

NASA to test new solar sail technology

October 14 2011, By Ray Sanders



The Solar Sail demonstration mission. Credit: NASA

Solar sails, much like anti-matter and ion engines appear at first glance to only exist in science fiction. Many technologies from science fiction however, become science fact.

In the example of solar sails, perfecting the technology would allow [spacecraft](#) to travel through our solar system using very little fuel.

NASA has been making strides with solar sail technology. Using the [NanoSail-D](#) mission, NASA continues to gather valuable data on how well solar sails perform in space. The Planetary Society will also be testing solar sail technology with their LightSail-1 project sometime next year.

How will NASA (and others) test solar sail technology, and develop it into a common, reliable technology?

The second of three recently announced technology demonstrations, The Solar Sail Demonstration, will test the deployment of a solar sail in space along with testing [attitude control](#). The solar sail will also execute a navigation sequence with mission-capable accuracy.

In order to make science fiction into reality, NASA engineers are testing solar sails that could one day provide the propulsion for deep [space missions](#). Spacecraft using solar sails would travel in our solar system in a similar manner to a sailboat through water, except spacecraft using solar sails would rely on sunlight instead of wind. A spacecraft propelled by a solar sail would use the sail to capture photons emitted from the Sun. Over time, the buildup of the solar photons provides enough thrust for a small spacecraft to travel in space.

NASA's solar sail demonstration mission will deploy and operate a sail area 7 times larger than ever flown in space. The technology used in the demonstration will be applicable to many future space missions, including use in space weather warning systems to provide timely and accurate warnings of solar flare activity. The solar sail demonstration is a collaborative effort between The National Oceanic and Atmospheric Administration (NOAA), NASA and contractor L'Garde Inc.



A solar sail system, measuring 66 feet on each side was tested in 2005 in the

world's largest vacuum chamber. Image Credit: NASA

[NASA](#) lists several capabilities solar sails have to offer, such as:

- **Orbital Debris:** Orbital debris can be captured and removed from orbit over a period of years using the small solar-sail thrust.

- **De-orbit of spent satellites:** Solar sails can be integrated into satellite payloads so that the satellite can be de-orbited at the end of its mission.

- **Station keeping:** Using the low propellantless thrust of a solar sail to provide station keeping for unstable in-space locations.

- **[Deep space](#) propulsion:** Payloads free of the Earth's pull can be continuously and efficiently accelerated to the other planets, or out of the solar system, such as proposed in Project Encounter.

As an example, the GeoStorm project considers locating solar storm warning satellites at pseudo Lagrange points three times further from the Earth by using the [solar sail](#) to cancel some solar gravitational pull, thus increasing warning time from ~15 minutes to ~45 minutes.

Providing a satellite with a persistent view of northern or southern latitudes, i.e., a “pole-sitter” project. This allows the observational advantages of today's geosynchronous satellites for orbits with view angles of the northern and southern high-latitudes.

More information: If you'd like to learn more about solar sails, Caltech has a nice “Solar Sailing 101” page at:

www.ugcs.caltech.edu/~diedrich...ils/intro/intro.html

Source: [Universe Today](#)

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