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CONCEPT AND FEASIBILITY STUDY OF A TWO-MEN CREW PRESSURIZED VEHICLE WITH
ROBOTICALLY ENHANCED DEEP SAMPLING CAPABILITIES FOR NEAR EARTH ASTEROIDS
EXPLORATION**Abstract**

Near Earth Asteroids are an amazing source of knowledge of the Solar System and a perfect test bed for future missions to Mars. Manned missions have never traveled so far, but nowadays a reach out opinion is growing strong and asteroids represent an ideal step in the **incremental path** towards the exploration of our system. Sample collection and examination may lead to answer questions about the origin of the Solar System and, more importantly, of life itself. Moreover, simply performing a mission of this kind could bring in return a vast amount of data on human behavior in outer space and on technologies readiness. Within this framework, a complete mission has been designed to reach, explore and return samples from NEA 1999 JU3. Over the six modules composing the whole architecture, this paper will focus on one of the most critical, which is the **Crew Vehicle** for asteroid landing and surface exploration. In this paper, the most critical issues from both a technical and a human factor point of view are identified and a review of proposed solutions is conducted, also identifying novel concepts when possible. The final outcome is a **conceptual design** of a two-men crew vehicle which includes already developed and tested technologies as well as innovative ones, in order to achieve a new and functional configuration that will allow to overcome the current limits of space design. Such spacecraft features independent landing capabilities and a power system capable of supporting the deployment of complex surface payload; moreover, the presence of men allows performing Extra Vehicular Activities, opening a set of scenarios unreachable by robotic probes. Among others, the paper focuses on contamination, ergonomics and information handling aspects, for their relevance in current research in space architecture and human-machine interaction, as it has been found by surveying a pool of astronauts. Moreover, the usage of already space-proven technologies ensures **technical sustainability** to the design together with the attention posed on technological spin-ins and spin-offs opportunities: whenever new conceptual solutions have been introduced, the choice has fallen on technologies already developed in other fields or with possibilities of being re-purposed in other technological sectors.