

## Project Details

**ROSES ID:** NRA-02-OSS-01

**Selection Year:** 2003

**Program Element:** Independent Investigation: LWS

**Project Title:**

Modeling the Long-Term Variations of Energetic Trapped Protons

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**Project Member(s):**

- Xapsos, Michael Anthony; COI; NASA/GSFC
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- Huston, Stuart ; Authorizing Official;

**Summary:**

We propose to develop methods to model the secular, seasonal, and solar cycle variations of the energetic protons in the Inner Zone. The effort will involve merging data from the low altitude POES and SAMPEX spacecraft as well as from CRRES to develop a data base of proton data covering more than two solar cycles and energies from 1 to 500 MeV. Each of these spacecraft has unique advantages and disadvantages. CRRES provides good energy resolution and covers essentially the entire radiation belt region, but the data extend only up to 100 MeV. SAMPEX provides data out to 500 MeV, but only at low altitude. POES has relatively poor energy resolution, but provides data covering more than two solar cycles. The spacecraft data will be augmented with simulations performed using the Salammb code in order to extend the spatial region of validity of the low altitude SAMPEX and POES data. In addition, we will develop a statistical model which for the first time will allow spacecraft designers to predict proton fluxes as a function of confidence level for any time period of interest. This trapped proton model will allow the design of more capable and robust spacecraft, and will also provide valuable insight into the source, transport, and loss mechanisms operating in the radiation belts. This project is a collaboration of researchers from the U.S. and Europe and thus provides the maximum return for NASA funding.

## Publication References:

**Summary:** "

**Reference:** Huston, Stuart Huston Asso - Modeling the Long-Term Variations of Energetic Trapped Protons

**Summary:** no summary

**Reference:** Fung, S. F.; Bell, E. V.; Tan, L. C.; Candey, R. M.; Golightly, M. J.; Huston, S. L.; King, J. H.; McGuire, R. E.; (2005) Development of a magnetospheric state-based trapped radiation database, *Advances in Space Research*, Volume 36, Issue 10, p. 1984-1991, doi: 10.1016/j.asr.2004.04.020