

ATD3 2023 Test Case Definition

Title: Delta-II 2nd Stage Re-entry

Proposed by: HTG Hyperschall Technologie Göttingen

INPUT DATA

Dimensions and masses:

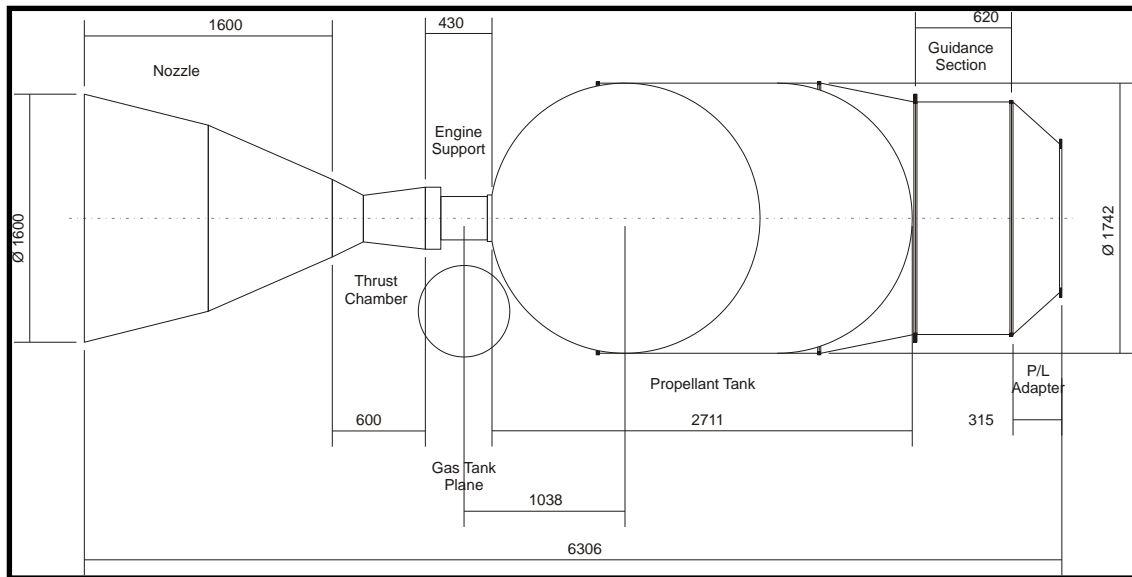


Figure 1 Delta-II Second Stage (derived sketch, dimensions in mm)

Subsystem	Material	Mass
		kg
Engine	Inconel, AA7075, CFRP	198 *
GasTanks	TiAl6V4	81.2 **
GuideSec	AA7075	165
PLAdapter	AA7075	20
PropTank	A316	267
Structure	AA7075	193
		924.2

* Nozzle included

** Gas Tanks: 2 small + 2 large

Material properties:

It would be desirable to use the same material properties. Whenever possible, it is recommended to use the material properties indicated in Table 3 column "SESAM" of the attached 6th IAASS paper.

Osculating state vector:

Epoch: Jan. 22, 1997 09:02:32.420 UTC

Semi major axis: 6495.30524 km

Eccentricity: 0.002241

Inclination: 96.57158 deg

RAAN: 344.69854 deg

Arg. of perigee: 98.30452 deg

True anomaly: 262.00863 deg

Corresponding geodetic state vector:

Altitude: 119.160504 km

Longitude: 87.273738 deg

Latitude: 0.31315034 deg

Velocity: 7.89959411 km/s

Flight-path angle: -0.12406669 deg

Flight azimuth: 99.9874818 deg

Flight heading: -9.9874818 deg

Solar/Earth magnetic activity on Jan. 22, 1997:

F10.7 (daily): 73.0

F10.7 (monthly): 78.7 (Nov. 96), 77.8 (Dec. 96), 74.0 (Jan. 97) → 90-day average: 76.8

Ap index: 6

OUTPUT

List of fragments and their characteristics (see Table 2 of the attached 6th IAASS paper and the attached excel sheets (e.g. IAASS Re-entry Testcase – Delta -2.2) as reference)

To facilitate the comparison of the results, please provide your results in an excel sheet (take as template for the results submission “IAASS Re-entry Testcase- Delta -2.2 20120829.xls”).

ATTACHMENTS

CAD files can be downloaded by <https://indico.esa.int/event/403/contributions/6675/>