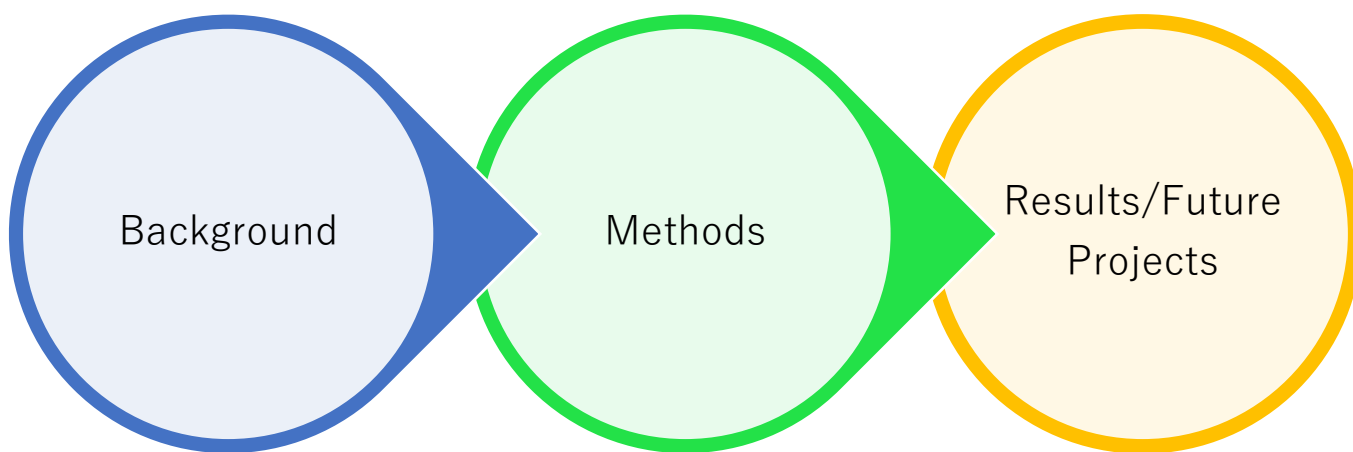


Forest Inventory/Management using LiDAR



FRSコーポレーション株式会社
Field ResearcherS corporation

Today



- Forest in Japan
- UAV
- LiDAR

- Field Survey
- LiDAR Survey
- Data Process

- Lidar/GIS Data
- Remained Steps



73%

Forest & Japan

- Securing of water source
- Control of climate change
- Natural environs
- Prevent soil erosion
- Habitat for millions of species of animals, birds, and insects



Forest Management

National level – plan for Forests and Forestry

Nation-wide Forest Plan – 15y

Forest Improv. & Conservation

Prefectural gov – Regional Forest Plan
– 10y

Regional Plan for Nati. Forest

Local Forest Improvement – 10y

Private forest activities

Forest Management – 5y



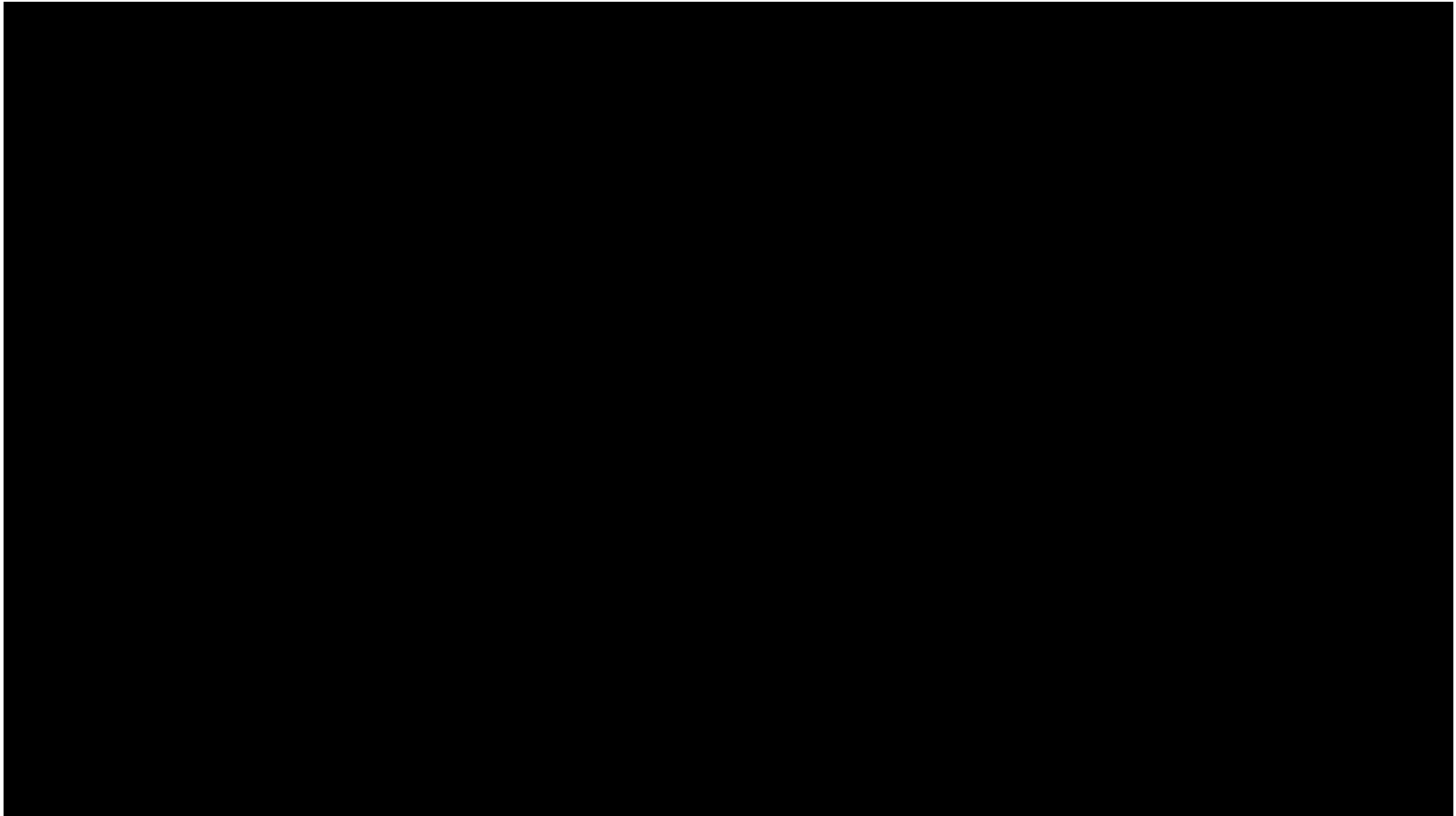
Identify current status

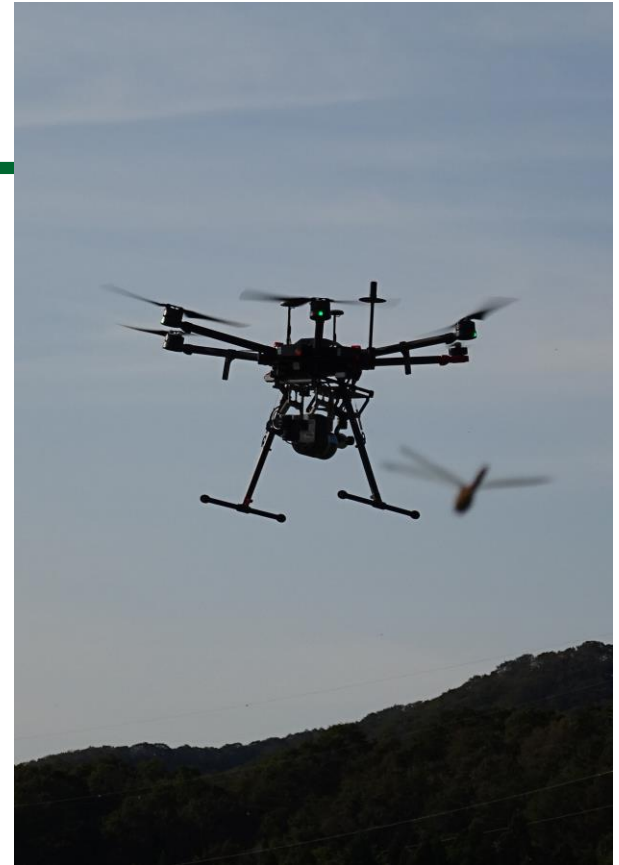


Known methods - Survey



UAV + LiDAR





UAV with LiDAR Scanners



Forest - LiDAR Survey Scope

Preparation

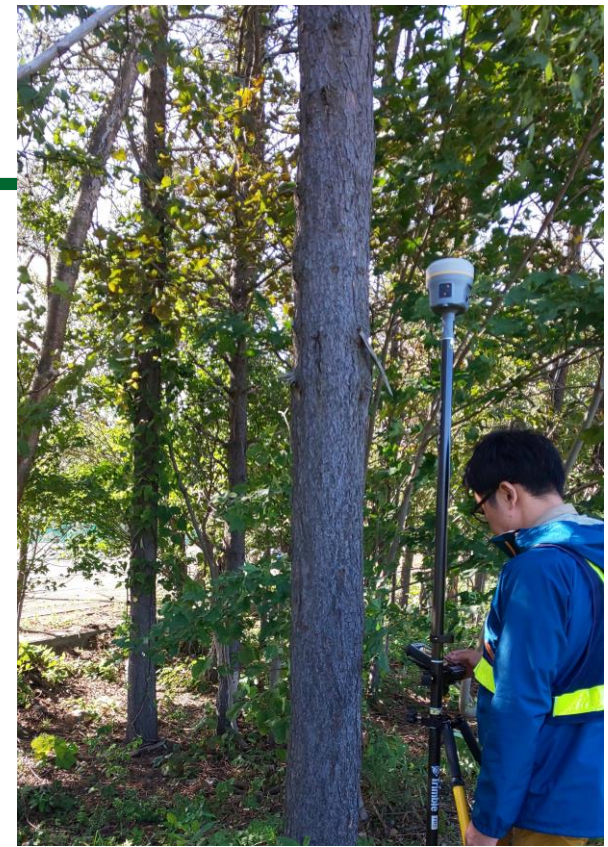
- Flight plan
- Survey conditions
 - Sat. forecast
- weather

Survey

- UAV survey
- GCP
- Field Survey

Data

- Post processing
- Filtering
- Classifying
- Extracting
- Converting



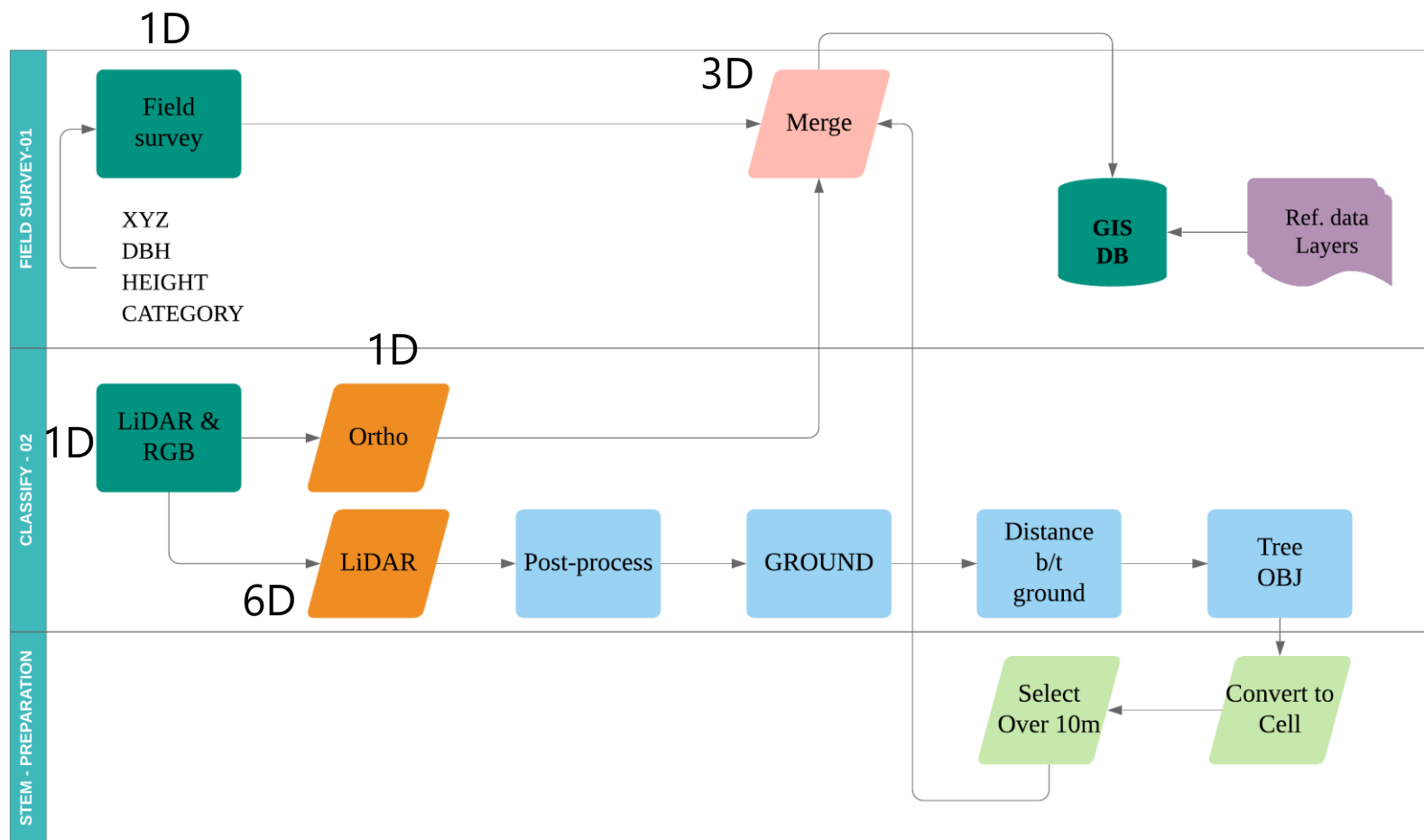
Sample Survey

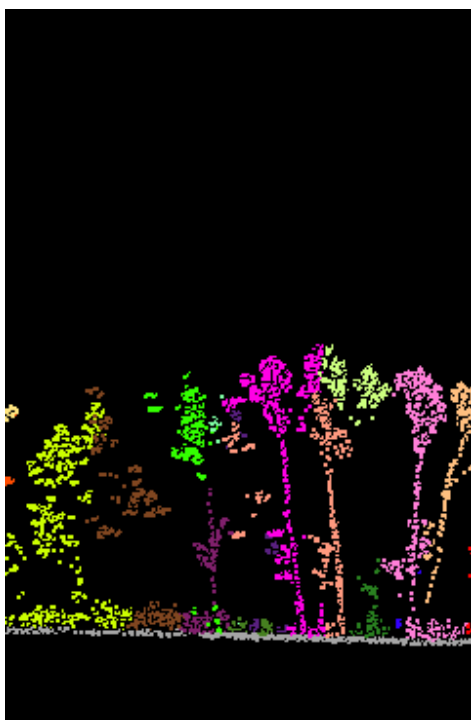
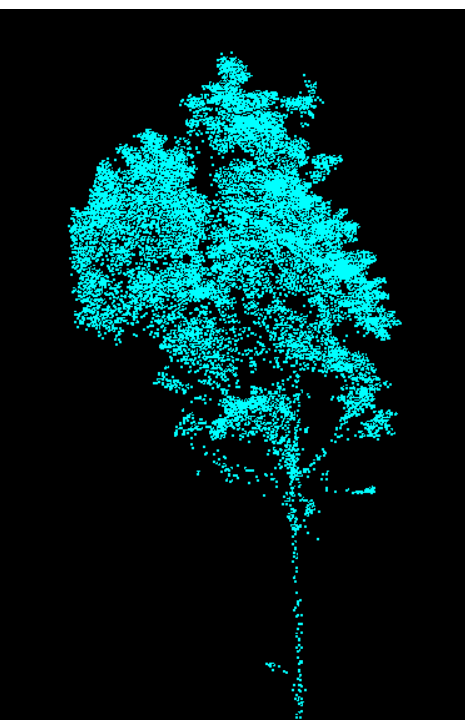
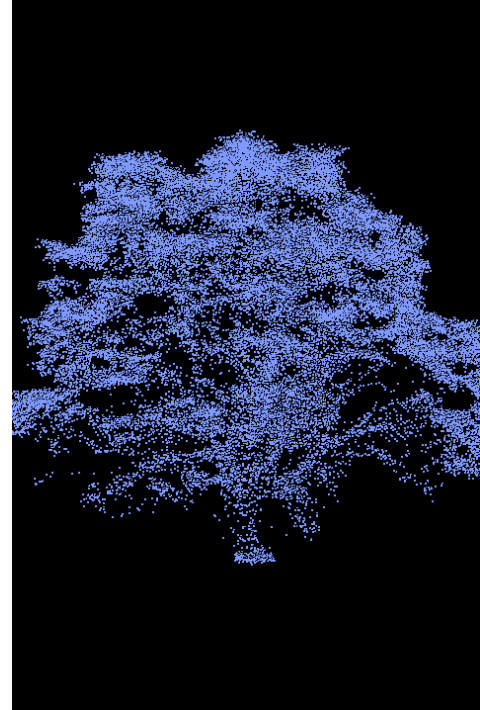
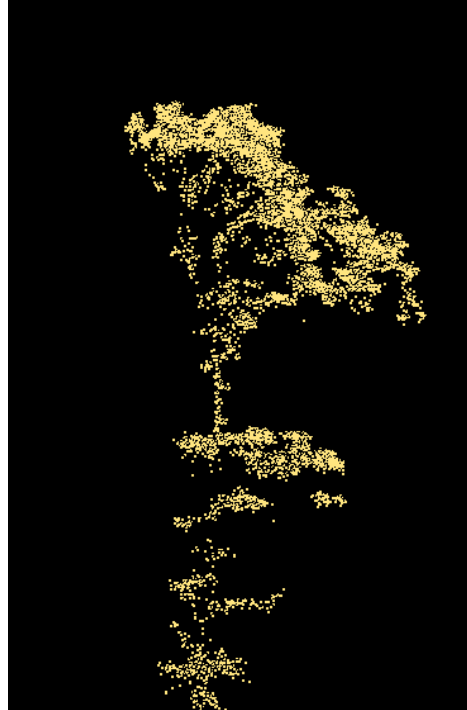
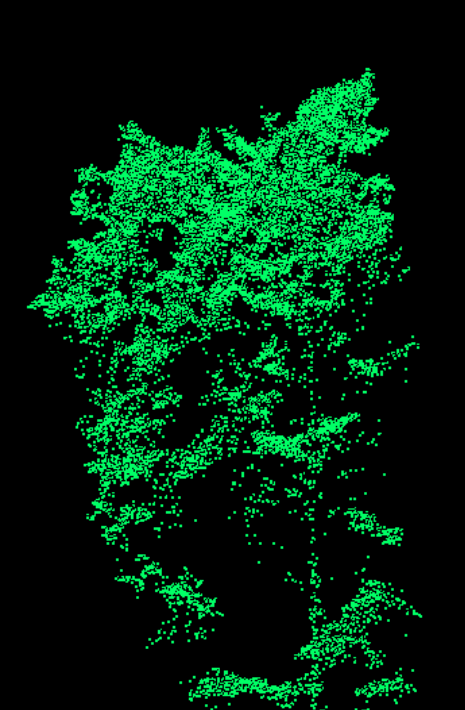


Data Flow Chart

UAV -Lidar Forest Inventory

park | December 3, 2019





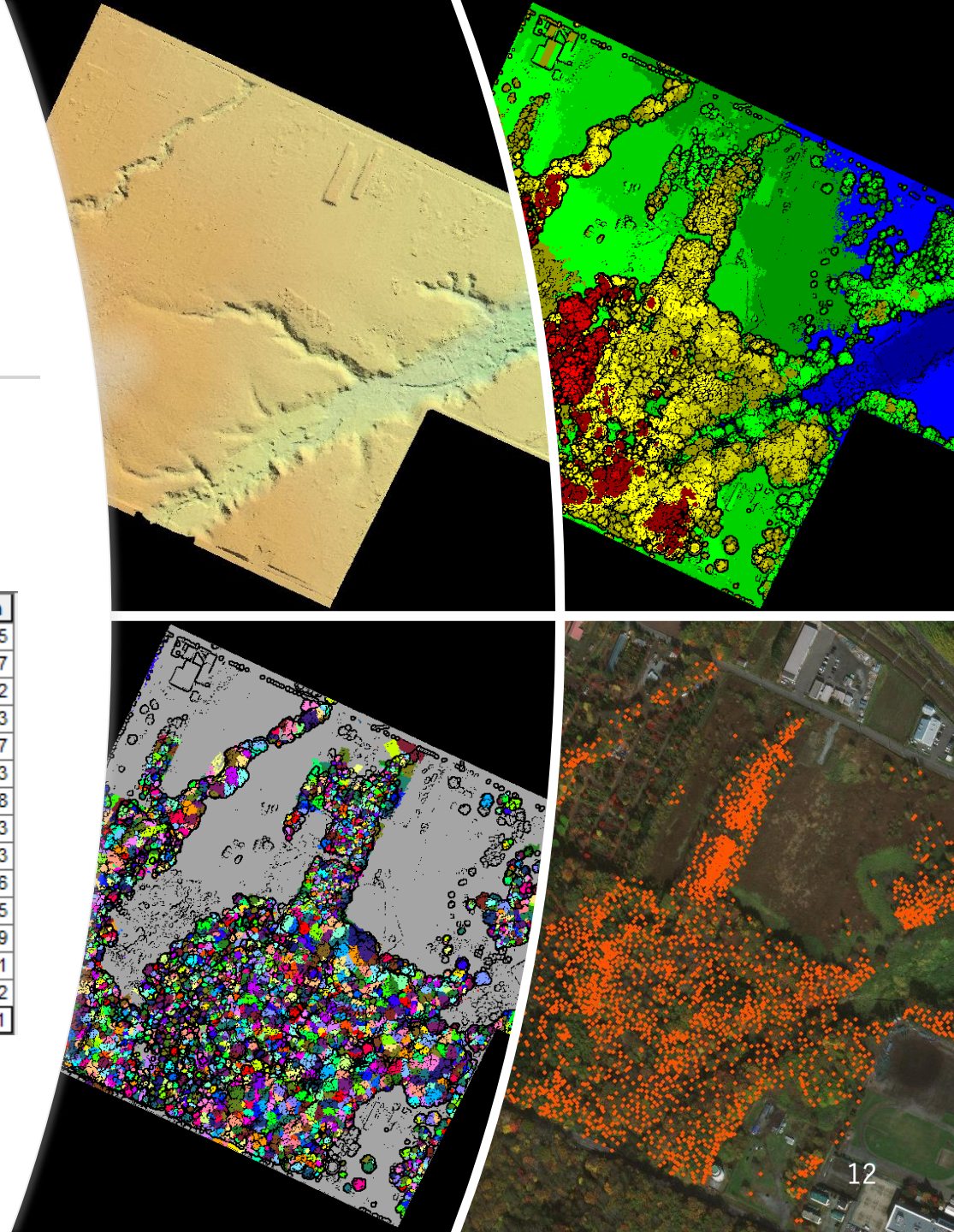
Tree group Objects

- Conifer → Less time
- Others → Requires additional efforts
- Man-made forest → Less time
- Natural forest → Requires additional efforts

Data - Procedures

- Total Num of Tree 3784
- Over 10 meters tree – 1070

category	Count_category	Average_H	Average_m
オニグルミ	16	15.0475	14.000625
カエデ類	56	14.212143	13.369107
カツラ	6	19.626667	12.82
カラマツ	52	17.786154	10.976923
カンバ類	390	15.312872	11.886487
クリ	20	14.626	17.603
ケヤマハンノキ	23	16.030435	12.003478
トドマツ	15	18.457333	11.901333
ハルニレ	3	23.523333	23.283333
ハンノキ	3	15.29	13.96
ホオノキ	16	17.36	20.91375
マツ類	36	13.241389	9.928889
ミズナラ	95	18.134737	15.768211
ヤナギ類	32	12.969375	14.240312
ヤマナラシ	17	14.99	8.11





Forest data in GIS



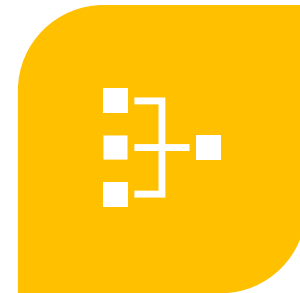
Remained steps



GIS SOLUTION WITH
ADDITIONAL DATA SETS



SIMPLER & AUTOMATED
PROCESS



CONFIRM AND MERGE TO
THE EXISTING SYSTEM



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