How to Use CST to Examine Beam Pattern Differences from Solidworks Models

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1. You'll need 2 Solidworks models: one of the BicoLog by itself (base), and one of the BicoLog with anything around it that may affect the beam pattern (test). Save them as STEP AP214 files.
2. Open CST, create a Project Template. Choose MW & RF & Optical > Antennas > Waveguide > Time Domain. Set units to your choice (I only changed GHz to MHz), and set the frequency range from 10 to 250 MHz. Add Farfield monitors only, specifically one at 137.5MHz.
3. Import one of the STEP models. Go through and set the materials again (as they don't carry over from STEP files). Improvise where necessary (plastic is similar to air, important materials are metals and electronics). Make sure to not forget the pieces inside the BicoLog.
4. Create a discrete port from the corner of one horn_connection to the other. Leave it's values default. Then you can start the simulation.
5. Once it completes, you can open the Farfields folder and click the f=137.5 option to view the 3D beam. With this option still selected, go to Post Processing > Import/Export and export as Plot Data (ASCII).
6. Once you have the result txt files for the solitary BicoLog and the comparison model, send them over to a Linux computer to start running some scripts for analysis. You'll need CST_to_healpix.py and plot_slices.py from the ECHO repo.
7. In a terminal, type the following to create fits files from the exported text files:
   `source activate HERA`
   `cd Downloads` (or whatever folder your ASCII files are in)
   `python ~/src/ECHO/scripts/CST_to_healpix.py results_BicoLog_ff137.txt` (or your filename of your base results)
   `python ~/src/ECHO/scripts/CST_to_healpix.py results_Vader_ff137.txt` (or your filename of your test results)
8. Still in the terminal, type the following to create the plots
   `plot_slices.py ~/Downloads/results_BicoLog_ff137.fits ~/Downloads/results_Vader_ff137.fits` (or whatever fits files you just created from your base and test models, in this order)
9. This will pull up a plot to see the difference in beam patterns between the two models.