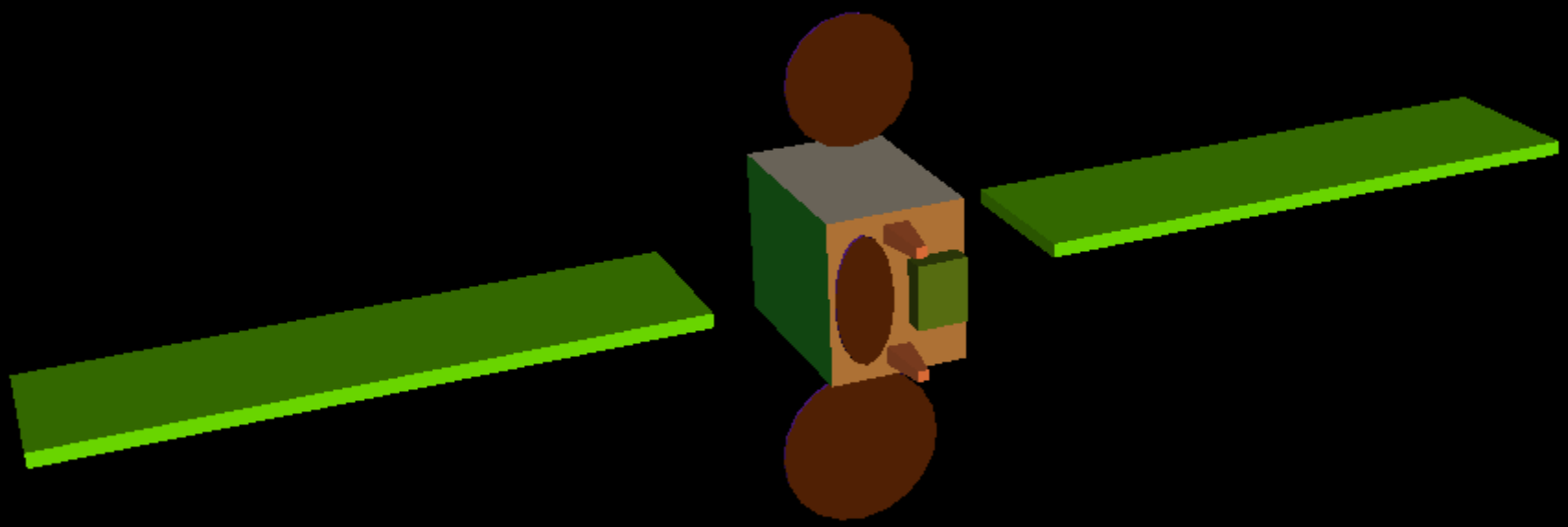


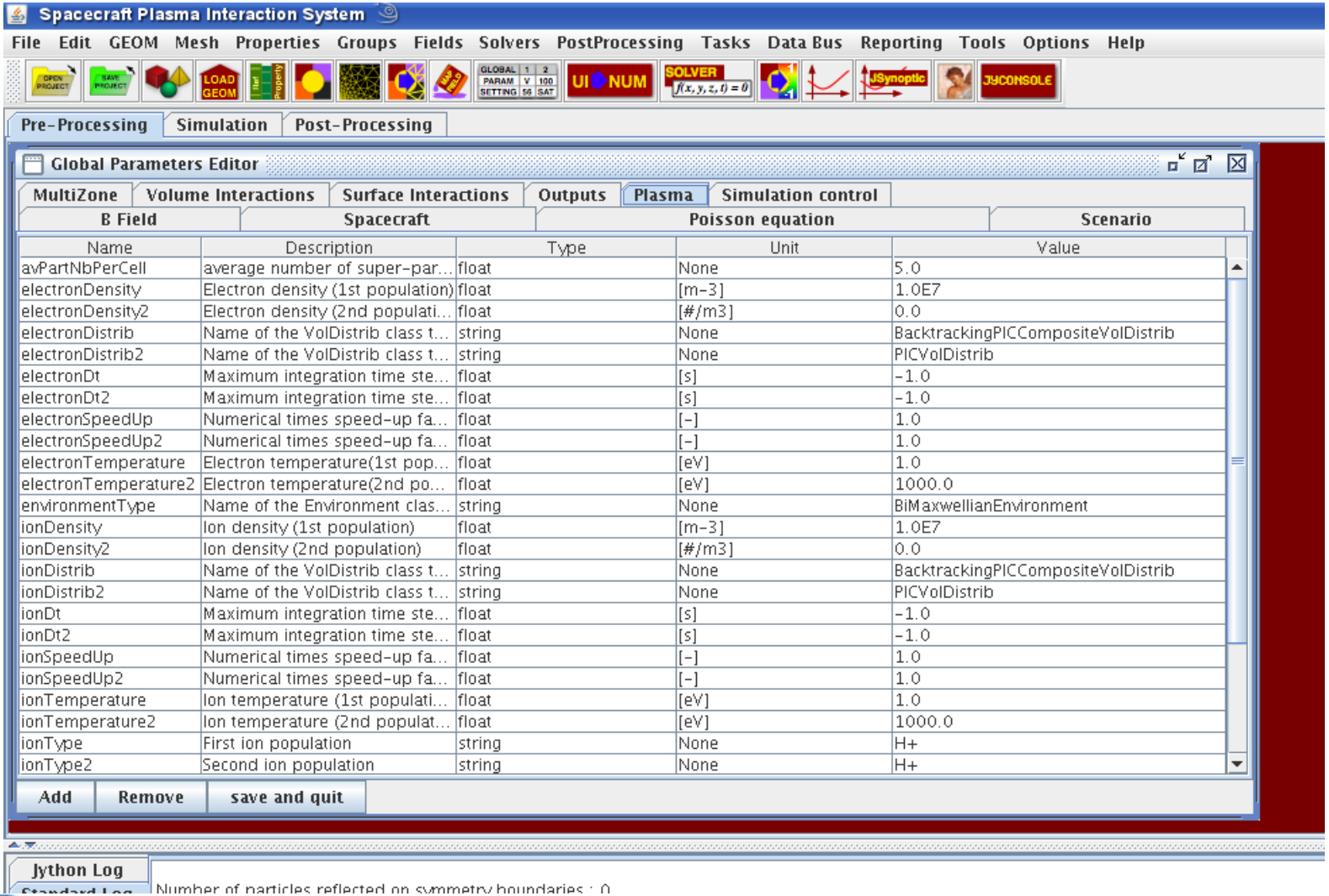
MEO-GEO Tool Development

SPINE Meeting
28-29 September 2009
ESTEC

Electromagnetics & Space
Environment Division – TEC-EES

Background

- GEO charging common engineering problem
- New SPIS capabilities aimed at better GEO charging simulation
  - Current through back-tracking
  - Implicit capacitance calculation
- SPIS flexibility means
  - Choice of physics methods
  - User control of the simulation process
- Steep learning curve for SPIS users



Name	Description	Type	Unit	Value
avPartNbPerCell	average number of super-par...	float	None	5.0
electronDensity	Electron density (1st population)	float	[m-3]	1.0E7
electronDensity2	Electron density (2nd populati...	float	[#/m3]	0.0
electronDistrib	Name of the VolDistrib class t...	string	None	BacktrackingPICCompositeVolDistrib
electronDistrib2	Name of the VolDistrib class t...	string	None	PICVolDistrib
electronDt	Maximum integration time ste...	float	[s]	-1.0
electronDt2	Maximum integration time ste...	float	[s]	-1.0
electronSpeedUp	Numerical times speed-up fa...	float	[-]	1.0
electronSpeedUp2	Numerical times speed-up fa...	float	[-]	1.0
electronTemperature	Electron temperature(1st pop...	float	[eV]	1.0
electronTemperature2	Electron temperature(2nd po...	float	[eV]	1000.0
environmentType	Name of the Environment clas...	string	None	BiMaxwellianEnvironment
ionDensity	Ion density (1st population)	float	[m-3]	1.0E7
ionDensity2	Ion density (2nd population)	float	[#/m3]	0.0
ionDistrib	Name of the VolDistrib class t...	string	None	BacktrackingPICCompositeVolDistrib
ionDistrib2	Name of the VolDistrib class t...	string	None	PICVolDistrib
ionDt	Maximum integration time ste...	float	[s]	-1.0
ionDt2	Maximum integration time ste...	float	[s]	-1.0
ionSpeedUp	Numerical times speed-up fa...	float	[-]	1.0
ionSpeedUp2	Numerical times speed-up fa...	float	[-]	1.0
ionTemperature	Ion temperature (1st populati...	float	[eV]	1.0
ionTemperature2	Ion temperature (2nd populat...	float	[eV]	1000.0
ionType	First ion population	string	None	H+
ionType2	Second ion population	string	None	H+

SIMPLIFIED STANDARD MEO/GEO TOOLS FOR SPACECRAFT CHARGING

- TRP (100-200kEuro)
- Initiated
- Objectives: To develop a tool for the evaluation of surface electrostatic charging that can be used without specialized training and which guides user in making appropriate choices for GEO/MEO application
- Description: A user-friendly tool will be developed using software components from the SPIS. It will include standard plasma environment, material property lists, and will allow 3-d geometrical models to be created. The tool will allow for a high degree of automisation of parameters needed to make the code run but which do not reflect real physical inputs, e.g. mesh resolution, particle weights, time-steps. The code will be extensively verified using available data. User and data interfaces will also be produced.

THE END