

PMPedia (Parts, Materials and Processes Encyclopedia): A Crowd-Sourced Space Radiation Electronics Knowledge Repository

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Small Satellite programs and short-duration missions are often characterized by limited budgets and short schedules, where protecting the precious opportunity for a ride to space on time is critical. In addition, increasing demands for advanced on-orbit capability through innovative technologies drive developers to use OTS (off the shelf) electronic parts, e.g., commercial, automotive, aviation, and industrial grade, as a key tactic. The challenge is that, while inexpensive, plentiful and highly capable, much is unknown about these parts' sensitivity to the natural radiation environment they will be exposed to in various orbits and in deep space. Due to multiple, interdependent constraints, such data is terrifically hard to come by. Meanwhile, the science and engineering workforce with vast radiation test experience is in a state of transition, with many experienced members exiting the space industry and the cadre of talented technical professionals entering still growing.

The PMPedia (**P**arts, **M**aterials, and **P**rocesses Encyclopedia) knowledge repository (www.PMPedia.space) has been deployed as a way to overcome the lack of ready access to radiation and other critical piece-part electronics knowledge. It simultaneously helps New Space players, developers, their stakeholders, and aspiring PMP professionals with a way to select OTS parts that is agile, efficient, based on sound technical rationale, and understandable. PMPedia is a collaboration between The Aerospace Corporation and the Laboratory for Atmospheric and Space Physics (LASP) at the University of Colorado-Boulder. The purpose is to host a wide range of OTS piece part knowledge with an emphasis on reliable, resilient space missions. PMPedia is a crowd-sourced repository that is openly accessible globally (account registration required for some functions). It hosts radiation test results, selection and test recommendations, FAQs (frequently asked questions), a discussion forum and linkage to valuable complementary web sites. PMPedia helps accelerate decision-making and knowledge transfer so that Small Satellite and other shorter-duration missions can reach their full potential for the benefit of their customers, principal investigators, and investors more quickly, reliably, and affordably.

This paper describes the PMPedia knowledge repository, including user access, participation agreement, process for submitting and vetting data, search capabilities, part selection decision tree, tutorials, links to related data sets, and user discussion forum. The PMPedia development team welcomes all interested users to visit www.PMPedia.space, contribute data, and submit feedback.