National Aeronautics and Space Administration

Deep Atmosphere Venus Investigation of Noble gases, Chemistry, and Imaging: DAVINCI

Credit: NASA/GSFC/CI Labs/Michael Lentz

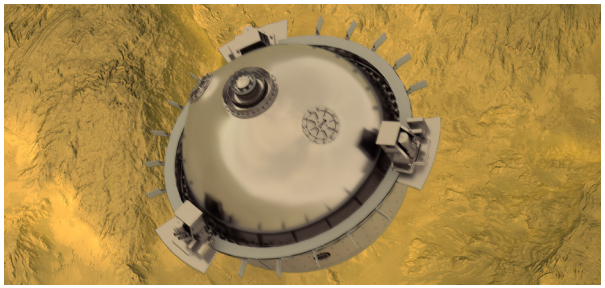
# Exploring Venus, Our "Sister" Planet

## DAVINCI: Uncovering Venus's Mysteries

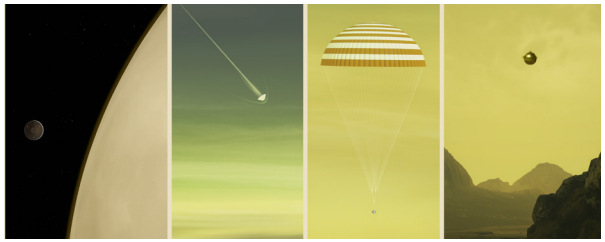
NASA's DAVINCI (Deep Atmosphere Venus Investigation of Noble gases, Chemistry, and Imaging) mission will study Venus from above its clouds down to its surface, investigating how the planet and its dense atmosphere formed and evolved over the past 4.5 billion years.

Made of solid rock at its surface, like Earth, and about the same size and similar distance from the Sun, Venus was long expected to be Earth's twin. But when spacecraft were sent to study the planet, they found a world very unlike our own: covered in ancient lava and punishingly hot, with a thick envelope of noxious gases forming its atmosphere.

The DAVINCI mission's goal is to help answer longstanding questions about our neighboring planet, especially whether Venus was ever wet and habitable like Earth. Carrying an atmospheric descent probe, the DAVINCI spacecraft will serve as a telecommunications hub by relaying information from the probe to Earth. It'll also use two instruments on its carrier-relay-imaging spacecraft



*A visualization of the DAVINCI probe above the surface of Venus. Credit: NASA/GSFC/CI Labs*



*A set of illustrations of the DAVINCI spacecraft approaching, and the probe descending, through the atmosphere of Venus. Credit: NASA/GSFC/CI Labs*

to study Venusian clouds and map the planet's highland areas as it flies by Venus. Named after visionary Renaissance artist and scientist Leonardo da Vinci, the DAVINCI mission is scheduled to launch in June 2029.

## DAVINCI's Probe

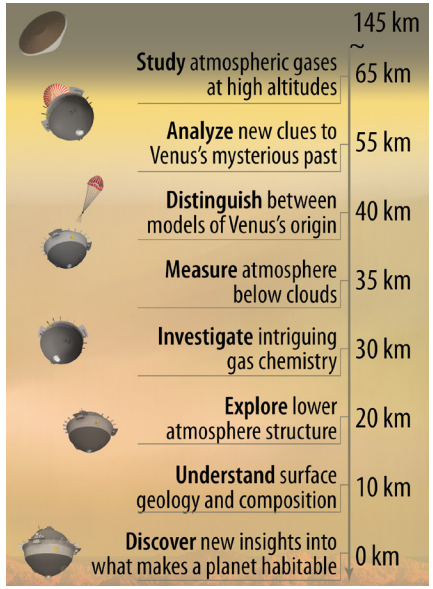
Using instruments onboard its spacecraft, DAVINCI will explore the cloud tops of Venus's atmosphere and the composition of Venus's diverse surfaces. In 2031, DAVINCI will drop its probe to the surface of a mountainous region twice the size of Texas, called Alpha Regio. The spherical probe is about 1 meter wide and made of titanium, which will help protect it from the searing heat of Venus.

The probe and its five scientific instruments will be built to withstand the extreme environment on Venus, where there's crushing air pressure, clouds made of acid that can dissolve most metals, and a surface hot enough to melt lead.

### *Descent into Venus's Atmosphere*

Once the probe begins its descent, a parachute that is designed to survive Venus's harsh environment will help slow it down. After the probe travels halfway to the surface, the parachute will detach. At this point, Venus's atmosphere is so thick, 90 times thicker than Earth's atmosphere at the surface, that the probe will slow down naturally, settling like a stone in water.

On its hour-long descent, the probe will take thousands of measurements and snap close-up images of the surface after it emerges below Venus's clouds.




*A timeline of events for the DAVINCI probe's descent into Venus's atmosphere. Credit: NASA/GSFC/CI Labs*

The probe is not required to survive landing, but if it does, it could provide up to 17 minutes of bonus science. Given how hard it is to operate in the hazardous environment on Venus, every additional minute would be incredibly valuable.

### More Information

https://ssed.gsfc.nasa.gov/davinci/

*NASA's Goddard Space Flight Center manages the DAVINCI mission for NASA's Science Mission Directorate.*