Air Force Research Laboratory

AE9/AP9/SPM: Update for the GEM Community

18 June 2014

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AE9/AP9/SPM Status

- AE9/AP9/SPM is a climatological model suite covering the radiation belts and trapped plasma for use in satellite design

- Includes 33 data sets, expanding over AE8/AP8's coverage to include plasma energies/species, plus protons to 2 GeV (in V1.2)

- Introduces data-based uncertainties and dynamics to inform design

- V1.0 was public released in Sept 2012, current version is V1.05

- New architecture supports routine updates with new data sets and features, as in forthcoming V1.2 release
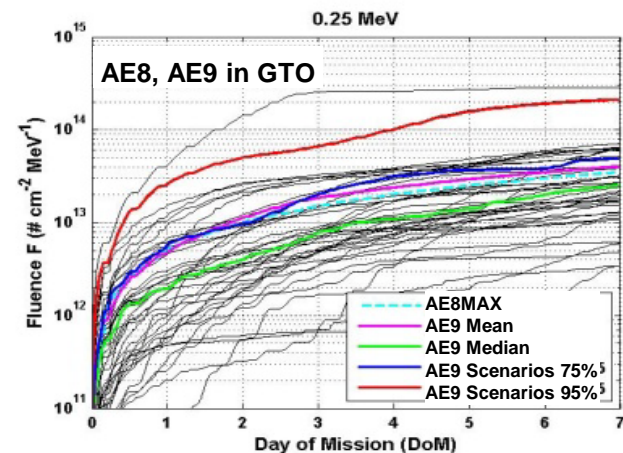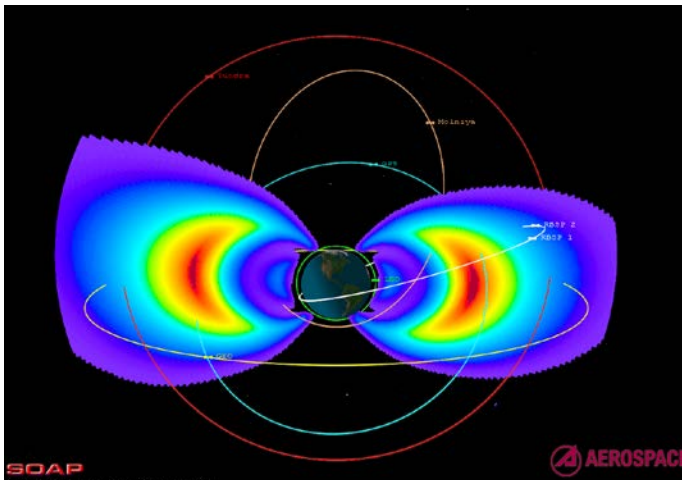
Our wish list

- We seek models and model products from the community for planned and proposed AE9/AP9/SPM upgrades, such as:

  – A radiation belt reanalysis spanning a solar cycle—intended for a sample solar cycle flythrough option

  – Sample radiation belt states (e.g., quiet time, storm time)—these can add to our template library, used to fill in gaps in data set coverage

  – Models of atmospheric interaction for added degrees of specification—drift loss cone, solar cycle variation, altitude gradients

  – Coordinate systems appropriate for planned additional populations—aurora, nightside and dayside plasma sheet

  – Descriptions of Shabansky orbit boundary

- We will be expanding our collaboration under a new name—IRENE—International Radiation Environment Near Earth

What we offer

- AE9/AP9/SPM is public released and free

- It is climatological—no activity-driven dynamics—but it does give data-driven estimates of the typical RB state with statistics encompassing the dynamics

- Provides realistic information for modelers—e.g., distributions in energy, pitch angle
  - V1.2 includes simplified ability to query by pitch angle

- Provides state-of-the-art representative radiation belts

- Intended as the new standard for spacecraft design (high visibility)

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- Info at NASA SET website:
  http://lws-set.gsfc.nasa.gov/radiation_model_user_forum.html

- No permanent download site yet—contact us to get the model