

Rough Surface RCS

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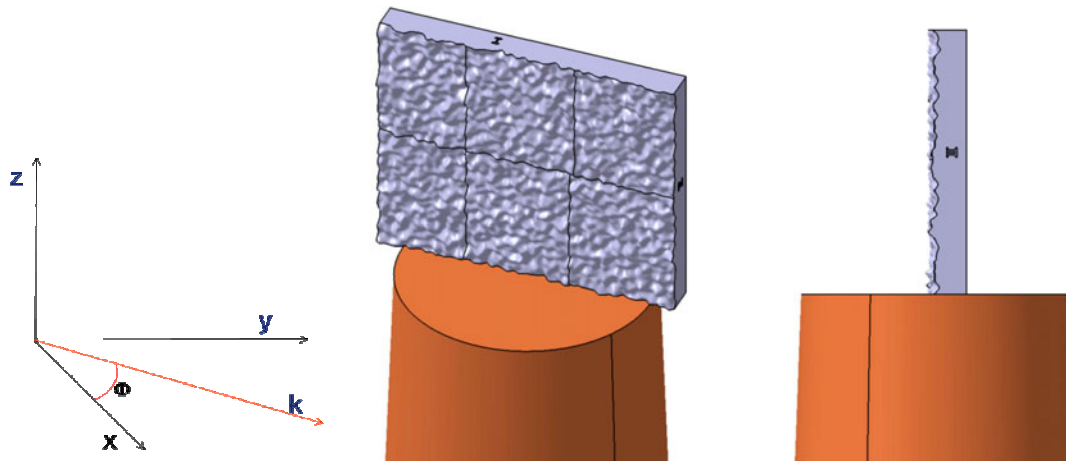
The objective of this problem is the calculation of a rough surface radar cross section. A sample has been manufactured and measured. The calculation results will consequently be compared to the measurement results. One IGES file of the random surface sample will be made available.



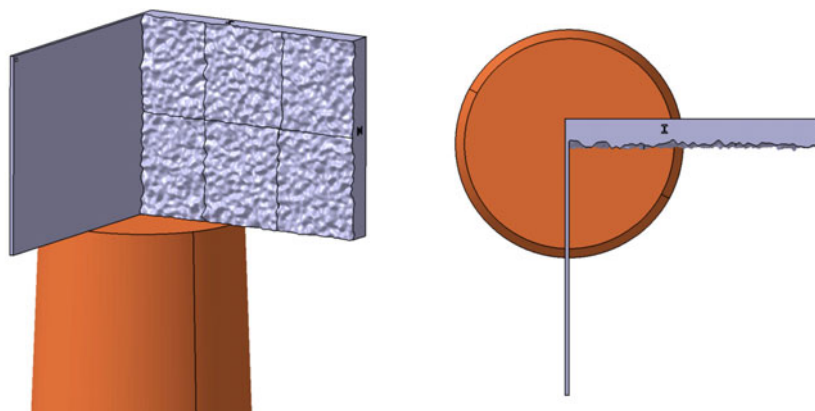
Figure 1: rough surface sample

Test cases

2 test cases will be considered as presented in the below figures:



The mast rotates around z axis
Test case N° 1



Test case N° 2
Dihedral + rough surface sample

Test cases

1) Sample N° 1

The rough surface sample is placed as shown on figure 2 such that the surface average plane is in the xz plane. The electric field is horizontally polarized. E is in the xy plane. The Φ angle is measured with respect to the x axis.

The calculation should provide the E field scattered by the surface: co-polar and x-polar, for the monostatic case. The angle Φ will vary from 1° to 179° . The step is 0.5°

The rough surface sample is constituted of a material with a dielectric constant $\epsilon_r = 6. - j 0.39$

Two calculations will be done for frequencies equal to 3 GHz and 10 GHz

The rough surface sample dimensions are 60 x 49.7 x 6 (average plane), all numbers in cm.

2) Sample N° 2

Same as before with a dihedral structure.

The additional plate is perfectly conducting. The height of the additional plate is 66 cm measured from the base of the sample rough surface. The thickness of the rough surface sample is 6 cm on average. The additional vertical plate has consequently dimensions equal to the rough surface sample. Its thickness will be ignored in the calculation.

Results provided as excel files.

1 file per submission

4 pages named: Sample N°1 10 GHz, Sample N°1 3 GHz, Sample N°2 10 GHz, Sample N°2 3 GHz

Sample N° 1: 10 Ghz : Φ angle, $E_{\Phi\Phi}$ and $E_{\Phi\theta}$ (real, imaginary, module), 7 columns

Sample N° 1: 3 Ghz : Φ angle, $E_{\Phi\Phi}$ and $E_{\Phi\theta}$ (real, imaginary, module), 7 columns

Sample N° 2: 10 Ghz : Φ angle, $E_{\Phi\Phi}$ and $E_{\Phi\theta}$ (real, imaginary, module), 7 columns

Sample N° 2: 3 Ghz : Φ angle, $E_{\Phi\Phi}$ and $E_{\Phi\theta}$ (real, imaginary, module), 7 columns