

WHAT PLANET ARE THEY ON?

The hubbub surrounding crewed flights to Mars in the late 2020s overlooks a closer interplanetary possibility. Nasa says manned voyages to Venus could be on the horizon. **Paul Sillers** reports

Mars might be the 'go to' destination for the likes of Elon Musk's *SpaceX* and Jeff Bezos' *Blue Origin* but, at 34 million miles away at the closest, it's a bit of a tedious slog to get to. That's why the boffins at the Systems Analysis and Concepts Directorate of Nasa's Langley Research Center in Virginia have been pondering the prospect of flying 24 million miles to Earth's nearer neighbour, Venus, using a combination of vehicles that includes a unique type of solar-powered airship.

The planet's dazzling aura has mesmerised successive civilisations for millennia, but Venus's incandescent allure is a mixed blessing, for the planet is a somewhat unapproachable beauty. During the 1960s space race, American *Mariner* and Soviet *Venera* exploratory spacecraft discovered the planet's surface temperature would quickly make landing vehicles wilt like Salvador Dali's melting pocket watches. Plus there were some other snags: Venus is covered in sulphuric acid clouds, craters and lava.

However, there's an upside. What was also discovered is that, 50km above its surface, gravity and radiation protection are comparable to that of Earth – to the extent that beyond our own planet, that layer of Venusian atmosphere is the most human-friendly to be found in the entire Solar System.

That actuality recently prompted Nasa to propose a five-phase exploration programme, known by the ironic acronym Havoc (High Altitude Venus Operational Concept). The first couple of phases involve robotic reconnaissance and orbiting around Venus. But it's in the third phase where things get personal, with a 30-day crewed journey to that

31-mile-high layer of benign atmosphere.

To descend to that altitude from the orbiting mothership, Nasa has designed a solar-powered airship that parachutes towards Venus while cunningly unfurling like a piece of unfolding origami. It then inflates like a pufferfish into a conventional looking airship with a gondola that provides safe habitat for the crew at that human-friendly altitude.

The Havoc airship's upper surfaces are covered in solar panels, which absorb four times more energy than they would on Earth, being much closer to the Sun. That energy can be used to sustain life, do experimental stuff and deploy probes – those perennial favourites of galactic exploration. Nasa is already developing sulphuric acid-resistant material to protect the airship, and if the Havoc project

goes ahead, its fourth phase would entail a one-year crewed mission, culminating in a final phase where 'Permanent Human Presence' is envisaged.

"With advances in technology and further refinement of the concept, missions to the Venusian atmosphere can expand humanity's future in space," says Nasa, though no launch dates are

pencilled in the diary yet. For the present, anyone wanting to have a peek at Venus will have to make do with her less celestial counterpart in the Louvre – the *Venus de Milo* can be found in Room 7 on the ground floor. ■

"Missions to the Venusian atmosphere can expand humanity's future in space"

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To boldly go...
Nasa's Havoc airships
could create a floating
outpost on Venus