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MISSION-ORIENTED DESIGN FOR NANOSATELLITES USING INNOVATIVE TOOLS AND  
PLATFORMS: BEEAPP AND BEEKIT

**Abstract**

There are three main barriers in the space sector that slow down the development of space applications, science and technology: extreme costs, consuming paperwork and complex technology. Open Cosmos reduces those obstacles with two main platforms: beeKit, a flexible payload development platform and beeApp, an innovative cloud-based mission and system simulator.

beeKit replicate the mechanical and electrical constraints of a satellite platform while still being modular to enable payload developers to change the configuration and physical dimensions. On the other hand, beeApp enables full online mission and systems development and space simulation capabilities when the payload is assembled in beeKit. In beeApp, payload developers can find a set of innovative tools that simplify the mission development process. The Mission and System Design (MSD) module allows users to run simulations and optimise different mission parameters based on the payload requirements. The Hardware In the Loop (HIL) module interfaces with the payload through beeKit, enabling smooth interaction and testing capabilities from day one. Other modules are currently being developed to assure mission operations, debris mitigation assessments, streamlined report generation and many more. These constitute a set of groundbreaking tools that simplify the process of sending payloads to space, with no precedents in the industry. With those platforms and tools, Open Cosmos provides public and private users a full end-to-end solution that covers all aspects of nanosatellite space missions with a new approach.

This paper will review the progress done and milestones achieved so far developing each of the innovative tools that simplify and optimise nanosatellite space missions. It will review the rationale behind using a fast-track approach towards space applications highlighting the potential of those tools currently being used in 20+ universities and research institutions around the world and also in soon-to-be-launched missions.