

Coherent Time and Frequency Distribution System for a Fundamental Station

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The demands of GGOS are a high for a modern geodetic fundamental station. Variable delays within the main techniques of space geodesy, namely SLR, VLBI, GNSS and DORIS are limiting the stability and accuracy of the geodetic measurements. This leads to the rather paradox situation, that each technique has to adjust the clock offsets independently. Although all main measurements systems on an observatory are usually based on the same clock, each technique provides different offsets. This reflects the fact that the clock adjustments are also contaminated with (variable) system specific delays.

We have designed and built a coherent time and frequency distribution system for the Geodetic Observatory Wettzell. It is based on a mode-locked fs- pulse laser, fed into a network of actively delay controlled two-way optical pulse transmission links. This utilizes the ultra low noise properties of optical frequency combs, both in the optical and electronic regime. Together with a common central inter- and intra- technique target time can provide consistency for the complex instrumentation of SLR, GNSS and VLBI systems in situ, which was not possible before. Here we report on the design and discuss first obtained results.