GPS ANTENNA INTEGRATION ON THE SWARM SATELLITE

The performance of the antenna including spacecraft interference was calculated with efield® MLFMM. The spacecraft/satellite is mainly covered by large solar panels, consisting of metal films embedded in a dielectric material. Small details compared to the wavelength were removed and all parts of the antenna and the satellite were assumed to be PEC, an acceptable assumption for the frequencies considered.

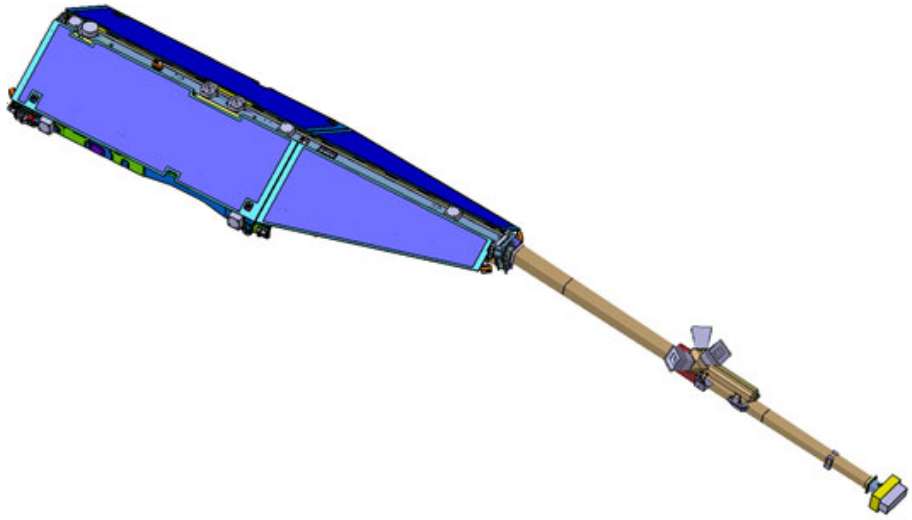

Figure 1: A CAD model oft the SWARM satellite. Courtesy of RUAG Space AB, Sweden.

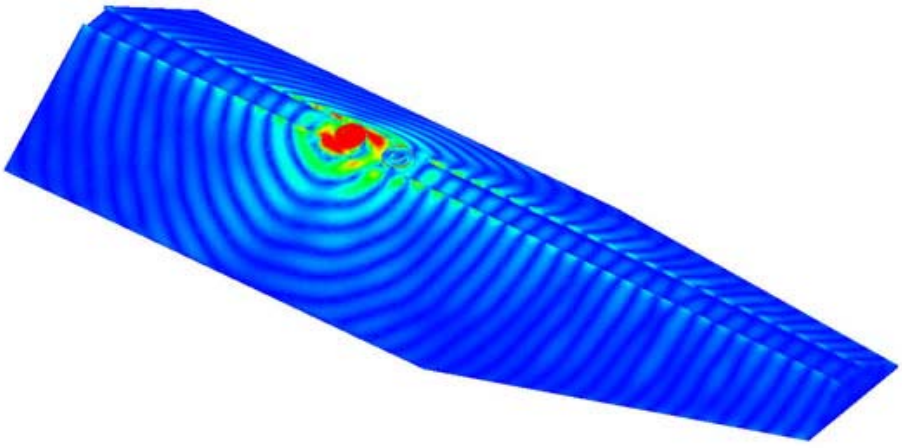

Figure 2: Simulation of surface currents on the SWARM satellite. Courtesy of RUAG Space AB, Sweden.

Details of the efield® MLFMM simulations

- Frequency GPS L1=1575 MHz

- Frquency GPS L2=1227 MHz
- Waveguide mode port excitations
- Memory usage ← 2 GB
- MLFMM + pre-conditioner + CFIE gives fast convergence

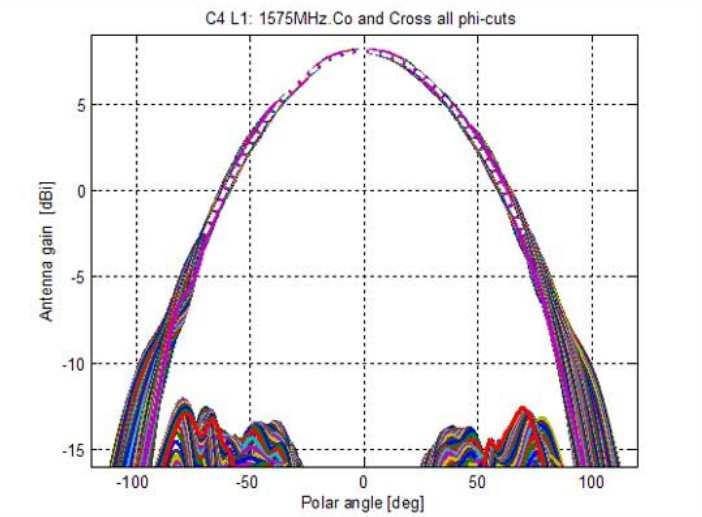

Figure 3: Far field for frequency L1 (1.6GHz). Co- and cross-polarisation for all azimuth cuts

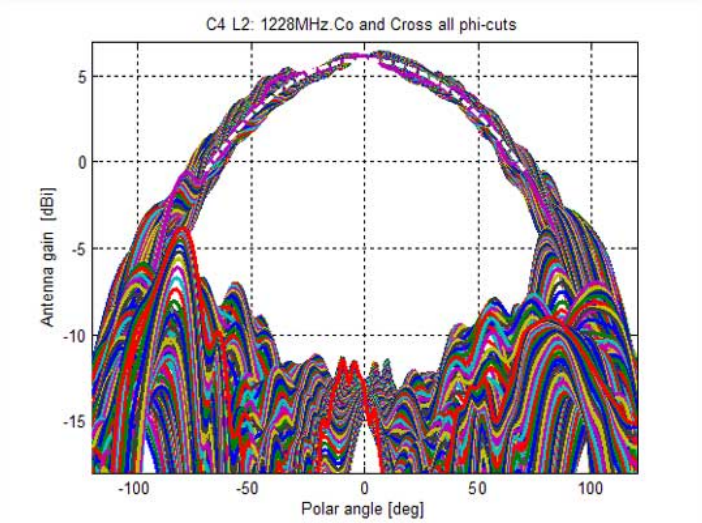

Figure 4: Far field for frequency L2 (1.2GHz). Co- and cross-polarisation for all azimuth cuts

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