

Theme: Localization

Precise GPS Positioning with a Smartphone

Background

GPS stand-alone positioning with an accuracy of several, to tens of meters has been available to the general public for many years through the use of handheld devices and car navigation units. More recently GPS positioning has become a standard function on smartphones. High-precision GPS techniques such as Real-Time Kinematic (RTK) and Precise Point Positioning (PPP) have traditionally been restricted to expensive geodetic GPS receivers. Over the last years, much effort has been spent to also bring these techniques to inexpensive GPS receivers, enabling new applications such as lane-level positioning on a freeway, and more accurate personal navigation.

Can precise GPS positioning be performed with a smartphone?

The use of RTK and/or PPP on a smartphone seems a natural extension of this development and would negate the need for a dedicated GPS device altogether. To develop software capable of this type of positioning, or perform these computations with existing software, requires raw GPS pseudoranges and carrier phase measurements. However, on smartphones so far only the computed position solution was made available, not the raw GPS measurements. This will change with the upcoming version of Android N Operating System (OS).



Google has announced that they will make the raw GPS measurements available to apps on smartphones running this OS later this year.

<http://gpsworld.com/google-opens-up-gnss-pseudoranges>

Possible research questions:

- Can all data needed to perform RTK or PPP positioning be extracted from a smartphone?
- What accuracy can be expected from these measurements?
- What influence does the environment and the (antenna) orientation of the phone have on this?
- Is successful RTK or PPP positioning possible with these data (e.g. using RTKLIB, or TU Delft SF-PPP software)?
- Can the software be made light enough to run on the smartphone itself?

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