Contribution ID: **56** Type: **Oral Presentation**

E-GRIP: A Highly Elliptical Orbit Satellite Mission for Co-location in Space

Thursday, 17 March 2016 15:15 (15 minutes)

In recent years much effort has been undertaken to combine space geodetic observations on-board satellites, known as co-location in space. Whereas for SLR and GNSS, co-locations on-board satellites already exist (LEO, GNSS), no such satellites are allowing at present for VLBI observations. In order to cure this situation new satellite missions like GRASP are considered, new observation concepts like tracking of GNSS L-band signals were implemented, and at some telescopes receiver chains were modified. However, evaluating today's situation, only a few experimental GNSS L-band observations were conducted, whereas the majority of radio telescopes participating in the IVS cannot observe these. Future VLBI observations to the proposed GRASP mission will be possible for nearly all radio telescopes but, due to the low orbit, only for short baselines.
In this presentation we will introduce a new mission: the Einstein Gravitational Red-shift Probe (E-GRIP). The scientific objectives of E-GRIP are the measurement of the space-time curvature around the Earth and the performance of multiple tests of general relativity. Therefore, E-GRIP will fly in a highly eccentric orbit (e>0.6, apogee>35000km) and will carry a narrow- and a wide-angle microwave link (both at X- and K-band), two GNSS antennas, an SLR retro-reflector array, and a space hydrogen maser. Consequently, E-GRIP could act as a co-location satellite with optimal observation conditions for VLBI. Beyond a mission overview, we will present results from extended VLBI simulations concerning link budget, visibilities, and achievable station coordinate results. We will also discuss the benefits for VLBI compared to co-location on GRASP and on GNSS satellites in terms of visibility and station coordinate accuracy. In addition, we will show the feasibility of co-located GNSS and SLR observations for this highly elliptical orbit.

Primary author: Mr MÄNNEL, Benjamin (ETH Zurich)

Co-authors: Prof. ROTHACHER, Markus (ETH Zurich); Mr ROCHAT, Pascal (Spectratime, Neuchâtel); Prof. JETZER, Philippe (University of Zurich); Dr LECOMTE, Steve (CSEM, Neuchâtel)

Presenter: Prof. ROTHACHER, Markus (ETH Zurich)

Session Classification: Oral6: VLBI observations of Space Vehicles

Track Classification: 6: VLBI Observations of Space Vehicles