TEST CASE 3 WORKSHOP ISAE 2023

PRIME AIRCRAFT

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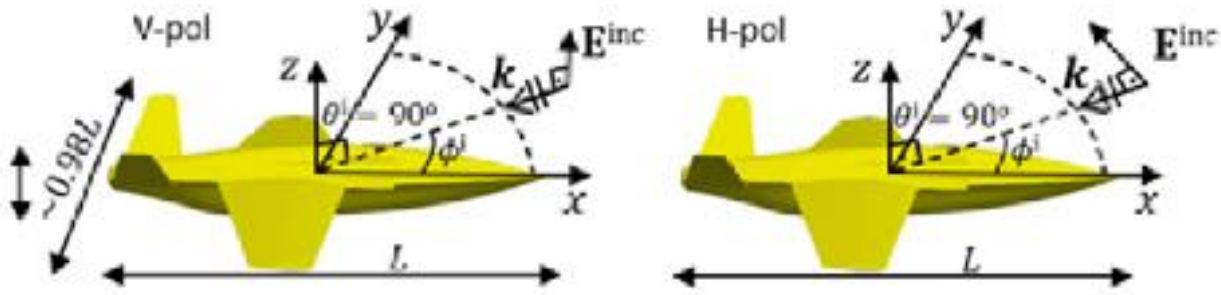
This test case is derived from benchmarks problem proposed by the UT Austin CEM Group (https://github.com/UTAustinCEMGroup/AustinCEMBenchmarks/tree/master/Austin-RCS-Benchmarks/Problem%20IV-PRIME%20Aircrafts)

For the present test case, 3 input models (IGES format) for required simulations are provided: Closed-Duct_PRIME_model_s7_9p1875in.igs, Closed-Open_PRIME_model_s7_12meters.igs and Closed_PRIME_model_s7_12meters.igs

DESCRIPTIONS:

1) **Metallic body with closed ducts**: reference body



With L main dimension of the body

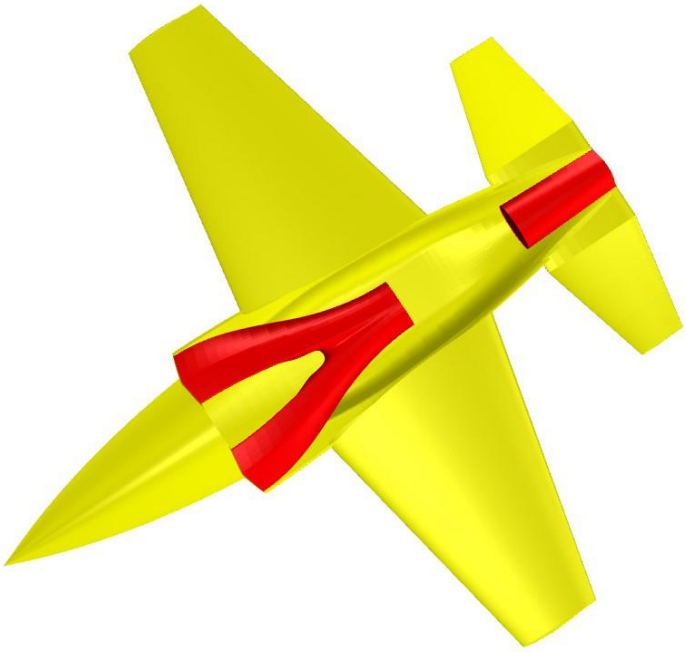
2) **Resin body with closed ducts**:

The whole body is made in resin: Debye Law for relative permittivity $\varepsilon_r(f)$ with f in GHz

$$\varepsilon_r(f) = \varepsilon_r'(f) - j\varepsilon_r''(f) = 2.85 - j0.0687 + \frac{0.365 - j0.0602}{1 - jf(-0.1135 + j0.899)}$$

3) **Metallic body with open ducts**:

With 2 convergent air-intakes and a nozzle



OUTPUTS:

Subtest case a) Resin body with closed ducts compared to reference body

L = 0.2333625meters (9.1875in)

Frequencies: F1=10.25GHz (measurements available); F2=20GHz

θi= 90°; Φi = 0° to 180°, step 0.5°

Results: monostatic RCS (resin and metallic bodies) for both H and V polarizations

4 ASCII output files: Case5a_F1_RCS.txt, Case5a_F2_RCS.txt, Case5aREF_F1_RCS.txt, Case5aREF_F2_RCS.txt containing 3 columns: Φi in degrees, RCS_HH in dB, RCS_VV in dB

Subtest case b) Metallic body with open ducts compared to reference body

L = 12meters (9.0116in x 52.4259)

Frequencies: F3=195.32MHz (measurements available); F4=1GHz and F5=3 GHz

θi= 90°; Φi = 0° to 180°, step 0.5° at F3 and F4 ; step 0.2° at F5

Results: monostatic RCS (open and closed bodies) for both H and V polarizations

6 ASCII output files: Case5b_F3_RCS.txt, Case5b_F4_RCS.txt, Case5b_F5_RCS.txt, Case5bREF_F3_RCS.txt, Case5bREF_F4_RCS.txt, Case5bREF_F5_RCS.txt containing 3 columns: Φi in degrees, RCS_HH in dB, RCS_VV in dB