Launch Systems 2021-22

Assignment #2 – Paneling Methods

The teams are requested to implement the evaluation of body lift and drag coefficients (no friction, just pressure) on a simple axial symmetric body using the paneling method and comparing the results with ONE (only ONE) another method suggested during the course (e.g. Allen model, components build-up, Open-Rocket, DATCOM, Barrowman, or experimental data, if available).

The missile is a body of revolution and consists in a simple cone-cylinder structure (no wings, no flare, conical nose, no cross-section variation). The following properties apply:

- Diameter: 1 meter
- Length/diameter ratio: 10
- Nose length/diameter ratio: 2
- Angle of attack: 2° and 10°
- Flight conditions: Mach 5 @ 10 km altitude

The groups shall report:

- The picture of the paneled system
- The local pressure coefficients chart, probed along two meridian lines of the body, connecting the nose tip with the nozzle exit section: the most forward facing meridian (bottom) and the most backward facing meridian (top).
- The integrated pressure forces generated by the pressure distribution on the body

The report shall be as short as possible and should be written by a technical staff for technical consultation (not as a classwork), meaning:

- quick identification of model hypotheses (including selected shadowing method), no theory background
- presentation of geometry
- results, brief comments, essential references if any.

Max length 3 pages including pictures.

Teams: max 4 people. You can use the same team of assignment #1. You can change the team, if you prefer.

File upload shall be completed by November 22nd, 2021, 23:59 (CET).

Upload link will be available on WEBEEP.

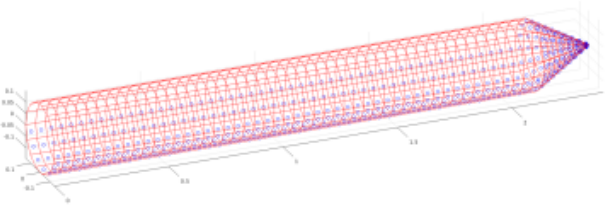

Figure 1: Example of paneling representation (by T. Lusetti, D. Miglio, P. Illuminati, A.Y. 2020-21)