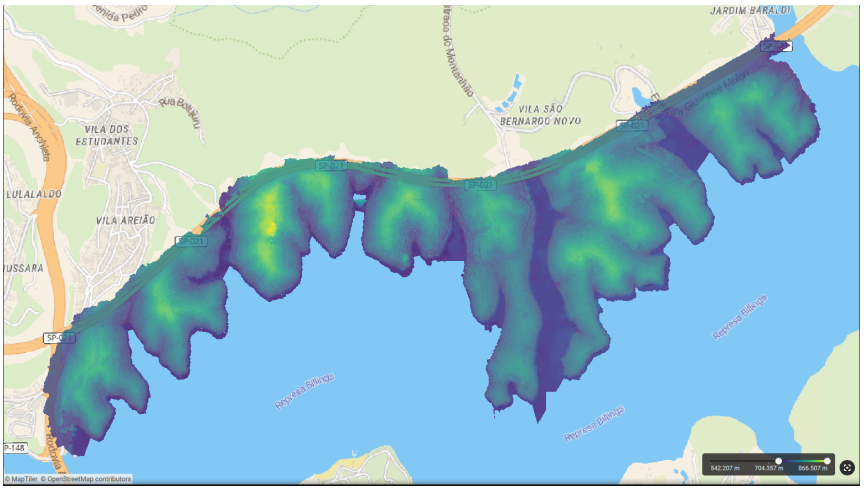
Mapping the Brazilian Atlantic Forest

Orthomosaic (left) and Digital Surface Model (right) of the forest



Point cloud of the forest

OVERVIEW	
Flying Labs	Brazil Flying Labs
Geographic area	Brazilian Atlantic Forest - "Aguas da Billings" Conservation Unit - State of São Paulo - Brazil
Date range	June - October 2024
Sector program	EcoRobotics
Main SDGs	GOAL 6: Clean Water and Sanitation GOAL 13: Climate Action

SCOPE	
Project stakeholders	Forest Foundation, a governmental organization responsible for the conservation units.
People impacted	• The community members living around the conservation unit and the unit managers.

	• The community members reached by the project activities.
Number of people impacted	40 people.
Problem statement	The Atlantic Forest in the state of São Paulo covers an area of approximately 3,457,301 hectares, which represents 13.94% of the state's territory. The Great Atlantic Forest Reserve, which crosses 50 municipalities in São Paulo, Paraná and Santa Catarina, forms the largest area of continuous forests in the biome, with around 3 million hectares. Unfortunately, deforestation of the Atlantic Forest increased by 406% in the state of São Paulo between 2019 and 2020, mainly due to regular and irregular real estate expansion and tourism. The protection of the Atlantic Forest in the state of São Paulo is important for several reasons. The Atlantic Forest is home to rich biodiversity, with many endemic species that are found nowhere else in the world. Furthermore, the Atlantic Forest plays a crucial role in regulating the climate, protecting against soil erosion and maintaining water quality.
Project objectives	1. To generate photogrammetric products such as orthomosaic, Digital Surface Model and Point Cloud. 2. To raise awareness among community members about the importance of forest preservation and the use of drone technology for this purpose.
Scope	Our scope included: • Coordinating with stakeholders to implement flights. • Carry out the flights. Processing the images and generating the products. • Analyzing the products. • Organizing community engagements activities. • Keeping the stakeholder informed about every project step. • Describing the key activities undertaken to meet the project. These activities allowed us to achieve project goals while building stronger relationships with stakeholders and community members.
Outcome	The stakeholder has begun actively seeking support during critical situations involving conservation units, as demonstrated recently by their response to the wildfires in Brazil. Additionally, there is growing interest from the stakeholder in continuing community awareness activities.
Impact	To ensure the enduring preservation and sustainable future of the Atlantic Forest by safeguarding it from deforestation, illegal hunting, and unauthorized encroachment, fostering a

	harmonious coexistence between human communities and the natural ecosystem.
Challenges	During the forest wildfires that occurred during the project's implementation, we collaborated closely with stakeholders. We addressed this challenge by assuring them that we were always available to offer support. After the wildfire crisis subsided, the stakeholders responded positively.
Next steps	We are using a pre-trained AI algorithm to analyze the images and identify both native and exotic vegetation species. We also hope to scale the project to other conservation areas.

COMMUNITY ENGAGEMENT AND STAKEHOLDER SUPPORT	
Consent for data acquisition	Regarding the RGB drones, we previously communicated that all drone images would be made publicly available. For media captured during community engagement, we sought authorization from the individuals responsible.
Community engagement activities	We organized several community engagement activities, primarily with high school students, but also with the stakeholder. For each activity, we conducted online meetings, local visits, and communicated through email and WhatsApp.
Community groups engaged with	Government officials, Community in General, Community children.
Community attendance	50 people.
Community feedback	We received positive feedback on all activities through email and WhatsApp.
Stakeholder support	The experience has been highly beneficial, both for building and strengthening relationships with stakeholders and for enhancing the Brazil FlyingLabs team. We have taken an important first step in positioning ourselves locally as agents of change, actively supporting climate action, environmental protection, and the fight against climate change.

DATA ACQUISITION	
Size of area	187 ha/ 1.87km2
Drone	DJI Mavic 3T
Sensor(s)	RGB
Flight plan software	DJI
Flight height	60m to 120m
GSD (Accuracy)	4.5 cm/pix
Number of images acquired	2800
Number of flights	8

Time invested in data acquisition	2 days
Georeferencing	DJI RTK

DATA PROCESSING & ANALYSIS	
Processing software	PIX4Dmatic v1.63.0
Processing time	34 hours
Data products	Orthomosaic DSM Point Cloud Storymap
Analysis tools	QGIS
Analysis outputs	We are using the photos to detect native and exotics vegetation species using a pre-trained AI algorithm.
Final outputs shared with stakeholders	Orthomosaic Digital Surface Model (DSM) Point Cloud Storymap
Data sharing	Google Drive Links