

Vesper: multi-experience transport mission architecture in the Venusian environment.

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Introduction: This study presents a multi-objective Venusian mission architecture. Its aim is to offer multiple “customers” (research institute, university, private company) a service to transport their payload to a study target located on Venus without having to design a complete space mission. In order to facilitate the interfacing, the payloads meet the cubesat format from 1U to 12U.

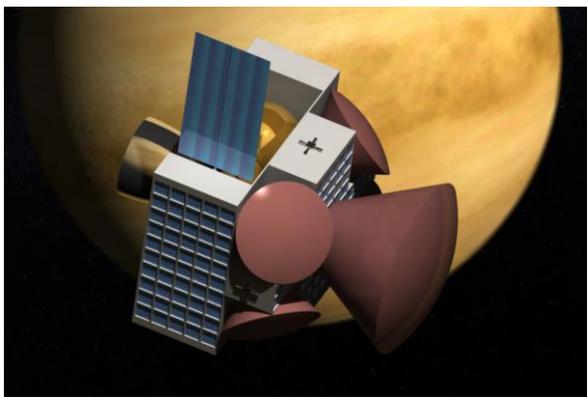
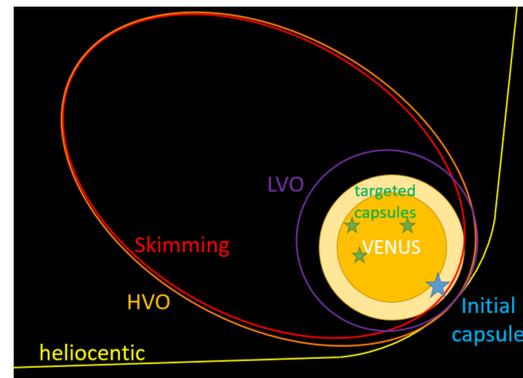
In comparison to a traditional mission focusing on some experience, a multi-customer’s transport mission allows the researcher to propose directly the experiences answering their questions. This would allow a single mission to generate many publications across a variety of domains.

The targets proposed by the mission are a heliocentric orbit, a high Venusian orbit, a low Venusian orbit, an atmospheric entry near Phoebe Regio or an atmospheric entry on a point selected by the customer.

This study presents the design of the transport platform, the distribution of costs per unit cubesat according to the target selected by the customer, management of the communications according to the payload position as well as the proposals of the simple, economical and cubsat air balloon inflation system.



1U atmospheric platform



Vesper probe

target	definition	Scientific interest
heliocentric	Heliocentric orbit (108Gm x 107 Gm 7.8°)	-Sun observation -NEO tracking -Interferometry
HVO	High Venus Orbit (66Mm x 250km 90°)	- Communication relay -Atmosphere observation -Balloons localization -magnetism
“Skimming”	High Venus Orbit (66Mm x 90km 90°)	-High atmosphere chemical analysis
LVO	Low Venus Orbit (250km x 250km 90°)	-Atmosphere observation -radar observation
Initial capsule	Atmospheric entry above phoebe regio (31°S 87°W)	-ballon, probe, lander -atmosphere chemistry and dynamic -surface morphology and chemistry -seismography
Targeted capsules	Atmospheric input above the selectable point	-surface morphology and chemistry -seismography -vulcanology