

## **Simulation parameters for step model**

The model is appropriate to test the following RaySAR aspects:

- simulation of 2D maps (MATLAB GUI „2D\_Maps“)
- simulation of height profiles / maps (including elevation; MATLAB GUI „Elevation\_Analysis“)

POV-Ray ray tracing:

→ Windows: open the POV-model in POV-Ray and run (→ button „run“) the rendering procedure using the rendering settings [1000x1200, No AA]. Result: „Contributions.txt“ in model folder. Define the intended setting in ini-file „QUICKRES.INI“ (→ button „Ini“) if it is not available yet.

→ Linux: use the terminal command „povray Step.pov +W1000 +H1200“ in the folder of the POV-model. Result: „Contributions.txt“ in model folder.

## **Model parameters**

- 3D model: composed by two boxes defined in POV-Ray; box dimensions (length, width, height): 20 m x 20 m x 20 m; 20 m x 20 m x 40 m
- Azimuth-Elevation plane: 100 m x 120 m
- Rendering: 1000 x 1200 pixels, no anti-aliasing
- Surface parameters
  - Step: finish {reflection {0.5} ambient 0 diffuse 0.3 specular 0.7 roughness 0.005}
  - Ground: finish {reflection {0.5} ambient 0 diffuse 0.1 specular 0}
- Imaging geometry
  - Position of sensor and light source: location <0,60,-60>, i.e. Angle of incidence = 45°
  - Scene center: look\_at <0,0,0>
- Object changes
  - Translation: box 2 translated <0,0,20>

## **Parameters for simulating the reflectivity map**

- Image limits: azimuth: -15 m to 15 m; (slant) range: 62 m to 137 m
- Pixel spacing: 0.2 m x 0.2 m

- Image geometry: slant range
- Aspect angle (heading angle): frontal view
- Summing of signal contributions: non-coherent
- Dynamic range of amplitudes: -20 dB to maximum dB

**Parameters for the elevation analysis**

- Elevation resolution for scatterer histogram: 2 m
- Sampling stepwidth for slice in elevation direction: 2 m
- Elevation interval to be displayed: Min - Max