



Long-duration Balloon for in-situ Exploration of the Atmosphere of Venus

M.L. van den Berg (1), P. Falkner (1), A. Phipps (2), J.C. Underwood (3), J. Moorhouse (4), S. Kraft (4), A. Peacock (1)

(1) Science Payload and Advanced Concepts Office, European Space Agency, ESTEC, Noordwijk, The Netherlands, (2) Surrey Satellite Technology Limited, Guildford, United Kingdom, (3) Vorticity Limited, Chalgrove, United Kingdom, (4) Cosine Research B.V., Leiden, The Netherlands (MvdBerg@rssd.esa.int / Phone: +31-71 565 6751)

The European Space Agency together with industrial partners has studied a concept for low-cost in-situ exploration of the atmosphere of Venus, the Venus Entry Probe. The Venus Entry Probe is one of ESA's Technology Reference Studies (TRS). TRSs are model science-driven missions that are, although not part of the ESA science programme, able to provide focus to future technology requirements. This is accomplished through the study of several technologically demanding and scientifically meaningful mission concepts, which are strategically chosen to address diverse technological issues. The TRSs complement ESA's current mission specific development programme and allow the ESA Science Directorate to strategically plan the development of technologies that will enable potential future scientific missions.

The mission profile of the Venus Entry Probe TRS consists of two minisatellites and an aerobot. The first satellite enters a low Venus polar orbit. This satellite contains a highly integrated remote sensing payload suite primarily dedicated to support the in-situ atmospheric measurements of the aerobot. The second minisatellite enters deep elliptical orbit, deploys the aerobot, and subsequently operates as a data relay, data processing and overall resource allocation satellite.

The micro-aerobot consists of a long-duration balloon that will analyze the Venusian middle cloud layer at an altitude of ~55 km, where the environment is relatively benign ($T = 20\text{ }^{\circ}\text{C}$ and $p = 0.45\text{ bars}$). The balloon will deploy a swarm of active ballast probes, which determine vertical profiles of selected properties of the lower atmo-

sphere.

This presentation will focus on the mission objectives and the design of the mission, the spacecraft and aerobot. It will conclude with the identification of the key technological challenges.