SPACE EXPLORATION SYMPOSIUM (A3)
Solar System Exploration (6)

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FLIGHT STATUS OF IKAROS DEEP SPACE SOLAR SAIL DEMONSTRATOR

Abstract

Japan Aerospace Exploration Agency (JAXA) plans to launch a solar sail demonstration spacecraft "IKAROS" in the summer of 2010. IKAROS is to be launched together with JAXA's Venus climate orbiter "AKATSUKI (Planet-C)" as an interplanetary piggy-back payload. The launch vehicle is H2A and will be launched from Tanegashima space center. JAXA has been proposing a concept of "Solar Power Sail" for future deep space exploration. It combines the concept of solar sail (photon propulsion) with a larger power generation by flexible solar cells attached on the sail membrane. IKAROS is the precursor mission to demonstrate the key technologies for the solar power sail concept, which are (1) deployment of large sail in space, (2) solar power generation by means of thin film solar cells attached on the sail, (3) confirming the acceleration by solar radiation pressure attracted on the sail and (4) demonstration of the interplanetary guidance and navigation of the solar sail spacecraft. IKAROS will deploy a 20m-span sail within one month after the launch, and performs interplanetary solar-sailing taking advantage of the Earth-Venus leg of the interplanetary trajectory. The spacecraft mass is 310kg and is equipped with a rectangular flexible solar sail which weighs 15kg with the thickness of 7.5um at minimum. The solar sail is deployed and kept extended by centrifugal force of the spacecraft spinning. Thus we do not have any rigid member to support the extension of the sail, enabling to realize light and simple mechanism. The deployment process is to be measured and recorded by several onboard equipments, such as cameras, attitude sensors and some surface sensor on the sail. At the time of this presentation, the up-to-date flight status of IKAROS and some results of the early mission phase, including the sail deployment result, will be shown.