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Practical registration of point clouds

Care4C Training, Freising

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Anton Kunneke, Stefan Seifert



Faculty of AgriSciences



Laser Technology



- Phase difference – Frequency modulated
 - High scan rate
 - Accuracy mm
 - Limit range
 - Range intensity
- Time of Flight – Return time of pulse
 - Long range
 - Lower scan rate
- Waveform



Scanner models

your knowledge partner

<http://www.zf-laser.com/Produkte.laserscanner.0.html>



• 190,000 p/s



• 1 000,000 p/s

<https://www.faro.com/products/construction-bim-cim/faro-focus/>



• 500 000 p/s

• 1 000,000 p/s



Targets



<http://www.riegl.com/nc/products/terrestrial-scanning/produktdetail/product/scanner/48/>



<http://www.zf-laser.com/Produkte.laserscanner.0.html>





Software used

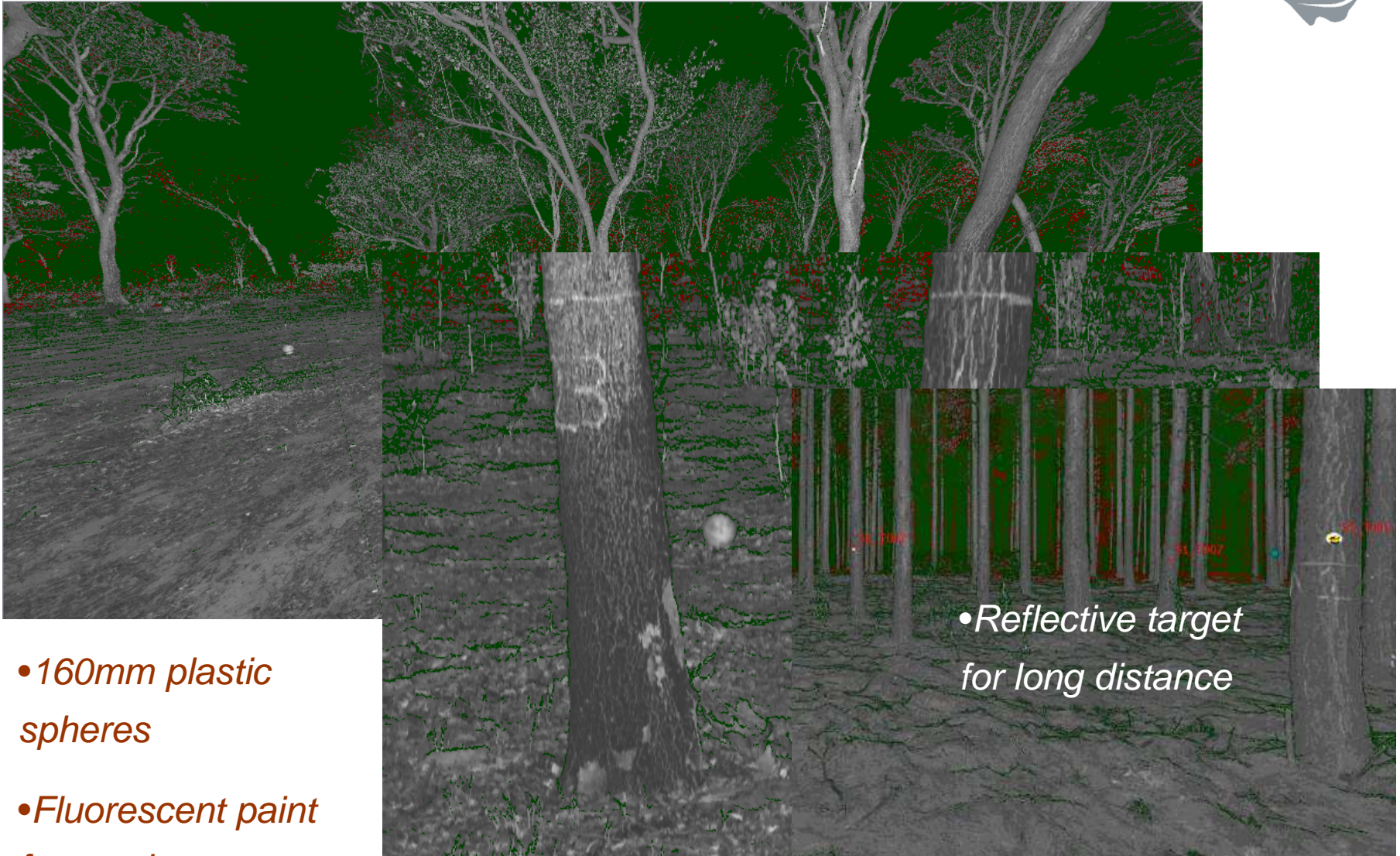


- Trimble RealWorks 9.x
- Z+F LaserControl V8.9
- Riegl RiSolve
- CloudCompare
- Autodesk Recap



Targets in scans

your knowledge partner



- *160mm plastic spheres*

- *Fluorescent paint for numbers on trees*

- *Reflective target for long distance*



Field scans

your knowledge partner





Scan registration Z+F LaserControl



- Stand of *P.patula*, 30 scans, South Africa

The screenshot displays the Z+F LaserControl software interface for scan registration. The main window is titled "york at D:/Anton/TLS/zmf/york1 - Z+F LaserControl". The interface is divided into several panels:

- Left Panel:** A list of scans and their positions. The "Scan" column lists scans from y1 to y31. The "Scan position" column lists positions from Scan position_1 to Scan position_31. A "Manual scan alignment" dialog box is open, showing a 3D view of two point clouds (one red, one green) being aligned. The dialog includes buttons for "View" (X, Y, Z), "Move", "Rotate", "Swap view direction", and "Reset". It also has fields for "Fixed scan position" (Scan position_1) and "Movable scan position" (Scan position_2).
- Top Center Panel:** A 3D point cloud view of the forest stand, showing the registration of multiple scans. The point clouds are color-coded by scan position.
- Right Panel:** A 2D grid view showing the registration of the scans. The grid is labeled with "m" and "Scan position" labels. The scans are represented by colored circles and lines, indicating their relative positions and orientations.
- Bottom Right Panel:** A 3D perspective view of the forest stand, showing the registration of the scans. The point clouds are color-coded by scan position.

At the bottom of the interface, there are several controls and status information:

- Buttons: "Scans", "Project", "3D", "Only show lower half of the scans", "Load scans", "Point size", "Subsampling", "Ok", "Cancel".
- Status bar: "R:2590 Rg:16.7716 m Rf:349 184nc 0.437 V:86.91° H:21.11° W xyz:6.0364 15.6225 -0.8868 m".



UAV ALS



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END