# Dynamic Precision Research Using Two GNSS Receivers With RTK

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# Why dynamics, for what do we need such high accuracy as GNSS RTK can provide?

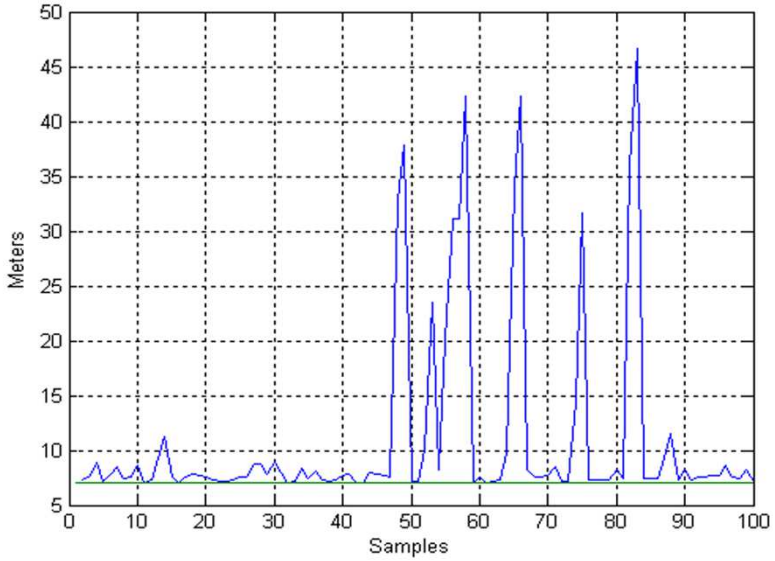
- Agriculture;
- Road construction;
- Autonomous robots;
- Etc.

# Problems to determine accuracy in dynamic mode

- No trustable reference points as for static measurements;
- One measurement at one location;

# How to test accuracy in dynamic mode

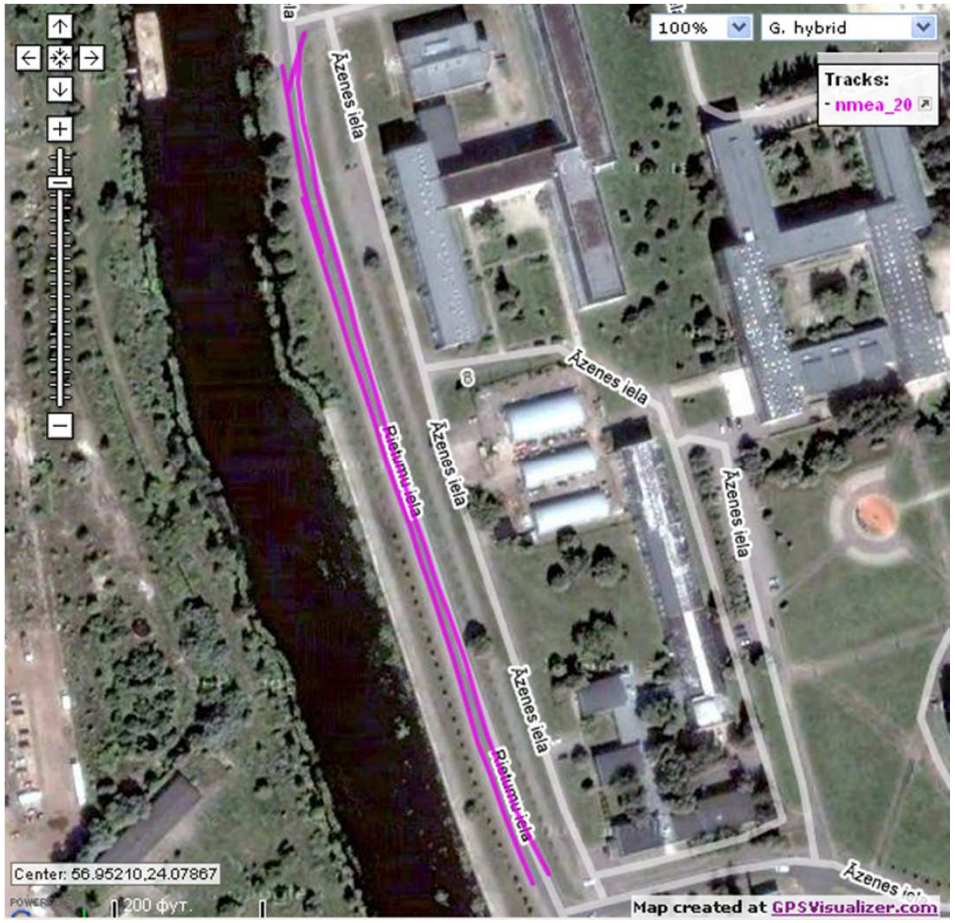
- Make measurements according to predefined values
  - Problem: Is the distance measured at right direction?




  - Solution: Visual control of the measurements.

# How to test accuracy in dynamic mode

- Visual control of the measurements
  - Shows that GNSS works in dynamic mode, but what is accuracy?

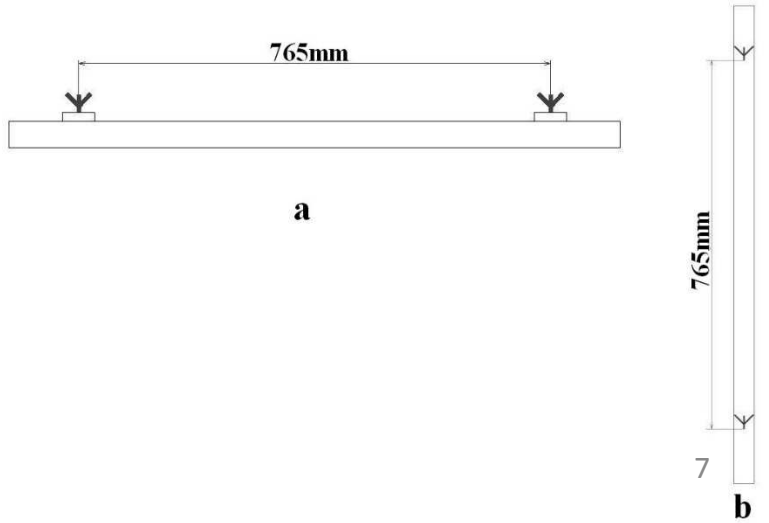


# How to test accuracy in dynamic mode

- Visual control of the measurements
  - Measurements on narrow constructions shows that accuracy is quiet good

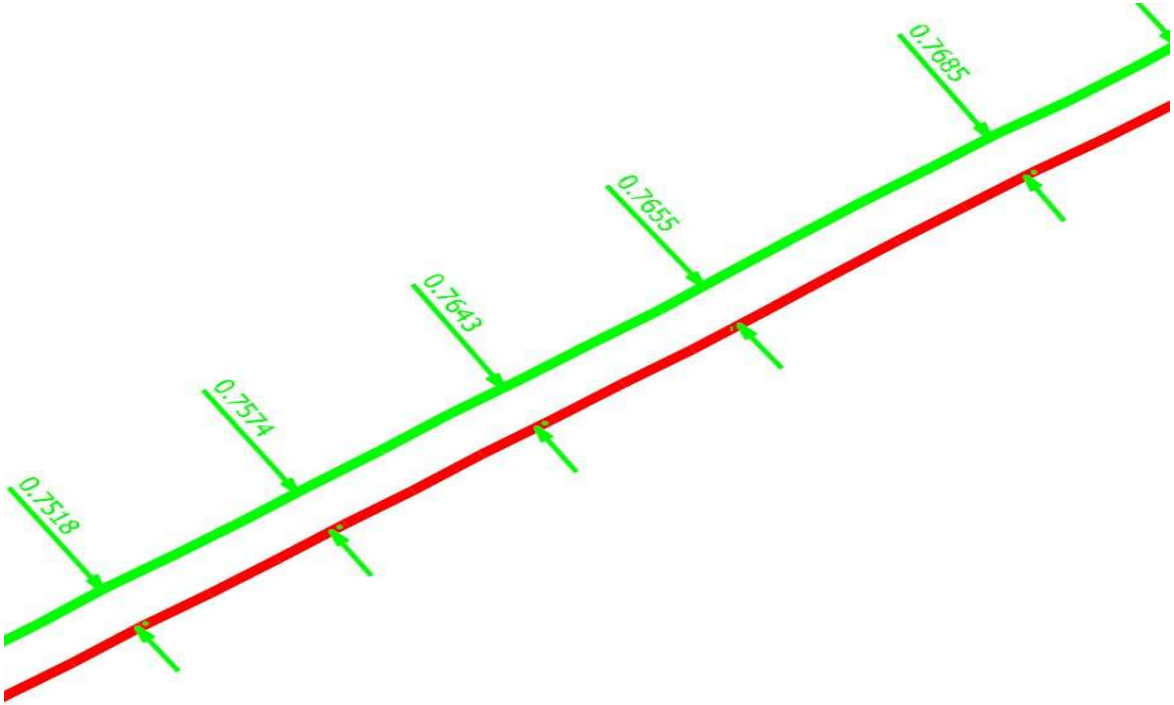
# Measurements in dynamic mode

- Use of two GNSS receivers;
- Well known and fixed distance between receivers;
- Distance between receivers as reference point;
- Mounting of the receivers;



# Processing the measurement data

- Bentley (PowerDraft) software was used to measure the distance between points
  - Distance between two formed lines;

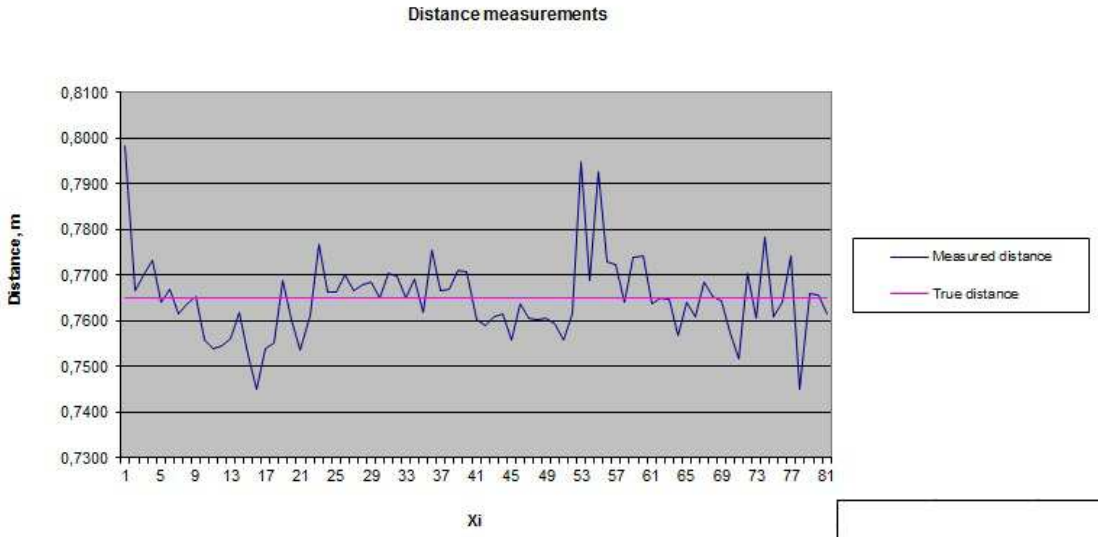


# Processing the measurement data

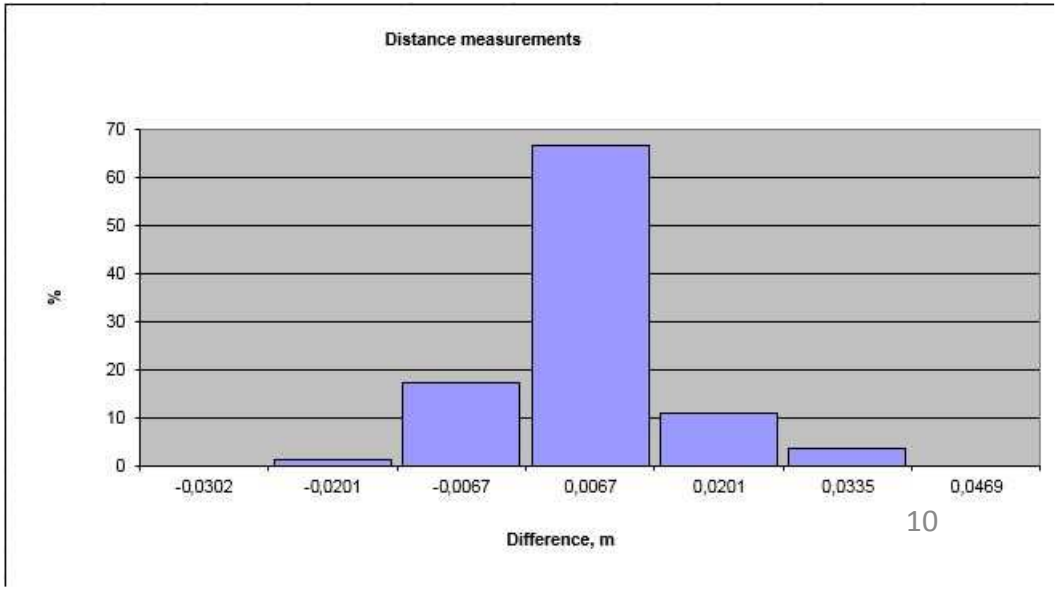
– Distance directly between two points;

# Results of the measurements

- Measurements at the speed of approx. 5km/h

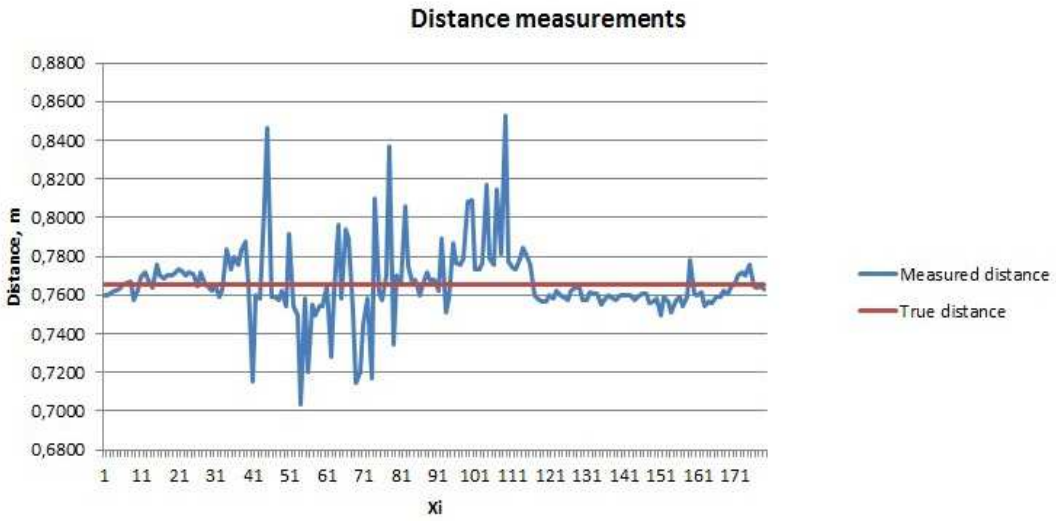


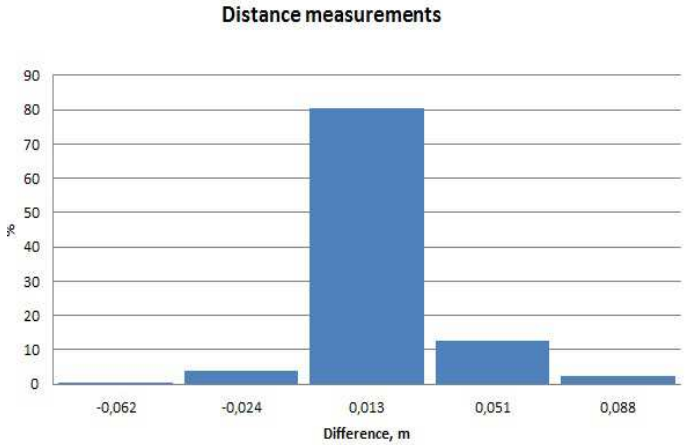

Average: 0.7650m
MAX: 0.7985m
MIN: 0.7449m
STDEV: 0.0090m
RMS: 0.0089m



# Results of the measurements

- Measurements at the speed of approx. 30km/h




Average: 0.7661m
MAX: 0.8530m
MIN: 0.7031m
STDEV: 0.0192m
RMS: 0.0192m

# Conclusions

- Measurements with geodetic receivers can be done in dynamic mode with high accuracy:
  - At least 80% of measurements have Absolute Error less than 20mm if speed is 30km/h or less.

# Further research

- Make measurements with two receivers at higher speed (90km/h);
- Measurements with one receiver at 90km/h already has been done and showed that at good observing conditions fixed solution can be achieved;

# Thank You