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ORBIT MANEUVERS STRATEGY OF TG-02'S CONCOMITANT SATELLITE

Abstract

TIANGONG-02(TG-02)'s concomitant satellite is a micro satellite, equipped with the TG-02 space lab. At 7:31 of October 23, 2016, TG-02's concomitant satellite with the TG-02 space lab launched into orbit was successfully released. The satellite natural drifted away from the combination of TIANGONG-02(TG-02) and SHENZHOU-11(SZ-11). Afterwards, the satellite executed several orbit controls to approach the combination of TG-02 and SZ-11 and finally fly above it for observation imaging, carried out the close formation residence test with the combination, and before SZ-11's return to the earth, ensured the relative flight safety with TG-02 and SZ-11.

The three main missions of TG-02 concomitant satellite are the observation imagine of flying over the combination, the residence formation of a distance relative to the combination and the avoidance of collision risk to TG-02 and SZ-11. These three missions would be completed by the concomitant satellite orbital maneuver control. With the concomitant satellite's constraints of small thrust force, single motor impulse being limited and time interval between of the continuous two maneuver impulses, the satellite's orbit maneuver strategy is very complicated. During the flight of the concomitant satellite along with the combination of TG-02 and SZ-11 , the satellite conducted 6 times orbit maneuvers to fly over the combination, 9 times orbit maneuvers to fulfill a certain distance resident captured and maintained, 1 orbit maneuver to avoid the collision risk. The concomitant satellite orbit maneuver strategy to fulfill these three missions is detailed in this paper.