Space Propulsion

ASSIGNMENT of flipped class on SRM internal ballistics

What you need to do

In class we have already analyze the pressure traces of the 27 rocket motors (9 batches, 3 motors each) to obtain the ballistics of the propellant.

Now the analysis focuses on the c* efficiency.

The ideal c* should be computed using the CEA code and the thermodynamic formula reported on the WEBEEP documents.

The real c* should be derived from the pressure traces by integrating the pressure curves using the points already identified in the previous part and marked with the letters B and C. The other parameters are available in the summary document (geometry, propellant composition). Statistical uncertainty should be evaluated too.

What you need to place in the report

The report is intended as an INTERNAL TECHNICAL REPORT written by the technician in

charge of a standard set of tests to inform the supervisor about the results.

The report shall include:

- Brief presentation of the motor and of the pressure curves.
- Brief presentation of the analysis method for both ballistics and c*.
- The recap of ballistic data and c* efficiency with uncertainty.
- The obtained data will be needed to perform a ballistic prediction with uncertainty propagation.
- The conclusion of the report shall contain the answer and the proof of this question: What is the expected propulsion system MEOP for the 70-bar rocket version, including uncertainty?

Report format

The following constraints apply to the report:

- A4 paper format
- minimum font size is 10 for the text
- margins: at least 2 cm from each side
- figures and tables should be understandable and supplied with a caption
- maximum length: 4 pages (excluding front, page if present)

Delivery

Delivery format is PDF on the FORMS. Include data on report co-authors.

Team member number: min. 2 – max 3

SHARP Deadline is May 31 2023, 23:59 Italian time.

Other forms of delivery are not accepted.

Submission checklist

- Give a name to the team
- Collect full names, personal POLIMI code (10xxxxxx) and email for EACH member
- Prepare your report in PDF with the name: [TEAMNAME]-Flipped1.pdf
- Go to webeep and get the link for the upload (available after May 20th, 2023)
- One representative fills the on line form and delivers the document for the team. The representative becomes the main contact point of the team.