

Round tables

The round tables were intended to allow users to share their ideas of needs and desirable next steps. From the ESA perspective these would help in shaping future activities. These notes were informally recorded by David Rodgers who apologizes for inaccuracies and omissions.

Data and Measurements

This discussion section was mainly aimed at discussing needs for new data and measurement techniques. It followed a session in which instruments developments and results of data analysis were presented

Dhiren Kataria mentioned new opportunities such as L5 Carrington: Monitors from LEO to L1 were needed: Cubesats – there are plans for lots of US missions + constellations in LEO

Jean-Francois Roussel - density of low energy protons not well known, they stop s/c charging

David Rodgers mentioned non-geo worst cases – there is a need for long term measurements in orbits away from GEO e.g. GPS

Other discussions mentioned the lack of space data for electric propulsion. Langmuir probes and electrostatic analysers are both useful also RPAs + mass spectrometers. CEX measurements are important because can't be done well in lab

The lack of in-site measurement of ESD effects, e.g. transients was regretted. Jean-Charles Mateo-Velez mentioned that flying monitors externally on solar arrays was difficult to be accepted by manufacturers. David Rodgers said that internal monitors inside the spacecraft would also be useful, e.g. detecting transients on the power bus.

Passive emitter flight testing is required with diagnostics.

Simulation tools

Here we discussed simulation tools including SPIS.

Users of tools such as SPIS for surface charging (and the internal charging tools) are in need of material properties.

Integration of material databases is desirable (as had been illustrated by the Matrex compatibility study).

Time-dependent environments in SPIS may be required.

Jean-Charles Mateo-Velez mentioned that obtaining material properties was not simply a matter of filling in parameter table. New types of material properties are needed because of new material models arising from better understanding.

Christian Imhof felt that SPIS was generally good but inputs (environment , e.g. protons and auroral environment) are the biggest problem; Speedup is still desired but runtimes are OK.

Fabrice Cipriani felt that for parametric studies run-times are too long. Pierre Sarrailh commented that parallelisation of parametric studies should be possible

Case studies are required in ground simulation for comparison with simulation tools.

R&D

Here there was a general discussion of possible future R&D activities.

In the electric propulsion field there are more SPIS activities expected.

Pierre Sarrailh commented that there is a need for modelling of the distribution function in the plume and the return current to the s/c.

Jean-Francois Roussel commented – physics of electrons in plumes needs more work, not just implementation in SPIS.

Pierre Sarrailh proposed that experimental measurement of interconnect behaviour in plumes would be useful.

Jean-Charles Mateo-Velez asked for more work on contamination from plumes

Henning Wulf was also interested in dust associated with plumes

FEEPs were mentioned – here more experimental characterization of emitted ions/drops are needed

Jean-Francois Roussel mentioned hopping trajectories around interconnects and the effects on the parasitic currents on solar arrays

Dave Pitchford mentioned some needs from his perspective

- Is GEO worst case really worst case at other locations (David Rodgers mentioned that he has also raised this in data an measurement discussion)
- Parasitic currents need better modelling
- Plume interactions need further work, including exit and entry to eclipse

Material characterisation issues were mentioned

- Populating materials list
- Improving our physical understanding

Jean-Charles Mateo-Velez suggested that there should be regular updates of both material parameters and models (e.g. every 6 months)