



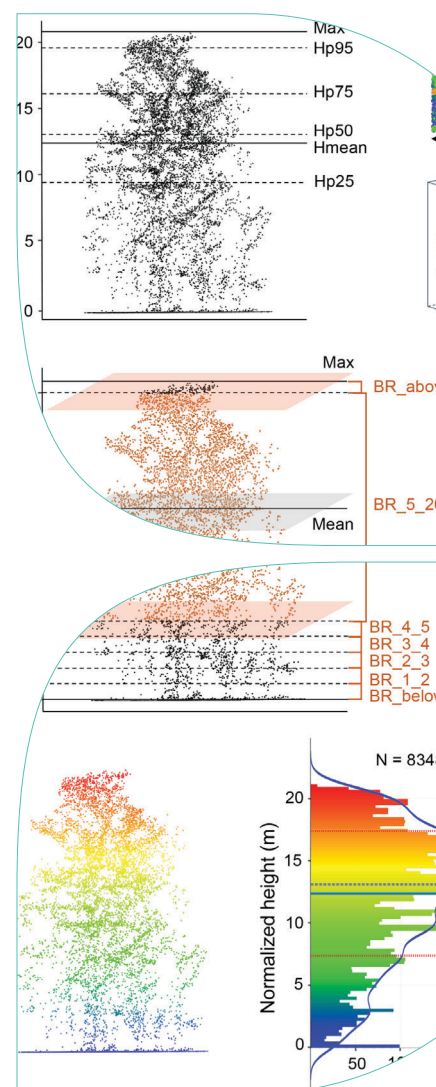
Airborne laser scanning

DESCRIPTION

The Airborne Laser Scanning tool for habitat condition monitoring, developed within MAMBO by UvA, comprises harmonised geospatial data products of vegetation structure derived from airborne LiDAR point clouds, generated at national and site scales across multiple countries and time periods. At its core is Laserfarm, a free, open-source Python workflow designed for high-throughput, scalable, and reproducible processing of multi-terabyte LiDAR surveys conducted at regional or national scales.

Laserfarm converts billions of LiDAR points into standardised map layers capturing key ecosystem attributes including vegetation height, cover and density, and structural complexity. Outputs are delivered as GeoTIFF raster layers at user-defined spatial resolutions (e.g. 10 m), making them directly usable in GIS software and ecological modelling. The workflow supports end-to-end processing, from re-tiling and normalisation of raw LiDAR data through to feature extraction, rasterisation, and optional post-processing, relying on open standards and established libraries including PDAL, GDAL, and Laserchicken.

Within MAMBO, Laserfarm has been applied to seven demonstration sites across five European countries, covering a wide range of habitat types including forests, broadleaf and conifer woodlands, dry and wet grasslands, marshes, reedbeds, arable fields, farmland, scrublands, and Mediterranean garrigue. A full multi-temporal national coverage dataset for the Netherlands has also been produced at 10 m spatial resolution. All datasets are publicly available via Zenodo, registered in the LifeWatch Metadata Catalogue and the MAMBO community on the EU Open Research Repository, with all processing code openly available on GitHub and WorkflowHub.





BENEFITS OF USING THE TECHNOLOGY

The main strength of this tool lies in combining a scalable, efficient processing workflow with the production of harmonised, analysis-ready vegetation structure metrics at both site and national scale across multiple countries and time periods. This overcomes traditional barriers related to data volume, computational requirements, and lack of standardisation, enabling repeatable and comparable habitat monitoring across regions. The resulting datasets provide an improved, consistent evidence base for biodiversity assessments, conservation planning, and environmental reporting, and directly support EU and national policy frameworks including biodiversity strategies and Natura 2000 habitat reporting. The open, extensible codebase and transparent workflows further support long-term reuse and adaptation beyond the project.



TARGET USERS

-  National and regional environmental authorities responsible for habitat monitoring and reporting
-  Biodiversity and ecosystem researchers requiring standardised, large-scale vegetation structure data
-  Conservation NGOs and practitioners involved in habitat assessment and management
-  Environmental consultancies and service providers delivering ecosystem assessments
-  Spatial planners integrating biodiversity data into land-use decision-making
-  Copernicus and other Earth observation downstream users



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