

Kolloquium Satellitennavigation

A new vision for time and frequency in space geodesy

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The International Terrestrial Reference Frame (ITRF) is obtained from the observation of celestial objects. Fundamental stations like the Geodetic Observatory Wettzell play an important role, since they combine all the main techniques of space geodesy, namely GNSS, SLR, VLBI and DORIS in one place. The classical approach is to treat individual systems separately and combine them based on the knowledge of their local ties. A deficit of this approach is that it considers some physical point of reference and not the real signal propagation path. Since the true signal path is subject to variable instrumental delays, errors occur, which are only in parts compensated by calibration procedures.

In order to improve the accuracy and stability of the geodetic measurements we propose to use a common clock and a delay compensated optical time and frequency distribution system for all space geodetic instruments. This actively controlled optical timing system is based on femto-second mode-locked laser. It enables the accurate transfer of time between distributed space geodetic instrumentation on an observatory and hence allows the correct estimation of system delays. The talk outlines the importance of time for space geodesy, describes the concept of the coherent optical time and frequency distribution system of the Geodetic Observatory Wettzell and suggests a common clock approach between different observatories.

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Ort: Technische Universität München

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