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ESA Planetary and Solar-Terrestrial Technology Reference Studies

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The Science Payload and Advanced Concepts Office at ESA has introduced the concept of Technology Reference Studies (TRS) with the overall purpose to focus the development of strategically important technologies that are of likely relevance to future science missions. This is accomplished through the study of several technologically demanding and scientifically interesting missions, which are not part of the ESA science programme. Presently the Planetary Exploration Studies Section of SCI-A has studied four TRSs, the Venus Entry Probe (VEP), the Jupiter Minisat Explorer (JME), the Deimos Sample Return (DSR) and the Interstellar Heliopause Probe (IHP).

The VEP focuses on in-situ atmospheric exploration of Venus using an orbiter, a relay satellite and an aerobot, which will deploy active probes during flight.

The main objective of DSR is the return of one kilogram surface sample material from the Martian moon Deimos in a low gravity environment. A similar mission concept could be also applied to perform a Near Earth Object (NEO) sample return.

The IHP aims to travel to the Heliopause and the interstellar medium at a distance of 200 AU from the Sun within 25 years.

The JME explores the Jovian system and in particular the Jovian moon Europa with one relay spacecraft in a highly elliptical orbit around Jupiter, one circular polar orbiter around Europa and a microprobe.

Current study activities focus in the extension of the Jovian Explorer Scenario with additional one or two Jovian Magnetospheric orbiter(s), one low Jovian orbiter and Jovian entry probes. Another new concept deals with multi-scale Earth Magnetospheric constellation.

This paper gives an overview on current and future Planetary and Solar-Terrestrial TRSs concepts, with a focus on the Jovian Explorer and its scientific payload.