

IAF SPACE SYSTEMS SYMPOSIUM (D1)
Space Systems Engineering - Methods, Processes and Tools (2) (4B)Author: Mr. Michael Halvorson
University of Alabama in Huntsville, United StatesMODEL-BASED MISSION PLANNING: ONTOLOGICALLY BESPOKE PROJECT MANAGEMENT
SYSTEM GENERATION USING MISSION-UNIQUE ARCHITECTURE AND PROCESS
FRAMEWORKS**Abstract**

A Model-Based Mission Planning architecture was presented at the 2022 International Astronautics Congress (IAC) wherein users input detailed or vague mission planning considerations such as payload type, orbit, launch type, funding institution, funding program, risk posture, partner institutions, contractors, and vendors into a software program called the Mission Planning Tool (MPT) resulting in the ontological generation of a Project Management System (PMS). The MPT input query structure and Graphical User Interface were usable at IAC 2022, but the PMS had not yet been formalized. Presented here is the fully realized system wherein MPT inputs generate the PMS in an open-source platform intended for use in CubeSat missions by developing countries and global universities. The PMS both contains and outputs a Work Breakdown Structure (WBS), Organizational Breakdown Structure (OBS), and Integrated Master Plan (IMP) bespoke to the query inputs from the MPT. The WBS contains all products to be executed throughout the mission life cycle, the reviews those products must be prepared by, the maturation status of products at a given review, the stakeholders who care about each product, and which stakeholders must be present at which review. The OBS defines which primary institutions, partner institutions, contractors, and vendors exist for the mission and which WBS products are allocated to which institutions or entities as statements of work for those parties. The IMP defines the development, procurement, integration, delivery, and launch schedules for the mission with preliminary spacecraft integration considerations resulting from vendor and contractor information inputs. The PMS is dynamically editable, and thus the WBS, OBS, and IMP outputs also update resulting in a system that represents a central source of truth for mission developers. The goal of this work is not to make it easy for universities or developing countries to succeed at spacecraft development; it is to make it hard for them to fail. The MPT and PMS software is completely open-source with plans to be distributed through the United Nations Office of Outer Space Affairs.