

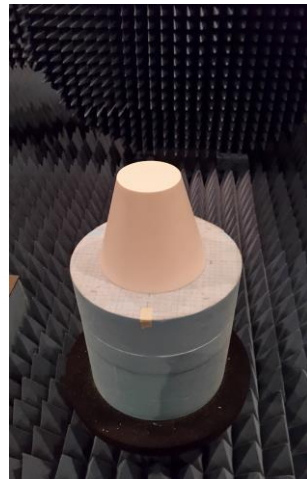
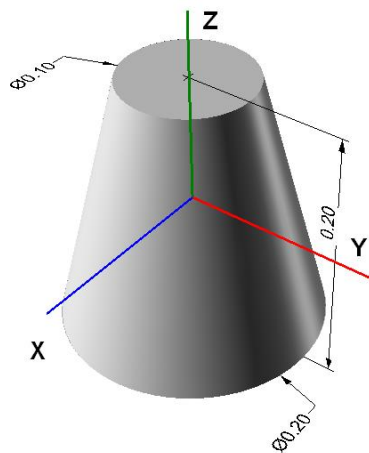
# TEST CASE 1: Dielectric Truncated Cone

## Monostatic / Bistatic Measurements

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### 1. Definition of the Geometry

The target is a dielectric truncated cone of height 20 cm. The phase centre is assumed to be located at  $(x,y,z) = (0,0,0)$ .



### 2. Measurement Parameters

Given the coordinate system of the CAD model (see above) and this usual definition of angles:

- Elevation angle Theta,  $\theta$ : starting from the positive +z axis.
- Azimuth angle Phi,  $\phi$ : starting from the positive +x axis.

, the following sub-cases are proposed.

#### 2.1. Case (a): X-Band (Monostatic RCS)

The co-polar monostatic RCS for both polarizations is required in an angular sweep that starts from the smaller base of the truncated cone and ends in the bigger one. This needs to be obtained for a certain number of equally spaced frequency points.

- Frequency:  $f = [8 \text{ GHz}, 12 \text{ GHz}]$ ,  $\Delta f = 100 \text{ MHz}$
- Angular Sweep:  $\phi = 0^\circ$ ,  $\theta = [0^\circ, 180^\circ]$ ,  $\Delta\theta = 1^\circ$
- Polarizations: Both co-polar, i.e. Theta-Theta and Phi-Phi

## 2.2. Case (b): Ku-Band (Monostatic RCS)

The co-polar monostatic RCS for both polarizations is required in an angular sweep that starts from the smaller base of the truncated cone and ends in the bigger one. This needs to be obtained for a certain number of equally spaced frequency points.

- Frequency:  $f = [12 \text{ GHz}, 18 \text{ GHz}]$ ,  $\Delta f = 100 \text{ MHz}$
- Angular Sweep:  $\phi = 0^\circ$ ,  $\theta = [0^\circ, 180^\circ]$ ,  $\Delta\theta = 1^\circ$
- Polarizations: Both co-polar, i.e. Theta-Theta and Phi-Phi

## 2.3. Case (c): C-Band (Bistatic RCS)

On the contrary, this sub-case requires co-polar bistatic RCS for both polarizations. The truncated cone is always illuminated from the smaller base and then, an angular sweep that starts from the smaller base of the truncated cone and ends in the bigger one is demanded for the reception. This needs to be obtained for a certain number of equally spaced frequency points.

- Frequency,  $f = [2 \text{ GHz}, 4 \text{ GHz}]$ ,  $\Delta f = 100 \text{ MHz}$
- Angular Sweep:
  - Illumination:  $\phi = 0^\circ$ ,  $\theta = 0^\circ$
  - Reception:  $\phi = 0^\circ$ ,  $\theta = [0^\circ, 180^\circ]$ ,  $\Delta\theta = 1^\circ$
- Polarizations: Both co-polar, i.e. Theta-Theta and Phi-Phi

## 3. Data Formats

The results will be stored in ASCII files, labelled as:

- test\_case\_1a\_CONTRIBUTOR\_NAME.txt
- test\_case\_1b\_CONTRIBUTOR\_NAME.txt
- test\_case\_1c\_CONTRIBUTOR\_NAME.txt

where “CONTRIBUTOR\_NAME” should be replaced by the name of the contributing institution,

Each file will contain on each row the data (5 columns):

$\theta$	$Re(\sigma_{\theta\theta})$	$Im(\sigma_{\theta\theta})$	$Re(\sigma_{\phi\phi})$	$Im(\sigma_{\phi\phi})$
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where  $\theta$  is the angle in degrees and  $\sigma_{\theta\theta}$  and  $\sigma_{\phi\phi}$  are the complex co-polar RCS in  $\theta\theta$ -polarisation and  $\phi\phi$ -polarisation and  $Re(\cdot)$  and  $Im(\cdot)$  denote the real and imaginary parts. Bear in mind that the RCS in dBsm will be calculated by the chairs from this raw data exclusively as  $20 \cdot \log_{10}(\text{abs}(\sigma_{xx}))$ , with  $\sigma_{xx} = \text{Re}(\sigma_{xx}) + j \cdot \text{Im}(\sigma_{xx})$ .

## 4. Conditions

Each institution willing to participate has to take into account the following conditions:

- The Target Under Test (TUT) is property of INTA.
- Each institution can have the TUT a natural month for conducting the tests.

- Each institution can choose the month that best fits its own internal schedule (up to 3 different months can be chosen, sorted by priority). A point of contact (name, telephone and e-mail) together with a postal address are mandatory for each institution willing to participate:

<b>Month</b>	<b>Preference (choose up to 3, indicating first, second and third options)</b>
October 2018	
November 2018	
December 2018	
January 2019	
February 2019	
March 2019	
April 2019	
May 2019	
June 2019	
July 2019	
August 2019	
September 2019	
<b>Point(s) of contact</b>	
Please, provide name, telephone and e-mail of the point(s) of contact together with the full postal address where the TUT should be sent	

- After receiving all the requests to participate, the chairs will distribute the final schedule and the points of contact.
- INTA will send the TUT to the first participating institution.
- Each institution is accountable for correctly manipulating the TUT during the tests to be conducted in its facilities:
  - Upon reception of the TUT, the first task to do is to notify the chairs and send them photographs of the TUT.
  - After finishing the tests, the institution must send the TUT to the following institution. Unfortunately, this courier service has to be funded internally by each institution.
- The last institution will send the TUT back to INTA.