SPENVIS Upgrades

Coordinate generators

- Merge orbit generator and grid generator:
  - Simplification of model implementation
  - Simplification of model presentation and navigation
- Orbit generator:
  - Add NORAD Two Line Elements
  - Multi-segment missions
  - Uploads of trajectory files
  - New plots: evolution of fluxes, doses…
  - New orbit types: heliocentric, interplanetary, Molnya, Tundra, ballistic, upload of user ephemera files

Meteoroids and debris models

- Implement NASA96 and DIADEM debris models
- Implement particle/wall interaction models and damage estimates
- Implement DEBIE-2 data system
- Upgrade plotting routines and input pages
- Provide user help on selection of damage equations

Magnetic field models

- Implement IGRF 2000 (in progress)
- Implement external field models: Tsyganenko 2001, Kosik
- Upgrade of UNILIB
  - Replace spherical coordinates by Cartesian coordinates for internal calculations
  - Implement interfaces for Fortran, C, IDL, Java
  - Improve code efficiency

Spacecraft charging

- Implementation of DICTAT v2.0
- Upgrade of model input pages
- Improvement of secondary electron emission model
- Study of material parameters:
  - Influence on charging levels
  - Access to material data bases
- Help on domain of applicability and environment definition
- Add Langmuir type formulation
- Improve LEOPOLD outputs

Atmosphere and ionosphere

- Implementation of neutral atmosphere models:
  - MET99
  - NRLMSIS
- Implementation of ionosphere models:
  - IRI2001
  - SMI plasmasphere extension

Radiation environment models

- Trapped radiation models:
  - Implementation of NASA/SEE (if export restriction is lifted) and dynamic SAMPEX model
  - Folding of directional proton flux with shielding distr.
- New solar and cosmic ray models:
  - Nymmik CR and SEP models
  - ESP model (if export restriction is lifted)
  - CHIME
  - Boeing specification of Oct 89 event
  - JPL91 plus abundance table; update of JPL91
  - Mission lengths exceeding 11 years

Radiation environment

- Improvements of geomagnetic cut-off
- Multiple shield thicknesses for LET spectra: off-line calculation
- Implement uploads of particle spectra

Radiation effects

- Implement new damage coefficients in EQFRUX and further effects on effective power output
- NIEL enhancements:
  - Equivalent proton energy as user parameter
  - New NIEL curves and upload of NIEL curves
- Use measured cross sections for SEU rates
- Remove protons from LET spectrum for direct ionization
- Implement other CREME96 functionalities?
- User selection of plotting scales and units
- Other effects: radiation biology

Sectoring tool

- Fold shielding distributions with dose curves (in progress)
- Transport proton spectra through geometry
- Implement new volume elements and check for overlapping volumes
- Import of Geant4 shielding distributions
- Generate particle spectra and geometry in Geant4 macro format: Mulassis (in progress)
- Upload of shielding distribution files
- Implement shielding materials other than Al (by specifying material density)

Other upgrades

- Addition of satellite data sets: XMM, SAMPEX, CRRES/PS, HEO, …
- Interface to new ECSS standards
- Implement common file format
- Implement new file naming scheme
- Implement HTML format for report files (easy import in EXCEL)

Interface improvements

- New home page layout
- New model and help page layout
- Simplify model navigation:
  - Extended navigation menu on pages
  - Better integration of models with coordinate generators
- Extended use of JavaScript:
  - ‘dynamic’ pages
  - Reduction of number of pages
- Port to Linux
- Java interface prototype

User feedback

- User requirements definition
- Survey
- Help desk
- Tutorial pages
- What is missing in SPENVIS? What can be improved?

Funding

- Funding for two more years in GSTP
- Future options:
  - No funding, SPENVIS disappears after maintenance period (no upgrades!)
  - Funded by ESA
  - Funded by users:
    - On-line usage
    - Licenced copies on Windows, Linux, UNIX; SPENVIS can also be used for other applications, easy to extend by users
    - Runs on demand
    - Advertising
  - Open source