

SYMPOSIUM ON BUILDING BLOCKS FOR FUTURE SPACE EXPLORATION AND  
DEVELOPMENT (D3)

Space Technology and System Management Practices and Tools (4)

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UPC, SpainFULL CYCLE ENGINEERING TOOL FOR LOW-COST UNMANNED RESPONSIVE SPACE  
MISSIONS**Abstract**

It is well known that the space mission development time could be reduced by using Computed-aided design (CAD) tools. Nevertheless, to achieve low-cost space missions it is mandatory to have a full engineering cycle tool to reduce both, cost and time development. The cost of a mission is huge especially in the design phase. For small satellites it is mandatory to down the cost. The quality of such a tool should be independent from the cost and for this reason the proposed tool should be open source and freeware. Safety and quality should not be dependent from the cost or available resource, mainly when a low-cost mission is intrinsically low budget. The tool should be focused in a niche that large, expensive and heavy missions are not interested for. This is the case of: Low-cost unmanned responsive space missions.

In this work, a full cycle engineering tool for low-cost unmanned responsive space missions is proposed. The tool should cover several issues; from the chemical to the payload operation. It has to include typical phases of a mission, Solid and Liquid propellants, Engine design, Balloon if any, Launcher, Rocket stages, Jettison, Hover if any, Satellite or Rover, Attitude control, Link coverage, Astrodynamics, Trajectory, Orbit, Parachute if any, Lander if any, Ground Station network, etc.