Galileo Probe
Frequently Asked Questions (FAQ)

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Where does the Probe fit?

The Probe is nestled on the "bottom" of the spacecraft, below the area where the camera scan platform is mounted.

How fast is the Probe going when it enters Jupiter's atmosphere?

170,700 kilometers per hour (106,000 miles per hour), or 47 kilometers per second (29 miles per second) That's the highest impact speed of any man-made object ever; it's about 100 times the muzzle velocity of a bullet fired from a .45 caliber gun.

What science will the Probe instruments return?

Galileo's Probe incorporates experiments to measure temperature and pressure along the descent path, locate major cloud decks, and analyze the chemistry of atmospheric gases. In addition, the Probe will attempt to detect and study jovian lightning both by looking for optical flashes and by listening for the radio "static" they generate. The latter detector will also measure high-energy electrons close to Jupiter just prior to atmospheric entry.

Once the Probe separates, what wakes it up many months later just before entry? Does it just have a built-in programmable timer, or does the Orbiter beam the Probe a command to wake up? Or does it remain fully "awake," doing the same thing (that is, taking data) from the time it separates until the end of its mission?

Yes, the Probe does have a built-in, programmable timer, which is set by ground command shortly before the Probe separates from the orbiter. The Probe designers wanted to have some flexibility in starting the timer to accomodate any late changes in the Probe release schedule. If Probe release is delayed for any reason, the timer is reset appropriately. The timer is the only thing running on the Probe during its five month long cruise to Jupiter.

Like an alarm clock, the timer is set to wake up the Probe 6 hours before entry into Jupiter's atmosphere so that the Probe can 1) take measurements of the inner magnetospheric energetic particle environment, and 2) listen for radio emissions characteristic of lightning (these actually sound like long, descending whistles).

This "pre-entry" phase ends when the Probe's accelerometers detect signs that the Probe is being decelerated by Jupiter's atmosphere. At this point, the Probe starts its entry/descent phase.

When the Galileo Probe enters Jupiter's atmosphere in December, will we be able to see pictures of the surface of Jupiter for the first time?

Although Jupiter is a planet, it is very different from Earth. In fact, scientists refer to hard and rocky planets like Earth, Mercury, Venus, and Mars as "terrestrial," while planets like Jupiter, Saturn, Neptune, and Uranus are called "gas giants," since they seem to be, essentially, huge balls of gas and liquid with a small rocky core. So, Jupiter doesn't really have a "surface" in the sense of its being something that humans could walk around on, or that a spacecraft could land on.

Galileo's atmospheric Probe will travel between 130 and 160 kilometers below Jupiter's cloud tops, deep enough to help answer questions such as what's in Jupiter's yellow clouds, or how strong are the winds below the cloudtops. However, the Probe won't come anywhere near seeing the "surface" of Jupiter's rocky core, buried roughly 60,000 kilometers underneath the cloud tops.

Why aren't we taking an image of the Probe as it drifts away from the Orbiter after separation?

Imaging the Probe as it drifts away from the Orbiter was contemplated both for engineering assessment (that is, looking for any problems with the Probe hardware) and optical navigation. In order to assess the external condition of the Probe, detailed pictures would be desireable, but, because the SSI is focused on infinity, objects up close would be out of focus. In fact, by the time the Probe is in focus (at about 18 km away from the Orbiter), it would only be about 2-3 resolution elements (about 4-6 pixels) across--not very detailed!

Taking a picture of the Probe for Optical Navigation purposes appears to be feasible , but, because the Probe delivery knowledge requirements are being met, and because of the operational costs of trying to return large data sets (such as images), it was decided not to pursue optical navigation.