

ASTRODYNAMICS SYMPOSIUM (C1)
Orbital Dynamics (1)

Author: Prof. Jiasong Wang

State Key Lab of Astrodynamics, China, wangjiasong@hotmail.com

Ms. Jianrong Chen

State Key Lab of Astrodynamics, China, wangjiasong@hotmail.com

Mr. Gongyou Wu

State Key Lab of Astrodynamics, China, Wangjiasong@hotmail.com

Mr. Yanrong Wang

Xi'an Satellite Control Centre(XSCC), China, wangjiasong@hotmail.com

Mr. Nan Ye

Xi'an Satellite Control Centre(XSCC), China, Wangjiasong@hotmail.com

ACCURACY ANALYSIS OF ORBIT DETERMINATION AND PREDICTION FOR LOW ORBIT
LUNAR SATELLITES

Abstract

According to Chinese three-stage lunar exploration project, the first Chinese lunar satellite Chang'e-1 has completed the mission of circling, and the next two stages will aim at soft landing and sample return. During the later two phases, the working orbits of lunar probes will be 100km*100km or 200km*200km circular orbit, and may be reduced to 100km*15km or 200km*15km elliptic orbits before soft landing. To satisfy the requirement of mission design, the accuracy of orbit determination and prediction for such orbits should be analyzed beforehand. In this paper, based on USB or USB+VLBI joint tracking mode, orbit determination and prediction accuracy for low orbit lunar satellites with long or short observation arcs has been investigated using the simulation data and actual tracking data of Chang'e-1. The precision of three-way range system tracking data for Chang'e-1 has also been evaluated as well. In the end, some conclusions have been drawn which may be useful for mission general design and engineering operation.