

Abstract Submitted
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Non-Linear Model for the Disturbance of Electronics in by High Energy Electron Plasmas in the Van Allen Radiation Belts¹ WILLIAM ATKINSON, The Boeing Company — A model is presented that models the disturbance of electrical components by high energy electrons trapped in the Van Allen radiation belts; the model components consists of module computing the electron fluence rate given the altitude, the time of the year, and the sunspot number, a module that transports the electrons through the materials of the electrical component, and a module that computes the charge and electrical fields of the insulating materials as a function of time. A non-linear relationship (the Adameic-Calderwood equation) for the variation of the electrical conductivity with the electrical field strength is used as the field intensities can be quite high due to the small size of the electrical components and the high fluence rate of the electrons. The results show that the electric fields can often be as high as 10 MV/m in materials commonly used in cables such as Teflon and that the field can stay at high levels as long as an hour after the irradiation ends.

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