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Volunteering for the future – Geospatial excellence for a better living

Integration of a geodetic grade GNSS receiver and an Android dual-frequency smartphone with low-cost IMU for seismogeodetic applications

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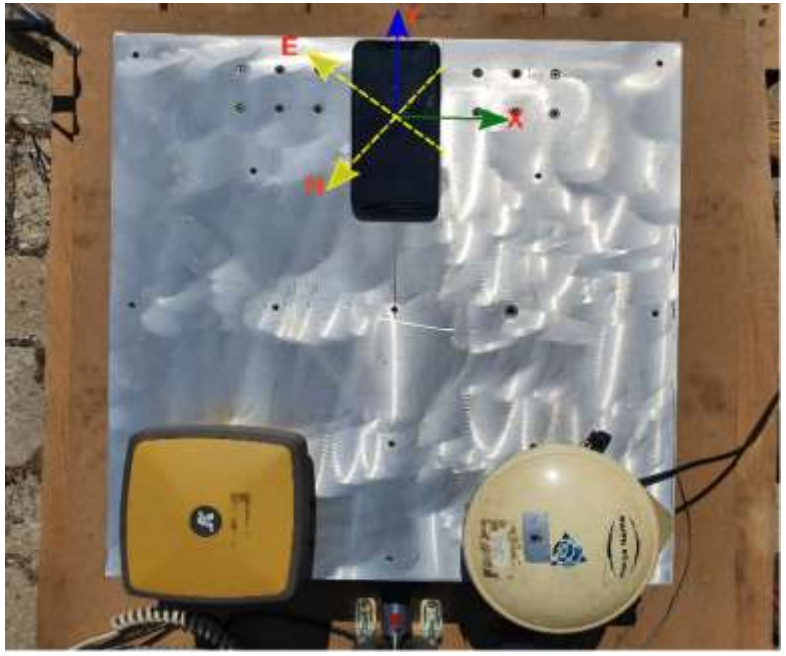
Android Sensors

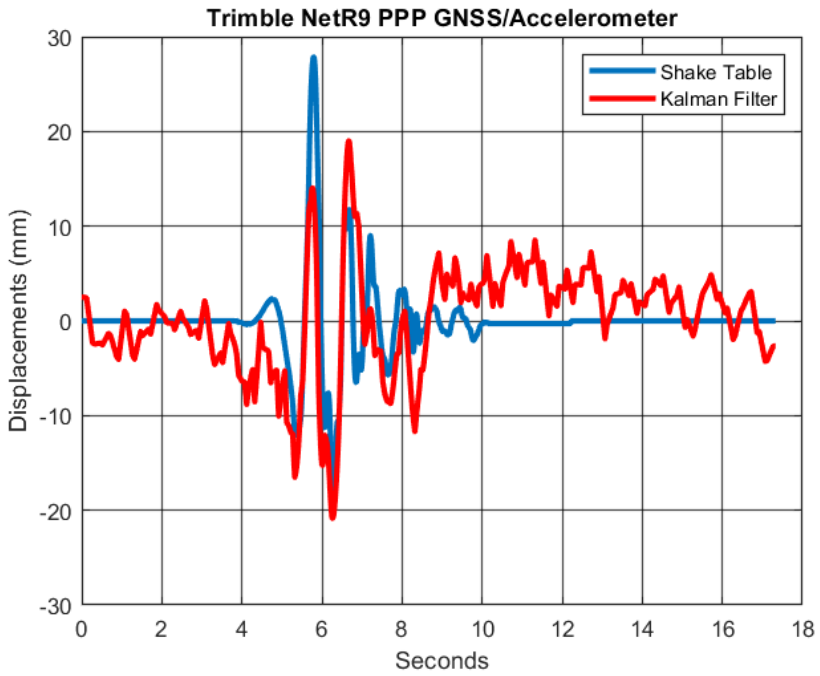
- Accelerometer, magnetometer, gyroscope (up to 150 Hz)
- Single frequency & double frequency GNSS chipset (1 Hz) (acc: ~m)
- Can smartphone IMU be used with geodetic grade GNSS for seismogeodetic applications?
- Is it possible to improve smartphone GNSS accuracy with IMU for seismogeodetic applications? (without external antenna)

Methodology

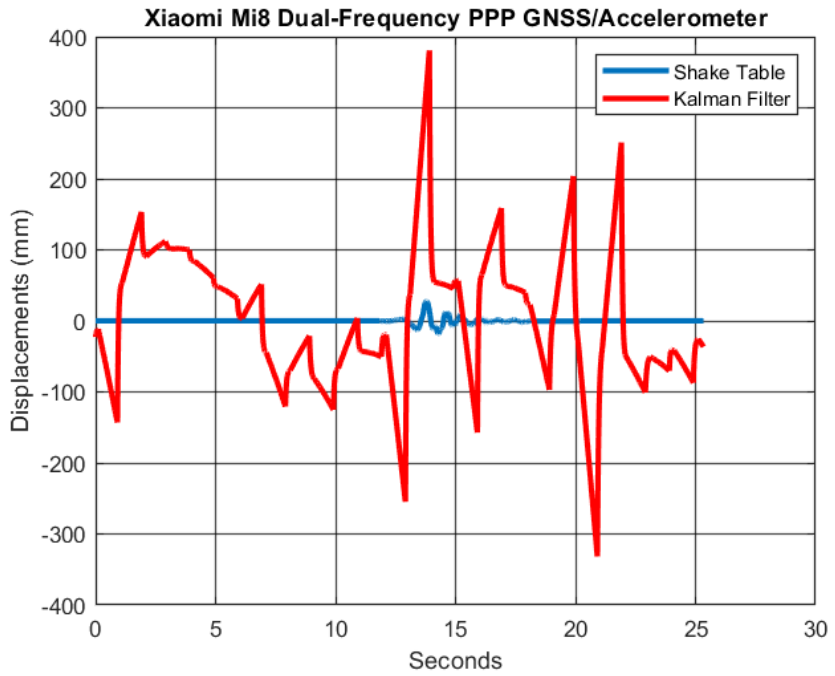
- Aligning smartphone coordinate system with local geodetic system: Singular Value Decomposition (SVD) method (Markley, 1988).
- Accelerometer + Magnetometer combination
- PPP GNSS with RTKLIB
- Integration: Multi-rate Kalman Filter



Results: Loma Prieta Earthquake 1994 (US)

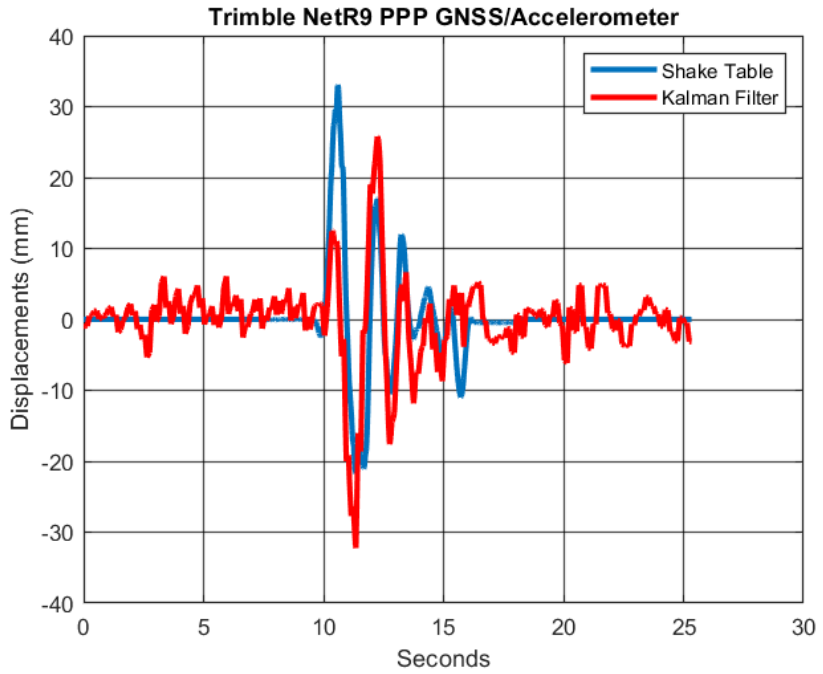


RMS: 5.4 mm

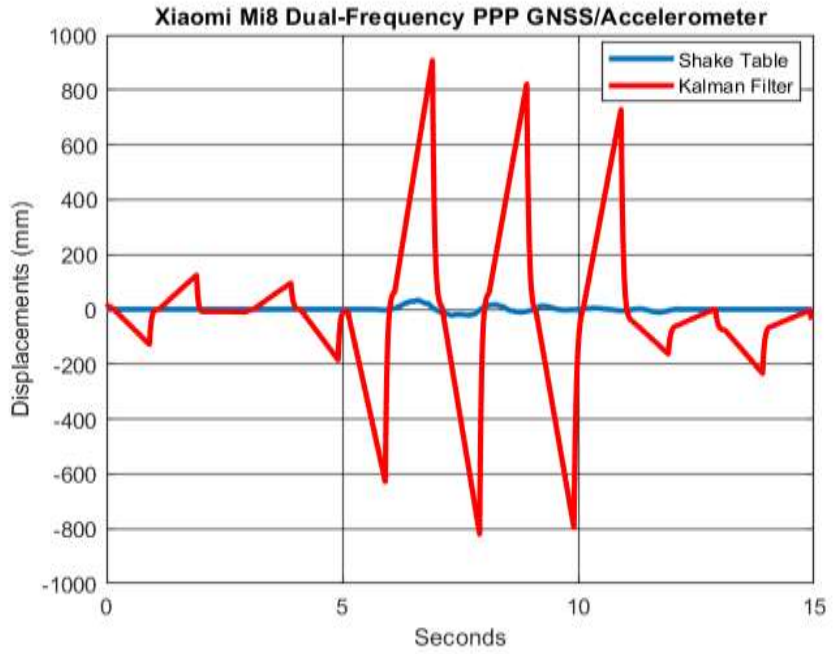


RMS: 96.7 mm

Results: Duzce Earthquake 1999 (TR)



RMS: 4.7 mm



RMS: 279 mm

Thank you for your time! Do widzenia!

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