IAF SPACE TRANSPORTATION SOLUTIONS AND INNOVATIONS SYMPOSIUM (D2)
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IN-ORBIT TRANSPORTATION: THE KEY SERVICE FOR COMMERCIAL SPACE MISSIONS

Abstract

The technological evolution characterizing the space sector during the last decades has led today to smaller satellites and new strategies for operative orbit selection. In fact, mass and volume have been shrinking, maintaining or even improving the level of performance. At the same time, thanks to the engineering progress, more orbital slots are now selected for commercial missions. Nowadays, space companies are not only launching more satellites but are also exploiting modern technologies to select specific operative orbits that were less used in the previous era. Small satellite manufacturers and operators can take advantage of different levels of service according to their needs in terms of launch and deployment. Selection of the right launch and deployment strategy is a key factor for the success of the project itself, as launch availability might influence the design and number of their satellites, the scope of the mission and even the target orbit identified to operate the spacecraft. So far, non-common release target orbits could be achieved only by dedicated small launch vehicles with a higher cost per kg, while missions with more relaxed requirements in terms of final orbit can be accomplished through piggyback missions operated by large-capacity launchers at a lower rate. Over the last few years, the development of spacecrafts equipped with propulsion and deployers, known as OTV (Orbital Transfer Vehicles), have started: these OTVs, have been conceived to provide customers with the unique opportunity to fulfil their specific orbit release requirements, at a more affordable price. OTV will cover the "last mile" of the deployment phase, offering on-orbit transportation services from the launch vehicle release orbit to the final customer orbit. The first D-Orbit space tug flew in 2020 aboard the Vega VV16 mission. As of today, eleven ION Satellite Carrier OTVs have been launched, releasing the customer on board on specific orbital parameters. Firstly, the paper will present an analysis of how the selection of the operative orbits is changing thanks to the advent of the new space era. Afterwards, it will focus on the ability of ION Satellite Carrier OTV to fulfil the space access requirements of the customer on board. This will cover the case of constellation deployment and it will focus also on how the OTV can enable more customized and cost-effective solutions to their users.