

SPACE EXPLORATION SYMPOSIUM (A3)
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GNC CANDIDATE SCENARIO FOR FUTURE CHINA ASTEROID EXPLORATION

Abstract

Asteroid exploration activities have gathered scientific data and deepened the current understanding about the solar system evolution process and space resource. In the U.S., Europe, and Japan, missions sending spacecraft to explore asteroids currently exist. China has not formally implemented asteroid exploration mission, except for Chinese second lunar probe Chang'e-2 flyby and exploring the asteroid 4179 Toutatis. And one asteroid exploration mission has been planed in China during next five years. In this paper, we will report Chinese asteroid exploration mission scenario and corresponding innovative guidance navigation and control (GNC) schemes. In order to overcome the defect of traditional IMU based navigation, new multi-information fusion integrated navigation based on optical is developed for accompany flight and landing asteroid. External navigation observation information from line-of-sight measurement and vector measurement are included in the integrated navigation schemes to improve the navigation accuracy. At the same time, autonomous precise guidance strategies are proposed to support accompany flight and safe landing on an asteroid with larger irregularity of gravity field.