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Kinematic orbit positioning applying the raw observation approach

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The kinematic strategy for precise orbit determination (POD) of low earth orbit (LEO) satellites uses only geometric observations to estimate the satellite orbit and does not take any forces into account. This strategy requires a large amount of observation data for one epoch to determine the three-dimensional satellite position. One possibility to get these data is the usage of the spaceborne global navigation satellite system (GNSS) technology, which provides a high number of accurate observations. Following Zehentner (2016) the kinematic orbit positioning applying the raw observation approach by using a least-squares adjustment has shown promising results with a high accuracy.

By applying this approach the kinematic orbits for several LEO satellite missions are estimated and subsequently validated by a comparison with state of the art gravity field solutions. Furthermore due to the fact that solar events causes an orbit decay, these precise determined orbit data are used to analyze solar event impacts on LEO satellites.