

# Structures Monitoring Using GNSS Technology and Sequential Filtering

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## SUMMARY

The GNSS technology is still not considered as a suitable method for the structures monitoring because of the relatively low precision, despite the increasing of the acquisition frequencies. This paper concern the evaluation of a strategy to filter a daily kinematic GNSS solution using a smoothing model of movement based on the observation of the previous days, so obtaining a less scattered solution. A test was made with a GNSS permanent station located on top of the troubled Garisenda tower in Bologna (Italy), being it an important cultural heritage and a reliable test site. Because of the presence of the nearby Asinelli tower, taller of the Garisenda, the sky visibility here is not optimal and for that reason a particular sequential filtering can be adopted in order to obtain more accurate solutions. The test was performed by using the RTKLIB software to calculate 1 Hz baselines between the test station and a master one located about one km far from the tower and on a stable area. In order to obtain reliable results some variables were considered both in the data processing phase and in the filter definition. All these results are reported and discussed in detail into the paper. The test results are evidencing a scattering reduction in the filtered kinematic time series of about the 20%, especially on the weaker geodetic components.