

IAF SPACE EXPLORATION SYMPOSIUM (A3)
Solar System Exploration including Ocean Worlds (5)

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THE ENVISION MISSION: UNDERSTANDING WHY EARTH'S CLOSEST NEIGHBOUR IS SO
DIFFERENT**Abstract**

EnVision is a Venus orbiter mission selected in 2021 by ESA's Science Programme Committee as the fifth Medium-class mission in the Agency's Cosmic Vision plan. It will be the first mission to investigate Venus from its inner core to its upper atmosphere, characterising the interaction between its atmosphere, surface/subsurface and interior. It aims at providing a holistic view of Venus, studying the planet's history, activity, and climate.

The EnVision spacecraft embarks five payloads and one experiment to address these science objectives. EnVision will deliver a completely new insight into geological history through complementary imagery, polarimetry, radiometry and spectroscopy of the surface coupled with subsurface sounding and gravity mapping; it will search for thermal, morphological, and gaseous signs of volcanic and other geological activity; and it will trace the fate of key volatile species from their sources and sinks at the surface through the clouds up to the mesosphere. EnVision will combine global observations at low or moderate spatial resolution (e.g. surface emissivity and atmosphere composition) with regionally targeted observations at higher spatial resolutions from innovative synthetic aperture radar measurements and subsurface sounding radar profiles.

This paper presents the EnVision spacecraft and its intended trip to our sister planet. It will also discuss the main engineering challenges that will need to be addressed during the development phase.

EnVision is an ESA-led mission in partnership with NASA, the latter providing the Synthetic Aperture Radar instrument (VenSAR), Deep Space Network (DSN) support and scientific contribution.