

IKAROS unfurls first ever solar sail in space

June 11 2010, by Lin Edwards



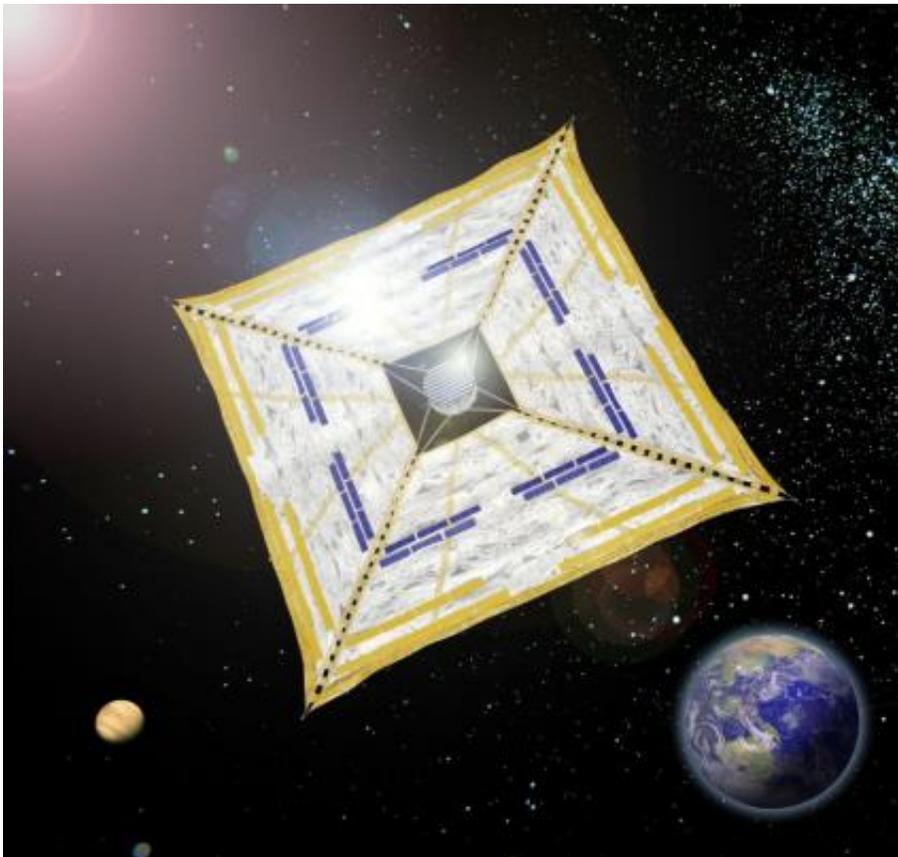
(PhysOrg.com) -- Japan's IKAROS has rolled out its solar sail, the first ever deployed in space. JAXA, the Japan Aerospace Exploration Agency, achieved the feat by rotating the craft rapidly and spinning the sail out by centrifugal force. IKAROS is the world's first solar-powered spacecraft.

The solar sail unfurled by IKAROS (an acronym of *Interplanetary Kite-*

craft Accelerated by Radiation Of the Sun) is an aluminized plastic membrane only 0.0075 mm thick and covered with thin-film solar cells. The sail works through [photons](#) of light reflecting off the sail transferring their forward momentum to the sail to push the attached craft forward.

The four panels of the sail make up a square measuring 20 meters along the diagonal. It was deployed by spinning the craft at up to 20 revolutions per minute, and once unfurled the sail is held flat by the craft's spinning motion. Dust-counter sensors and steering devices that adjust the angle of the sail to the Sun are also fitted to the sail.

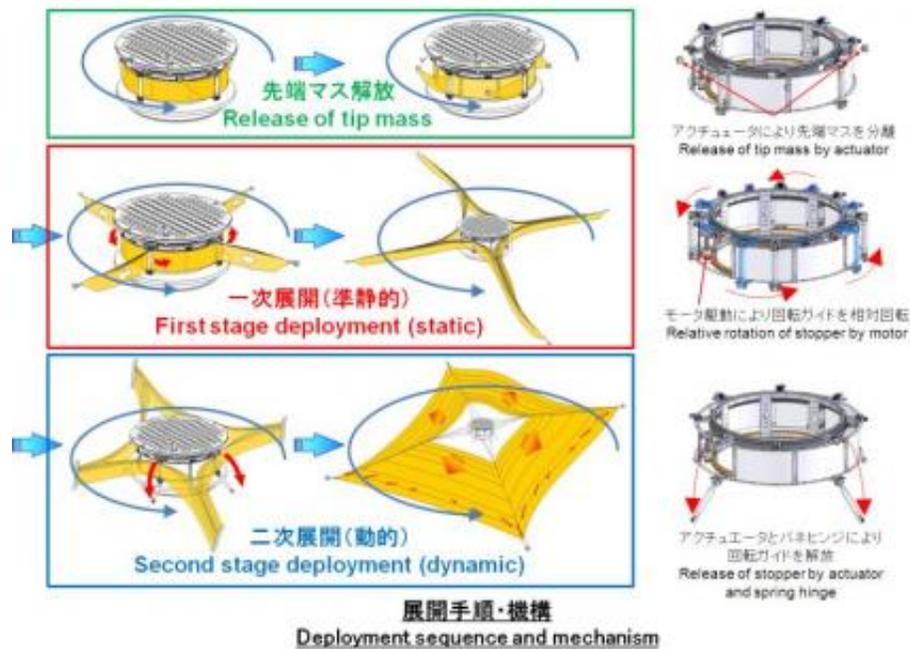
IKAROS is powered only by the abundant photons from the sun and no other [power source](#) or propellant is needed, making the technology ideal for long-distance [space travel](#).



The sail's solar cells also convert some of the light into photovoltaic electricity, and in future this system could be used to power an engine. The craft is not powered by the [solar wind](#), which is made up of much slower ionized particles that create a force of only one percent that produced by photons.

IKAROS is a demonstration craft and as such is designed only to test whether or not the solar sail can work as intended by setting the craft on course towards Venus. After passing Venus in six months' time it will travel the far side of the Sun, arriving in 2013.

JAXA is planning a second mission that will include ion-propulsion engines along with a solar sail 50 meters in diameter. This second mission will aim to use [solar power](#) to try to reach the Trojan asteroids orbiting Jupiter.



[JAXA](#) has confirmed the solar sail is generating power, but it may be several weeks before confirmation is received the sail is moving the craft forward because it will take some time to produce sufficient momentum to start it sailing through space. The acceleration produced by the photons is tiny, but it is continuous, unlike propulsion by chemical engines that fire until the craft reaches cruising speed and then are turned off to conserve fuel. Once in motion the [solar sail](#) can accelerate the craft constantly and reach high speeds in a short time.

IKAROS was launched from the Tanegashima Space Center on May 20th along with the Akatsuki Venus Climate Orbiter.

More information: IKAROS page:
www.jspec.jaxa.jp/e/activity/ikaros.html

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