particularly for species recognition).



Colorized pointcloud of one of the study areas

### Mission parameters.

The Mapper flew over 11 nesting sites with each site requiring between 2 and 4 flights to cover the entire area (between 15 and 50 hectares).

Each site represented at least a 7-hour day in the field for flight planning, acquisition, verification of the acquisition, and determination of the species with observations made from the ground.

- Equipment used: a YellowScan Mapper including a camera module, mounted on a DJI Matrice 300.
- Flight speed: 10m/s
- Flight height: 60m altitude



YellowScan Mapper on DJI M300 in the field

### Results.

The terrain studied was often snowy or wet, but this did not prevent the team from obtaining a digital terrain model for each flight.

- Point density : 300pts/m<sup>2</sup> on average
- Accuracy : 20cm in Z (not given for X,Y)