

REALISTIC ENVIRONMENT MAPPING AND INTEGRATION TO UNITY 3D

Baris Cem Baykara
Tallinn University of Technology

12.05.20

OVERVIEW

- Background
 - Why
 - What
 - Where
- Method
 - Flight Missions
 - Ground Mission
 - Processing
- Unity 3D
 - Generated Terrain
 - Detail Spawning

BACKGROUND **WHY?**

PURPOSES:

- Develop and test autonomous vehicles
- Efficient testing of vehicles in different terrain types
- Safety Validation

BACKGROUND

WHAT?

REALISTIC 3D MODEL OF DIVERSE ENVIRONMENT

- Collecting aerial data with RGB camera
- Photogrammetric processing of data
- Integrating with Unity 3D



BACKGROUND WHERE?

PILOT AREA: TalTech Campus

REASONING FOR CHOOSING:

- ISEAUTO Track
- Different types of buildings
- Urban details (Buildings, road signs, cars, vegetation etc.)



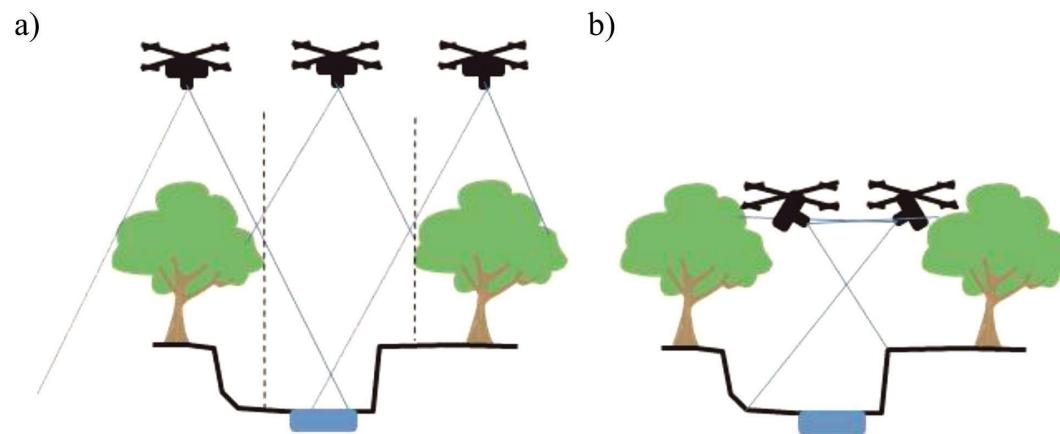
METHOD FLIGHT MISSIONS

**FLIGHT MISSIONS ARE PERFORMED ON THE
SAME FLIGHT TRACK WITH CONSTANT
ALTITUDE AND OVERLAPPING**

- Grid Mission
- Overlap
- Different camera angles



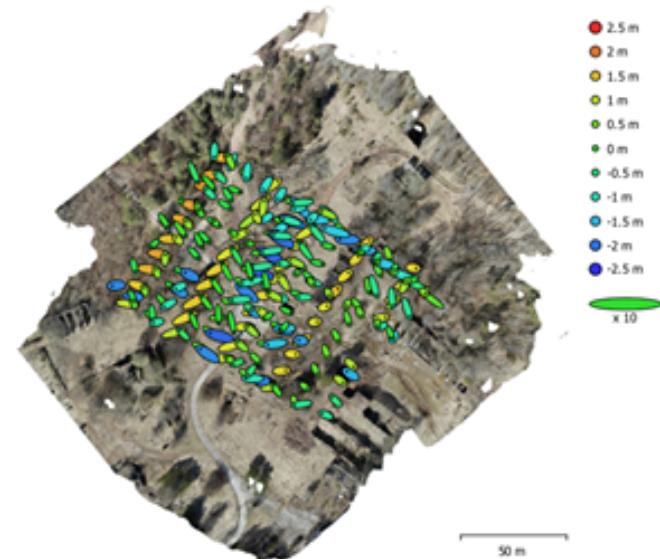
FLIGHT MISSIONS DIFFERENT ANGLES



METHOD DATA PROCESSING

PHOTOGRAMMETRIC PROCESSING CREATES DENSE POINT CLOUDS AND EVENTUALLY 3D MODEL

- Aligning of cameras
- Generating dense point cloud
- Classifying point clouds
 - For mask generation of different terrain details (Terrain type, vegetation etc.)



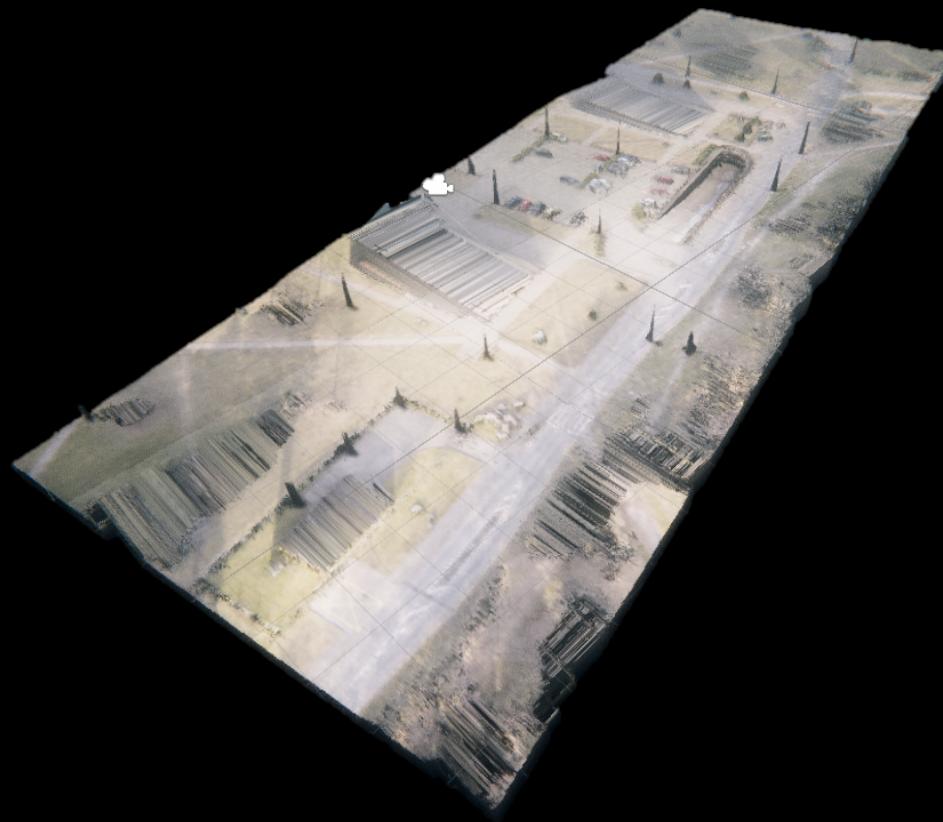
PROCESSING GENERATED DENSE POINT CLOUD



PROCESSING CLASSIFIED DENSE POINT CLOUD



UNITY 3D UNITY TERRAIN



UNITY 3D DETAIL SPAWNING





**THANK YOU
BARIS CEM BAYKARA**

Baris Cem Baykara
Tallinn University of Technology

12.05.20