

ASTRODYNAMICS SYMPOSIUM (C1)  
Mission Design, Operations and Optimization - Part 1 (1)

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A STUDY OF THE ACCESSIBILITY TO ASTEROIDS FOR IKAROS MISSION AFTER VENUS  
FLYBY**Abstract**

The Small Solar Power Sail Demonstrator, IKAROS, was launched on May 21 in 2010 with the Venus orbiter, Akatsuki, and was deployed its solar sail on June 9 to become the world's first spacecraft. On December 8, half year after the launch, IKAROS passed near the Venus successfully. For the extended mission of the IKAROS, we are considering the accessibility to asteroids during a few year-transfer.

An accessible asteroid for IKAROS is searched by controlling the solar radiation force by changing the attitude of the solar sail. Compared to conventional spacecraft, the instantaneous controllability of the IKAROS is limited because of the small radiation pressure. However, assuming the long flight such as a few years, the controllability becomes larger. Although the increase of the controllability by changing the sail's attitude makes the accessibility to the asteroids easy, its computation to search the accessible asteroid is time-consuming because we have to simulate a number of cases of the sail's attitude. Thus, in this study we present a simple search method using characteristic of the solar sail to reduce the computation time. As a result, we find some asteroids that IKAROS could approach within a few million km from the around 7000 asteroids, which is filtered by perihelion and aphelion from about 550000 asteroids, in a day computation with the Intel Core i5 CPU (2.53 GHz)