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Boost Radiation Hardness Assurance in your Space Mission with Machine Learning

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PRECEDER (Prediction of the Electrical Behavior of Electronic Devices under Radiation, Spanish acronym) is a new concept in the strategy of ensuring the radiation hardness in electronics, developed by our group. The idea is based on the use of archival data to assess the risk associated to radiation environments without irradiation testing needs. A critical step of Radiation Hardness Assurance (RHA) for space systems is given by the parts selection in concordance with the expected radiation effects. Radiation testing is the most decisive way of studying the radiation degradation. However, the increasing use of COTS (Commercial Off-The-Shelf) devices and the New Space challenges are pushing the need of finding new approaches to assess the risk associated to the radiation environment.

PRECEDER applies the methodology of Machine Learning searching the appropriated algorithm and finding solutions quality assessment. The development of this tool includes the search for optimal usage of the accumulated data, the search for learning methods, the analysis of application features and predict the behavior of EEE (Electrical, Electronic and Electro-mechanical) devices under radiation.

In this work, the methodology and application that has been established will be shown. The first successful results, obtained for specific devices and conditions, will be presented as a practical example.

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