

## **Picosecond accuracy VLBI of the two subsatellites of SELENE (KAGUYA) using multifrequency and same beam methods**

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### **Abstract**

Same beam very long baseline interferometry (VLBI) observations of the two subsatellites of SELENE (KAGUYA) are demonstrated for purpose of the precise gravimetry of the Moon. Same beam VLBI contributes a great deal to cancel out the tropospheric and ionospheric delays and to determine the absolute value of the cycle ambiguity by using the multifrequency VLBI method. As a result, the differential phase delay of the X-band signal is estimated within an error of below 1 ps. This accuracy is more than 1 order of magnitude smaller than former VLBI results. The preliminary results for the orbit determination of the subsatellites show a decrease of the orbit error from a few hundreds of meters to around 10 m when the differential phase delay data are added to the conventional range and Doppler data. These results reveal the possibility of precise gravimetry. Copyright 2009 by the American Geophysical Union.

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