

DOCKS – An open-source software suite for space mission profiles

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The growing pace of the NewSpace has resulted in a significant rise in space missions, and consequently, a need for mission profile tools. Though many tools already exist in the market, either they are not capable of doing the complete mission profile or have high costs, which make them unsuitable for many. To overcome this gap, an open-source software suite targeting scientific nanosatellite mission profiles called DOCKS is developed at CCERES, the space pole of PSL Université, hosted at Paris Observatory. An additional advantage of DOCKS is that it is compatible with VTS, the French space agency (CNES) software to visualize and animate satellites in a 3d simulation.

DOCKS will be composed of seven thoroughly validated Python modules as plug-ins, which can also be used as standalone. Until now, the deep space trajectory Propagator, Energy Power Simulator, and Intervisibility modules have been developed. These are regularly updated on public GitLab with new features and improvements based on user feedback. Currently, DOCKS is being restructured to make it faster by adopting methods like parallelization or remote service from our servers. The latest developments in DOCKS with our future perspective will be presented in the talk. Further, CCERES also provides Model-Based System Engineering (MBSE) support to various CubeSat projects for the early phases of mission profile modeling, so the use of DOCKS in this context will also be demonstrated.

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