

SMART Forest

Empowering Sustainable Forest Management with AI:
The ForestSens Experience

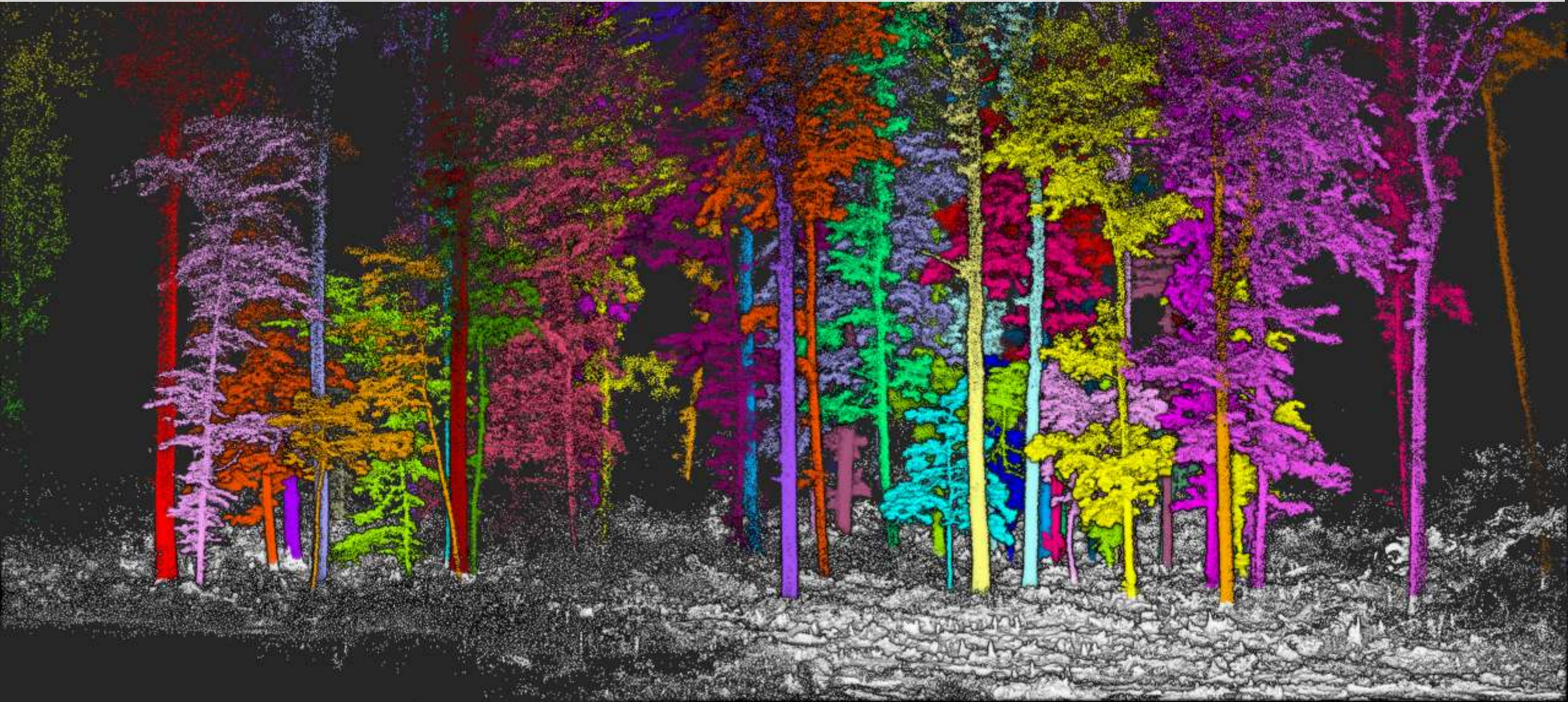
Dr. Johannes Rahlf
Geospatial World Forum 2023



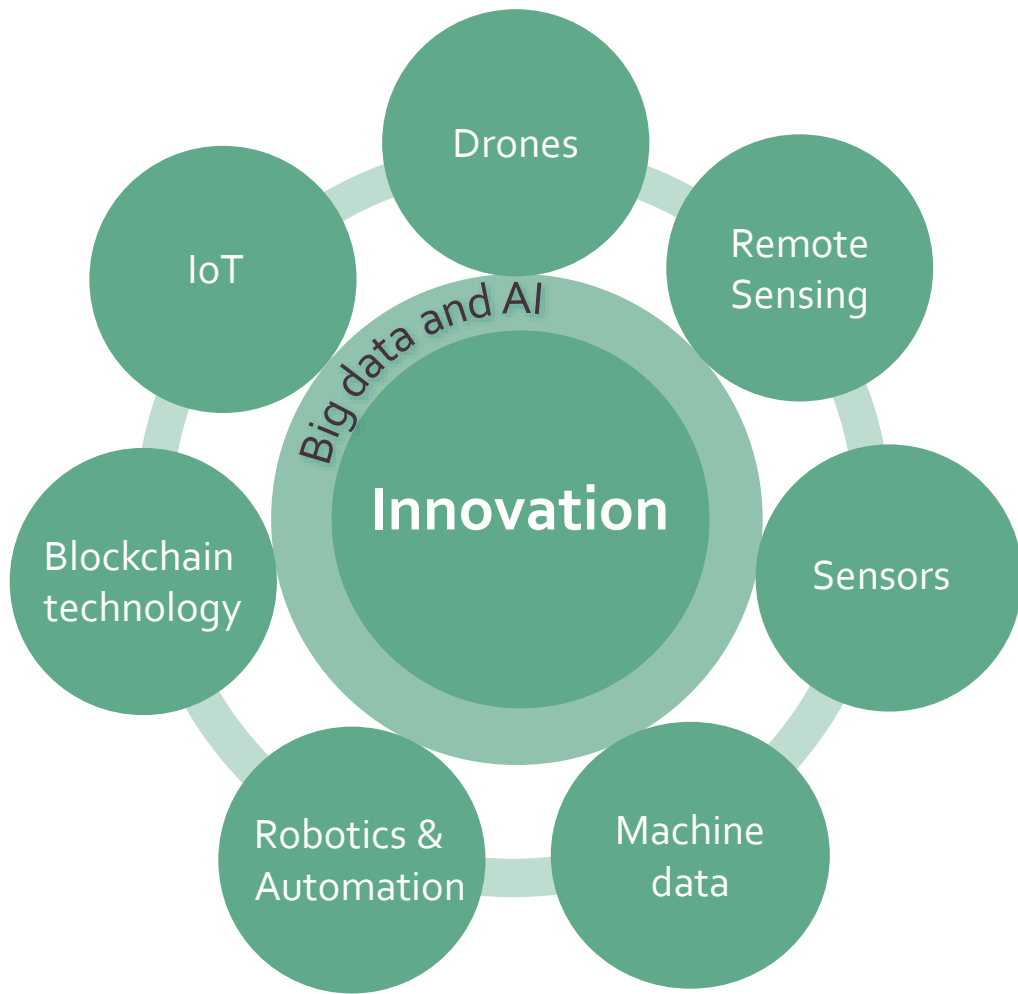
NIBIO

NORWEGIAN INSTITUTE OF
BIOECONOMY RESEARCH

The importance of forests and ecosystem services, and of forests management



Enabling technologies and innovation



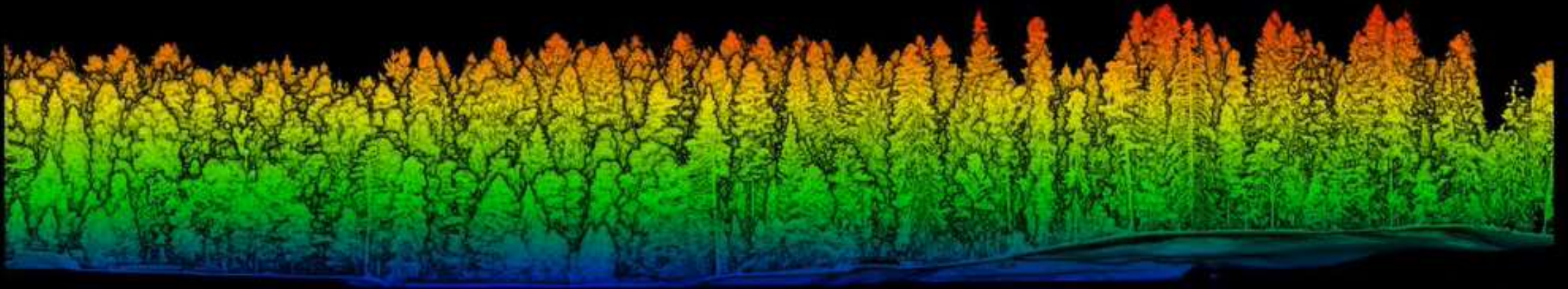
Digital transformation of the forest sector through implementation of enabling technologies



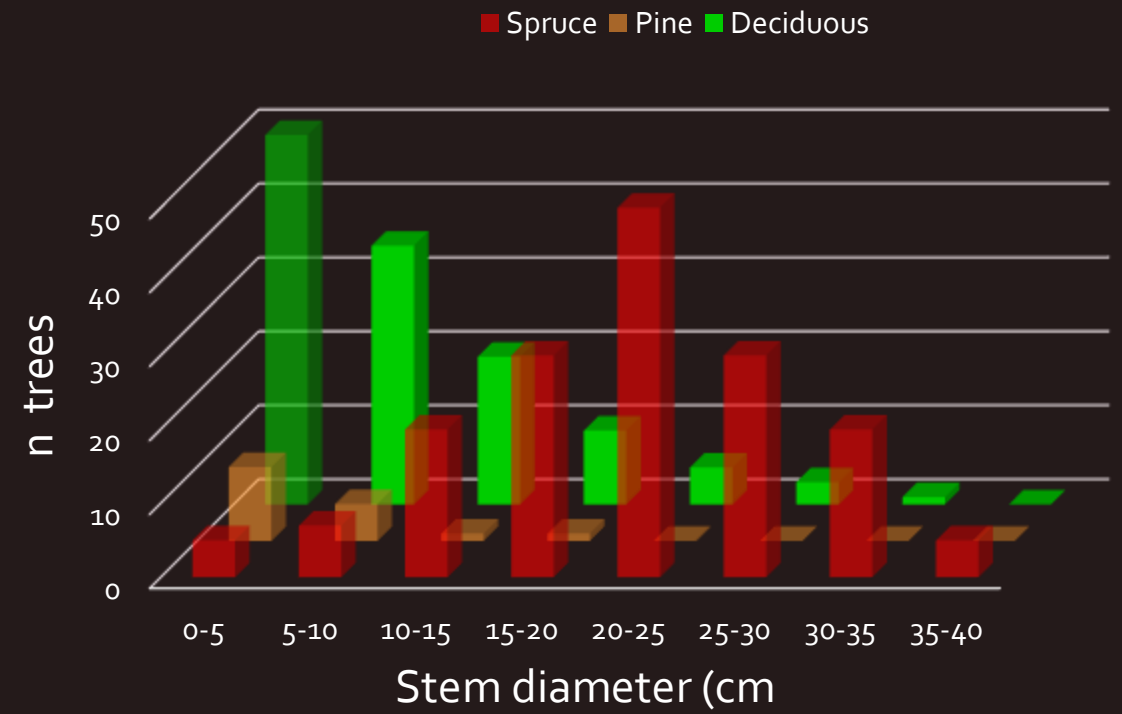
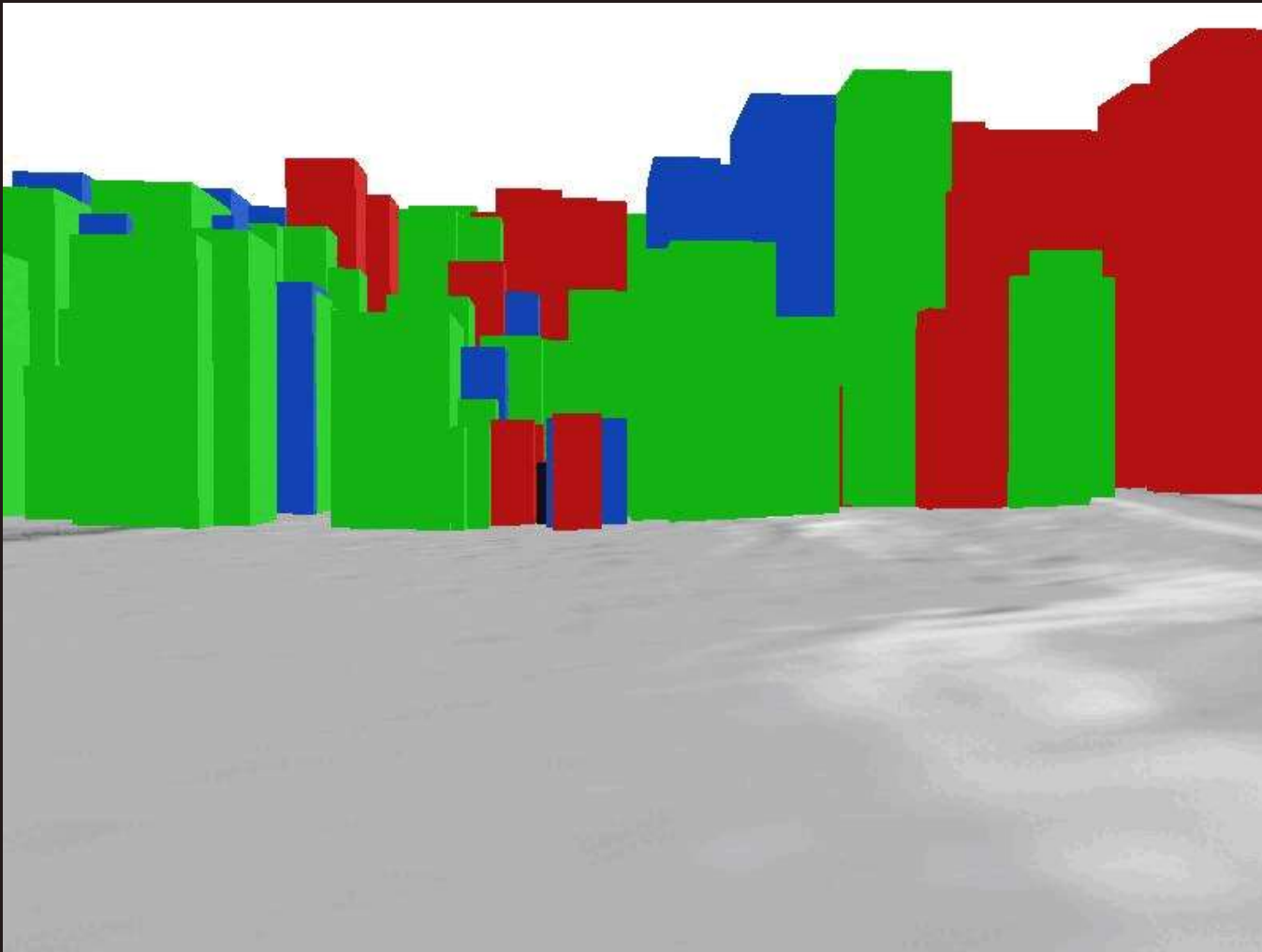
ForestSens



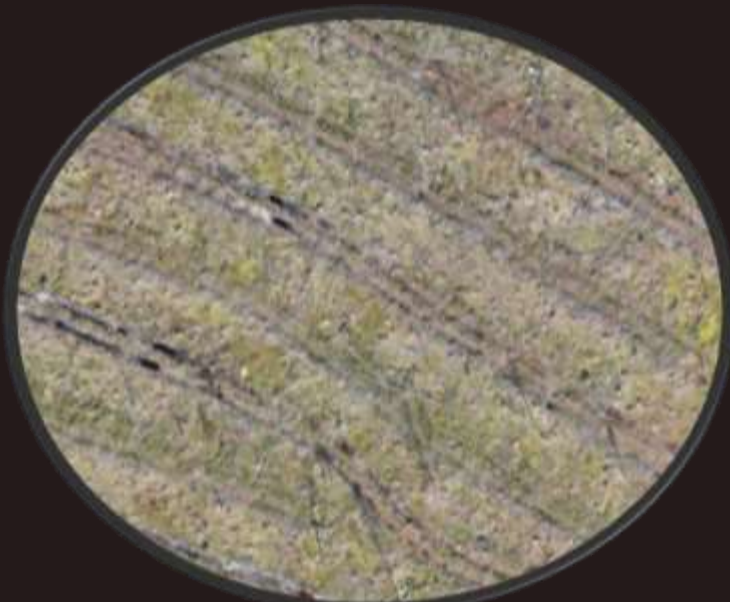
Pre-harvest assessment



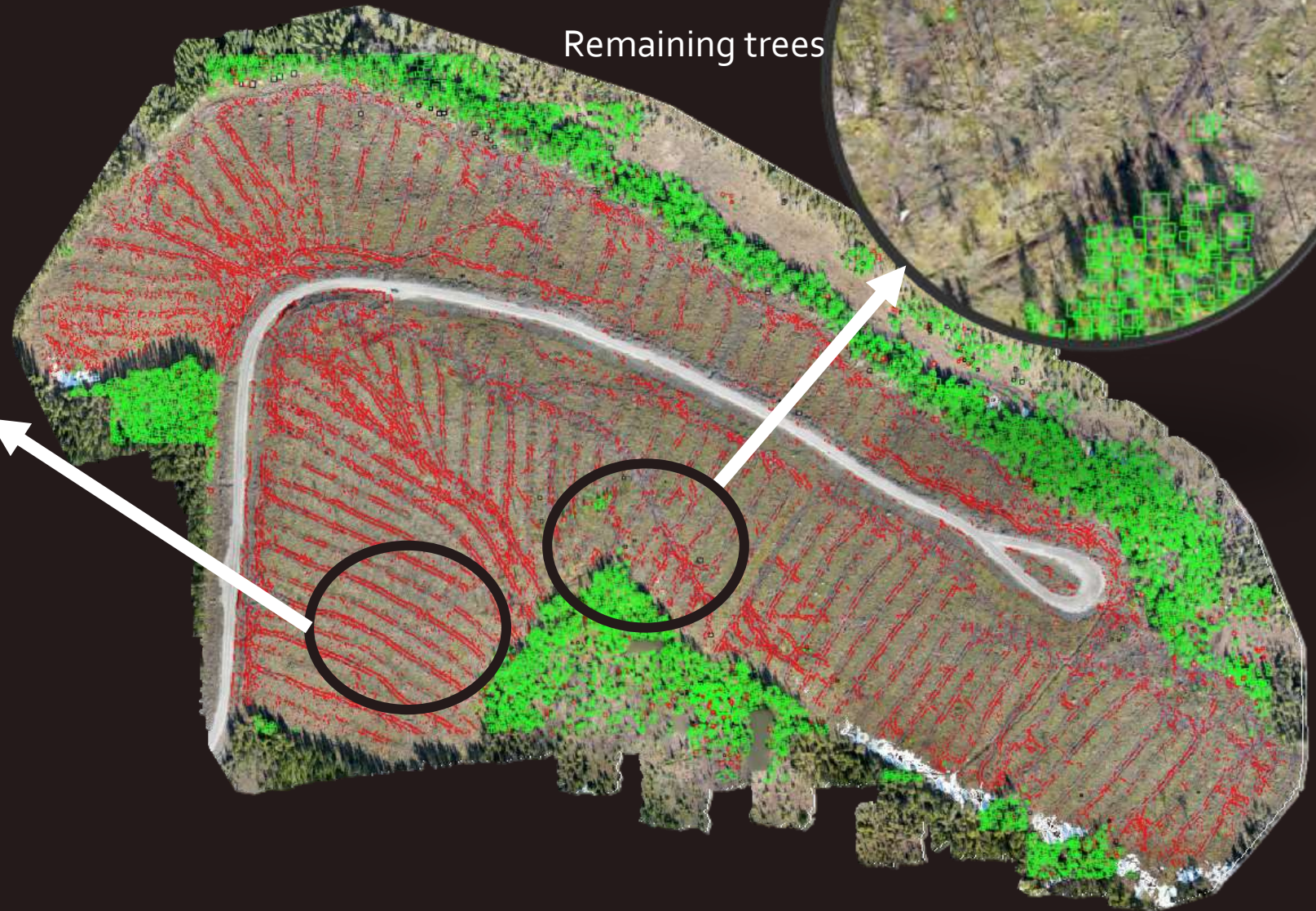
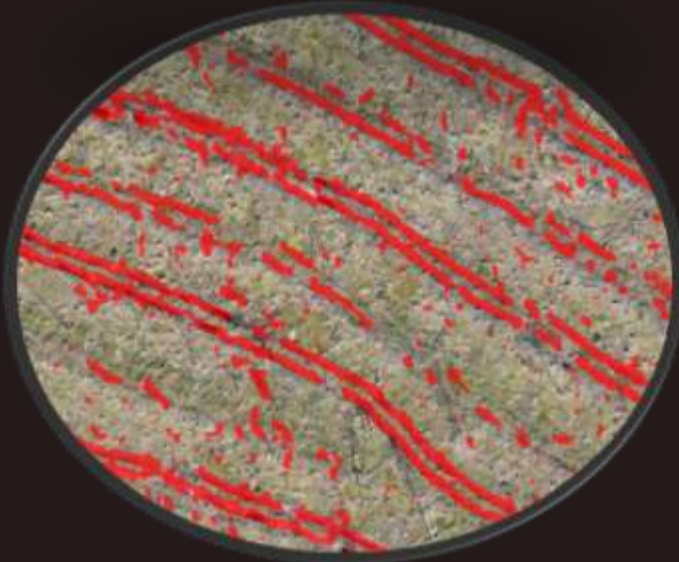
Pre-harvest assessment



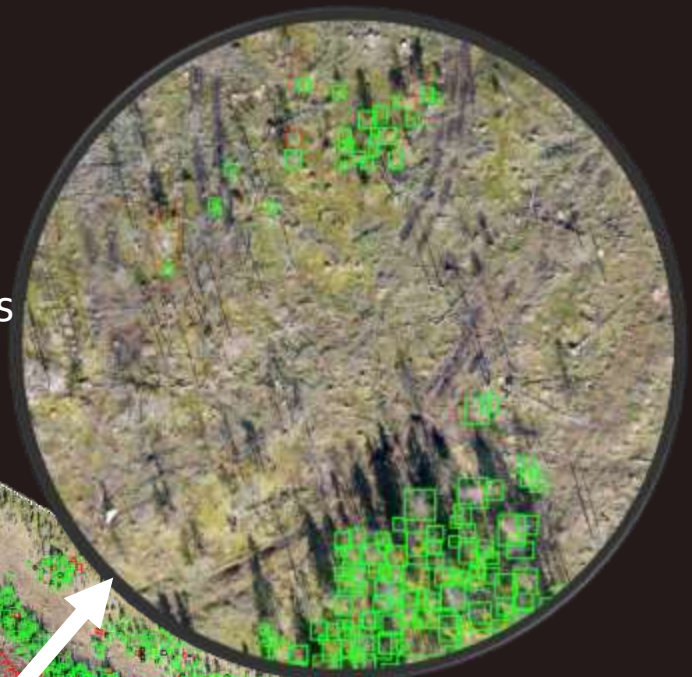
Post Harvest assessment



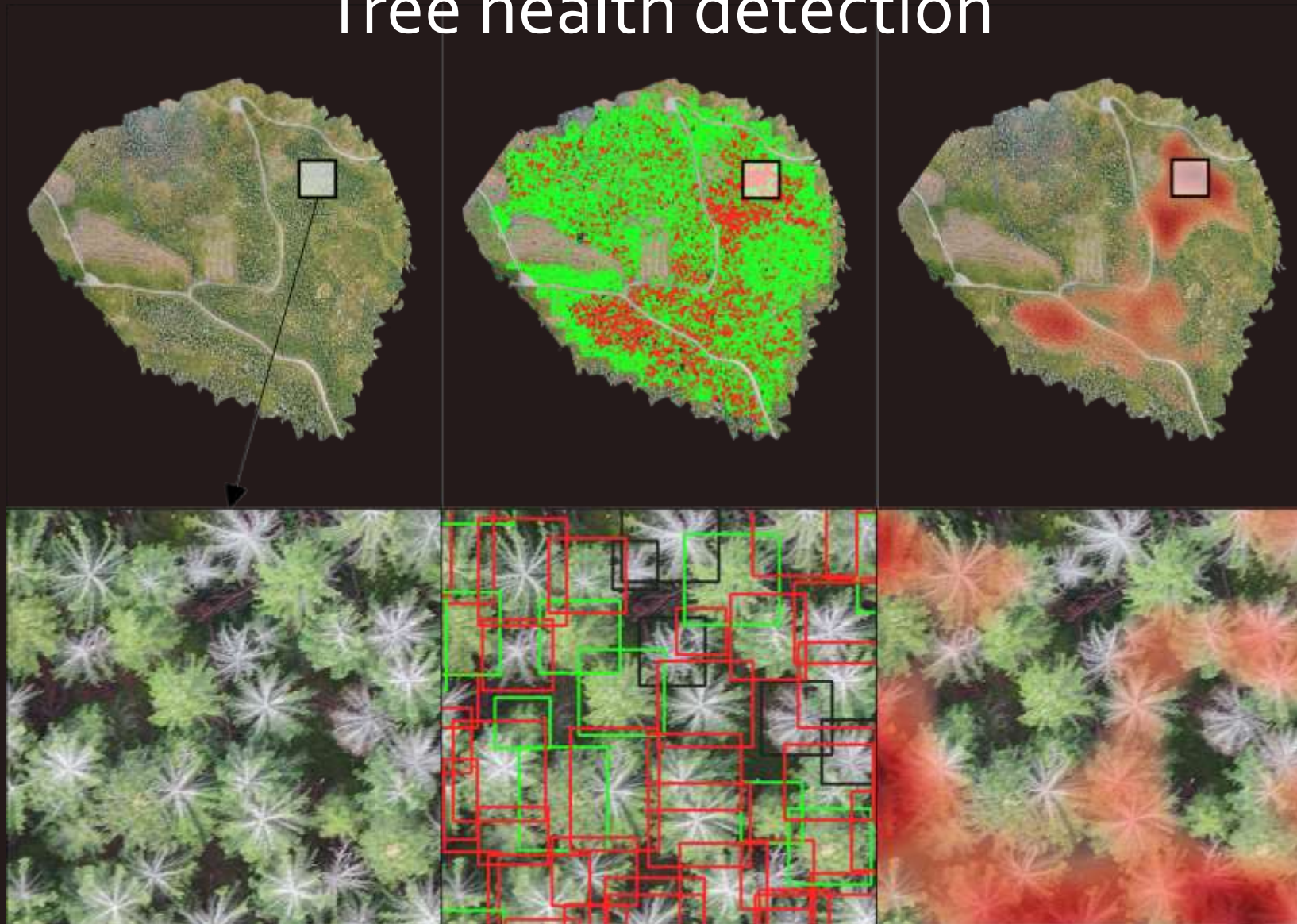
Wheel-ruts



Remaining trees



Tree health detection



Regeneration control

Harvester head tracking and positioning

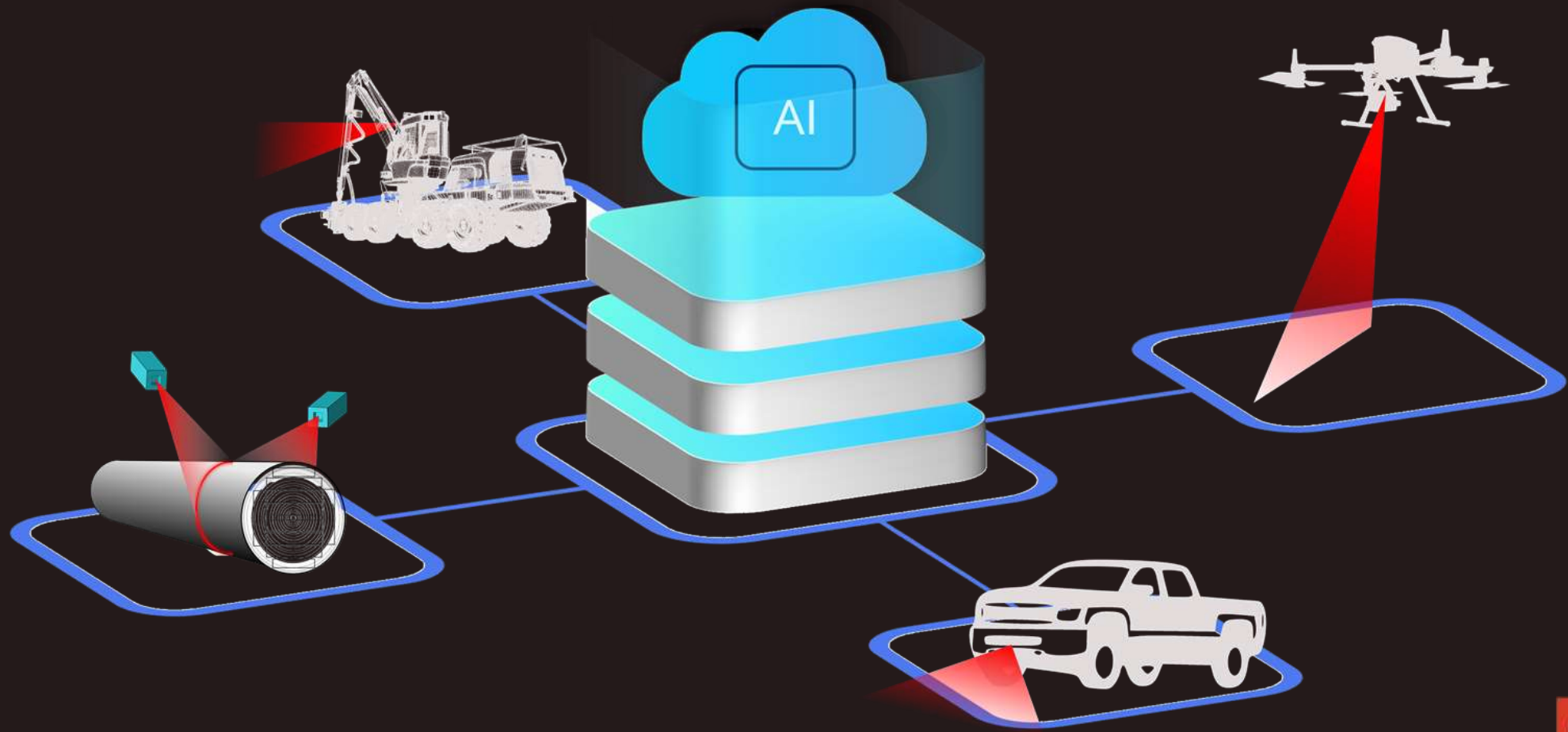


Road maintenance

Seedling positioning



ForestSens



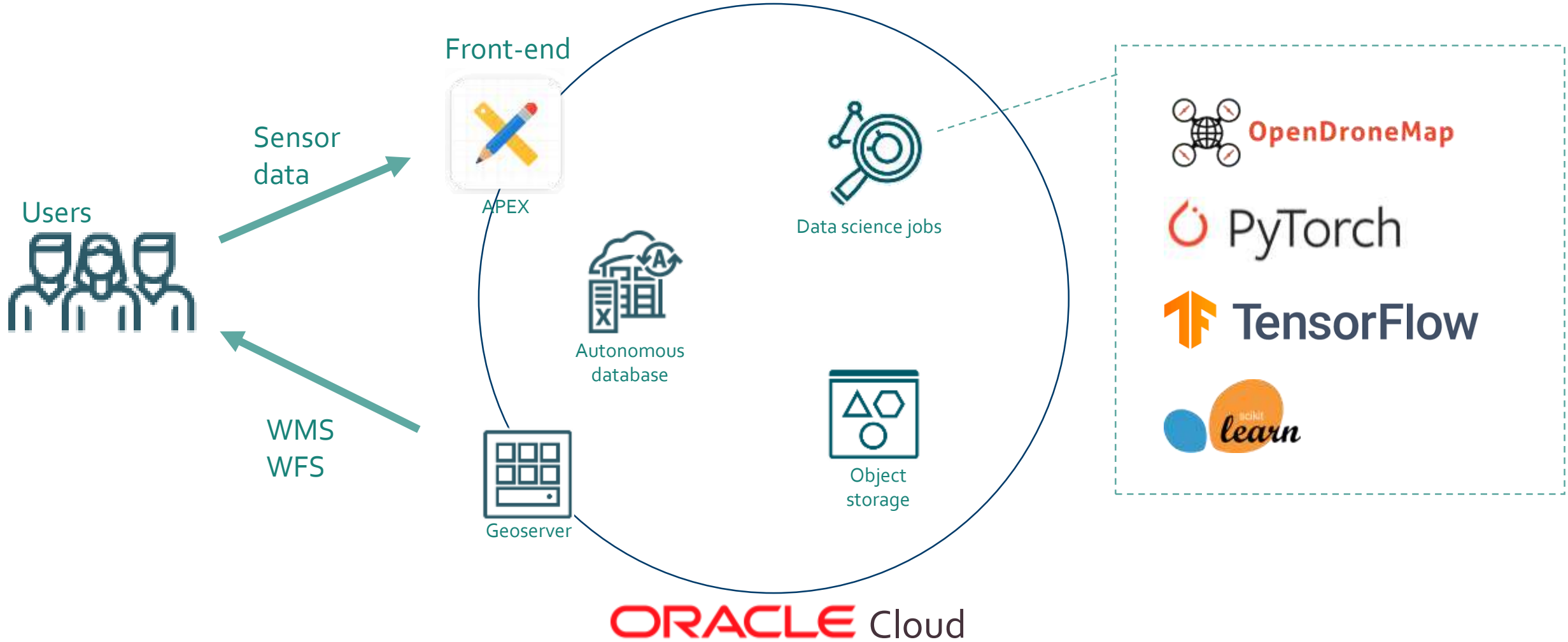
Powered by



ForestSens: core concepts

- (1) Enable the use of sensors and AI for **better information throughout the value chain**
- (2) Should **strengthen existing decision support systems** by providing better information. Should **not replace existing systems**.
- (3) **Data ownership**: the party that provides the data owns the data (results are always password protected) but can give access to other actors
- (4) Should be **easy to use**
- (5) **Modular structure** for “easy” additions of a “Sens” (new sensor, new algorithm, new output)
- (6) **Versatility** in input output

Framework components





New batch process

Algorithm

DroneSens: Forest damage

Required

Batch name

Required

Instructions

Drag-and-drop drone images (*.jpeg or *.JPG) collected with at least 70-70% (forward-lateral) overlap

Live upload

Drop files here or click to upload.

Cancel

Create

Algorithm steps

Create fast orthomosaic

Creates one orthomosaic (.tif) from input drone images

Publish ortho

Publishes the orthomosaic as a WMS layer

Prepare data YOLO

Tiling orthomosaic image into tiles for YOLO inference

YOLO damage detection

Detecting single trees and classifying them according to damage classes

Publish YOLO trees with damage class

Publishing the YOLO-detected trees with damage classes as a WFS layer

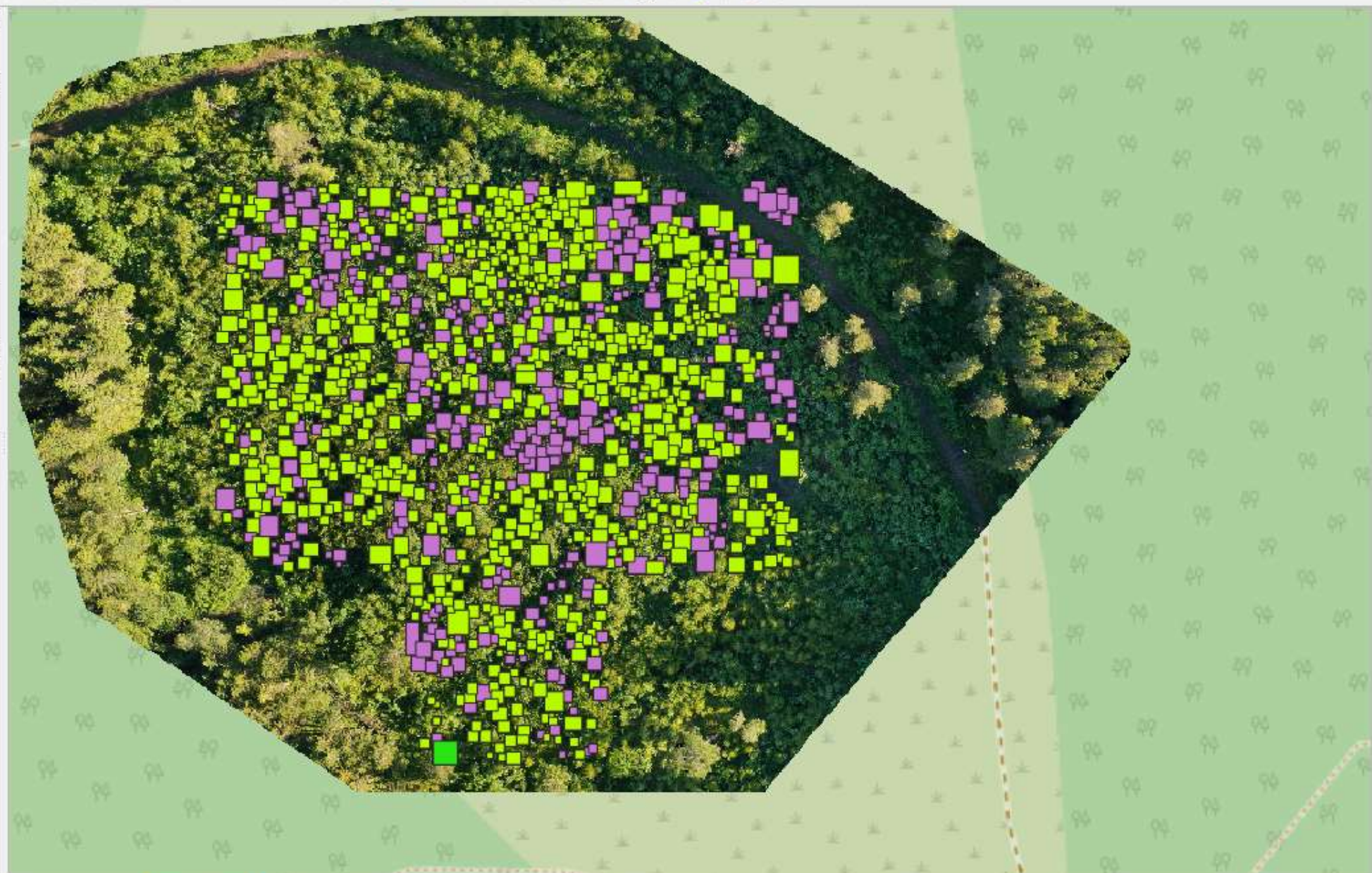


Utforsker

- ForestSens
 - GeoServer Web Map Service
 - norgebilder
 - Norgeskart
 - SR16
- Vector Tiles
- XYZ Tiles
 - OpenStreetMap
- WCS
- WFS / OGC API - Features
 - ForestSens WFS
 - acc6 sens10 algo16 2023 batch204

Lag

- acc6_sens10_algo17_2023_batch289
 - 1
 - 2
 - 3
- acc6_sens10_algo17_2023
- OpenStreetMap



An aerial photograph of a forest landscape with a digital overlay. The overlay consists of a network of glowing green lines connecting various nodes, some of which are bright green spheres. Numerous numerical data points are scattered across the scene, including 303.7, 516.2, 126.8, 435.4, and 143.0. The background shows rolling hills and mountains under a soft, hazy sky.

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