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On the study of highly integrated payload architectures and instrumentation for future planetary missions

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Future planetary missions will require advanced, smart low resource payloads and satellites to enable the exploration of the solar system in a more frequent, timely and multi-mission manner. The concepts required to build Highly Integrated Payload Suites (HIPS) was introduced during the re-assessment of the payload of the Bepi-Colombo (BC) Mercury Planetary Orbiter (MPO) [1]. Considerable mass and power savings were achieved throughout the instrumentation by better definition of the instruments design, higher integration and identification of resource drivers [2]. Higher integration and associated synergy effects permit optimisation of the payload performance at minimum investment while meeting demanding science requirements. This promising strategic approach and concept has been applied to a set of hypothetical planetary technical study missions to Venus, Mars, Jupiter/Eurpoa, Deimos and the investigation of the Interstellar Heliopause. Thereby the needs on future instrumentation were investigated and potential future instruments were proposed [3]. Knowledge on required innovative technologies, miniaturised electronics and advanced remote sensing technologies are the baseline for a generic approach, which is investigated here in the context of largely differing mission requirements. A review of the study, its outcome and the implications for the technology development programme will be presented.

[1] M. Collon, ESA SP-542 (2003) [2] S. Kraft, ESA SP-542 (2003) [3] S. Kraft, SPIE 5570-14 (2004)