Survey of Landing Methods on Small Bodies: Benefits of Robotics Manipulators to the Field. P. Peñarroya[1], S. Vyas[2], R. Paoli[3], and K. M. Kayak[4]. [1]Deimos Space SLU, Spain, Pelayo.Penarroya@deimos-space.com, [2]German Research Centre for Artificial Intelligence, Germany, Shubham.Vyas@dfki.de, [3]Universitatea „Alexandru Ioan Cuza" din Iași, Romania, Roberto.Paoli@uaic.ro, [4]German Aerospace Center (DLR), Germany, Karl.Kajak@dlr.de.

It is fully acknowledged that the exploration of small bodies can provide vital information about the origin of our Solar System and possibly also about the origin of life on Earth. Over the last years, there have been various attempts to study these small bodies and some have even returned samples ([1], [2], [3], [4], [5]). Current missions, such as *OSIRIS-Rex* and *Hayabusa2*, are in sample collection or return phases respectively, but still present limited sample collection capabilities due to their *Touch-and-Go* acquisition mechanisms. Concurrently, the capabilities of robotic manipulators have improved in the last decade leading to applications in space missions such as [6], [7], and [8].

In this paper, a summary of the landing techniques used in missions to small bodies is given and their performance, flexibility, and robustness are assessed. Based on these criteria, the overall gaps that these techniques present are identified and classified. Furthermore, a study on space-based robotic manipulators is presented, and their benefits are highlighted. A novel landing technique to land on small bodies that tries to fill the gaps in current landing systems with the possibilities that the robotic manipulators offer is introduced. A compilation of the possible applications that such a landing technique provides is given, and its potential performance is assessed and compared to the state of the art. Finally, the feasibility of using a robotic arm for posterior mission phases, such as hopping to traverse around the surface of the small body, is discussed.

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