Sailing the planets

NASA investigates using a wing to steer the next generation of planetary balloon probes through alien atmospheres.

New balloon probe

Scientists and engineers from NASA and the Global Aerospace Corp. are developing research balloon platforms that will take observations of a planet's atmosphere for longer durations than current balloon probes. The project improves upon previous balloon designs by attaching a new steering device called the StratoSail.

Stowing the StratoSail

Gondola

11110

Before the StratoSail is deployed, it is collapsed and stored on the gondola of the platform in two configurations.

Gondola The gondola is equipped with a suite of solarpowered instruments and sensors for studying a planet's atmosphere and recording data.

Solar panels

Teflon

balloon

Dropsonde

Dropsondes are small probes that can be deployed from the gondola. While parachuting to a planet's surface they record humidity, temperature and pressure. The data are then transmitted to the gondola.



Wrapped around the gondola or

folded beneath gondola.

Dropsondes

How the StratoSail works

Wing

The wing's shape causes more air pressure to build on one side of the wing than the other as wind passes over it. This causes a lifting force which pushes the StratoSail forward, dragging the balloon and gondola across a planet's sky.

Tether

Tethered to the platform, the StratoSail is lowered 9 miles by a winch inside the gondola.

Space probe history

Nov. 16, 1965 The Soviet probe Venera 3 lands on Venus, making it the first spacecraft on the surface of another planet.

Aug. 7, 1970 The Soviet

probe Venera 7 is deployed to study the Venusian atmosphere. It was the first probe to return data from another planet.



Aug. 20, 1975

The United States launches Viking probes to study the Martian atmosphere and collect soil samples.

May 20, 1978 The U.S. Pioneer Venus mission deploys multiple probes into the atmosphere of Venus to study the planet's clouds and map its surface.



July 13, 1995 The U.S. spacecraft Galileo deploys a probe into Jupiter's violent atmosphere to measure winds, clouds and lightning.



Dec. 15, 1984

Soviets launch Vega 1 and Vega 2. Each spacecraft deployed a lander and an atmospheric balloon. This was the first use of data-collecting balloons on a planet other than Earth. The balloons transmitted directly to Earth for 47 hours.

Rudder The rudder controls the direction of the platform's flight path.

Low pressure



Sept. 27, 1997

The U.S. Mars Pathfinder mission deploys several instruments and a robotic rover. The probe photographs the surface features, analyzes soil and rock composition and monitors weather.



Balloon probes



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High pressure

Staff graphic/Edward Bremne