





Virtual Laser Scanning (VLS) with HELIOS++

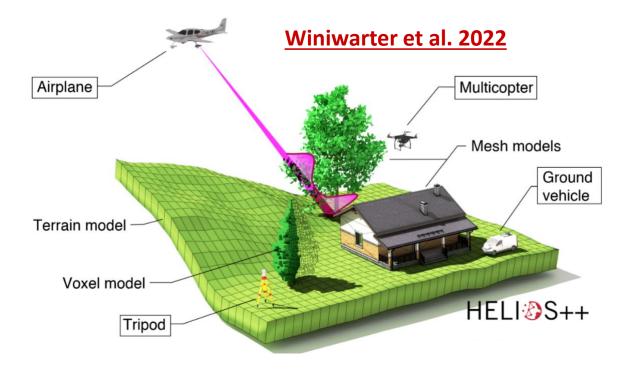
3D Geospatial Data Processing (3DGeo) Research Group
Institute of Geography
Heidelberg University

Presenter: Hannah Weiser, PI: Prof. Bernhard Höfle

Virtual Laser Scanning (VLS)

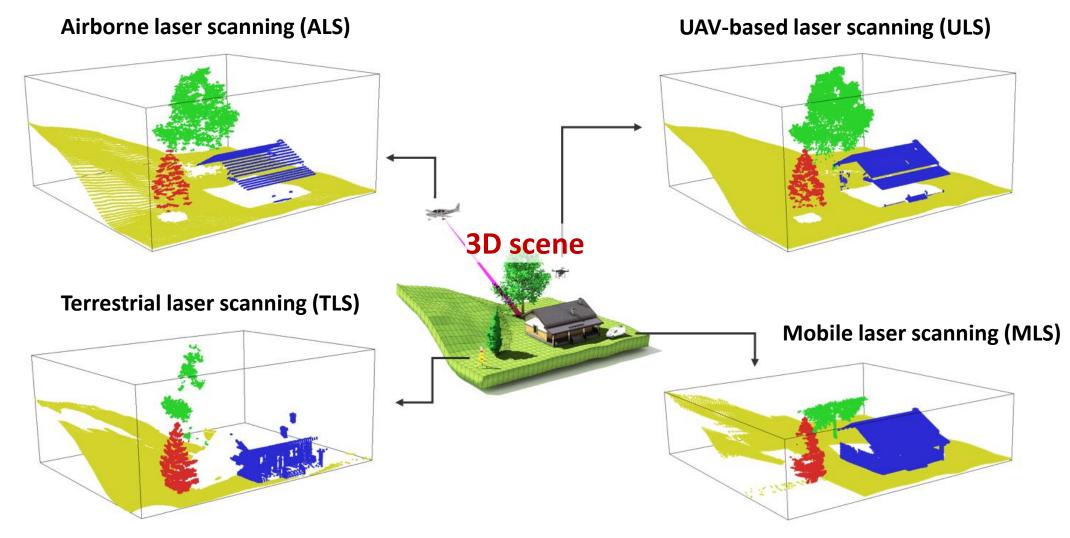
- Simulation of laser scanning in a computer environment
- VLS to complement real data acquisition, e.g.
 - Survey planning
 - Sensitivity analyses
 - Algorithm and sensor development
 - Generation of training and test data
- Annotations and known reference
- Open-source software HELIOS++:
 - Supports multiple platforms, scanners, and scene types
 - Full-waveform simulation and reflectance modelling





Virtual Laser Scanning for Synthetic Point Clouds





HELI: S++

Heidelberg LiDAR Operations Simulator



Survey parameters: scan settings, {\operations} trajectory (XML)

Platform

specifications (XML)

Scanner

specifications (XML)

3D **Scene** parts (GeoTIFF, OBJ, XYZ, VOX)

with transformations (translation, rotation, scale) and motions (XML)





Multi-channel physical-based ray tracing

for multiple sub-rays (beam divergence)

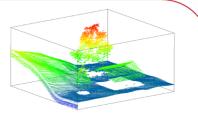
Interface

Command line / Python bindings **pyhelios**

High performance

Parallelization
Optimized KDTree

Outputs



Point clouds (ASCII / LAS)

Trajectory (ASCII)

Full waveform (ASCII)

Log (ASCII)

