

# The possible effect of reaction wheel unloading on orbit determination for Chang'E-1 lunar mission

Yan jianguo(1,2), Ping jingsong(1,3), Li fei(2)

(1) Shanghai Astronomical Observatory, Chinese Academy of Sciences, Shanghai ,China , (2) Key Laboratory of Geospace Environment and Geodesy, Ministry of Education, Wuhan University, Wuhan, China, (3) National Astronomical Observation, Chinese Academy of Sciences, Beijing, China (jgyan@shao.ac.cn/Phone:+86 021-64386191-666)

**Abstract** During the flight of 3-axis stabilized lunar orbiter, (i.e. SELENE main orbiter, Chang'E-1), due to the overflow of the accumulated angular momentum, the reaction-wheel will be unloaded during certain period so as to release the angular momentum for initialization. Then the momentum wheel will be reloaded for satellite attitude measurement and control. Above action will not only change the attitude, but also change the orbit of the spacecraft. Assuming the reaction-wheel unloading is carried out twice a day according to the current engineering designation and plan for SELENE main orbiter and Chang'E-1 missions, considering the algebra configuration of the tracking stations, the Moon and the lunar orbiter, the orbit determination is simulated for 14 days evolution of lunar orbiter. In the simulation, the satellite orbit is generated using GEODYNII code. Based on the generated orbit, the common view time period of the satellite by VLBI and USB network in every day is computed, the orbit determination is processed for all the arcs of the orbit. The orbit determination result of 28 orbits in 14 days is provided. The orbits cover most of the possible geometrical configuration among orbiter, the Moon and the tracking network. The analysis here can benefit the tracking designation and plan for Chang'E-1 mission.