

Appendix I

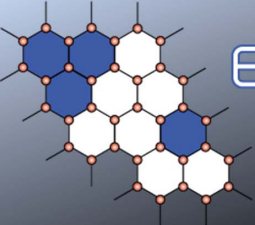
Improved integrated way of post-processing thermal result data

Henri Brouquet
(ITP Engines UK Ltd, United Kingdom)

Abstract

Post-processing and reporting of the thermal results is a significant part of the overall thermal modelling process. Clear presentation of results not only helps towards the understanding of the thermal behaviour of the model, but also helps towards model validation.

This presentation focuses on how ESATAN-TMS helps the thermal engineer work efficiently, removing the burden of repetitiveness by making the process fully automatic and integrated within a single interface.

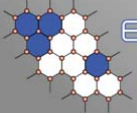



ESATAN-TMS
thermal modelling suite

Improved integrated way of post-processing thermal result

Henri Brouquet

30th European Thermal & ECLS Software Workshop
5 – 6 October 2016, ESA/Estec, Noordwijk, The Netherlands

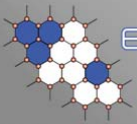


ESATAN-TMS
thermal modelling suite

Introduction / Background

Requirements → Demo → Questions

- Post-processing and reporting of the thermal results is a significant part of the overall thermal modelling process
 - Repetitive manual process
 - Disconnected from the main geometrical model
 - Model validation is therefore difficult to perform
 - Error prone and time wasting
- Complexity of thermal models has increased significantly over the years

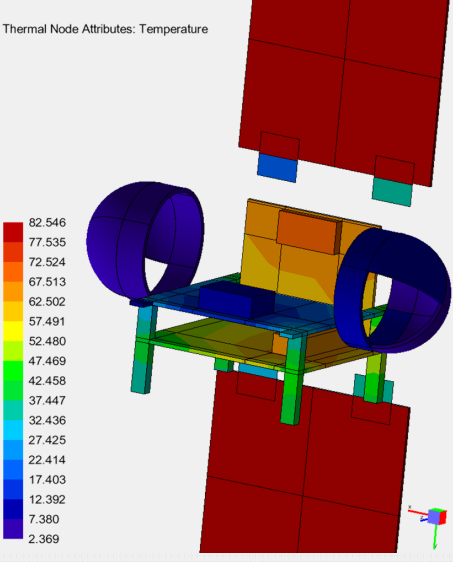


ESATAN-TMS 2017 – Integrated Post-processing

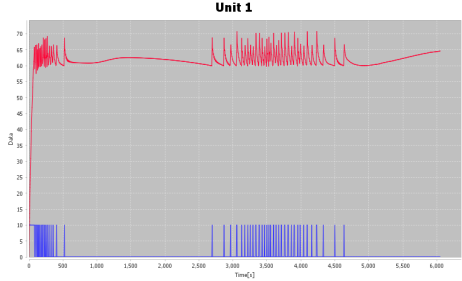
Requirements → Demo → Questions

- How can ESATAN-TMS support thermal engineers post-processing results data?

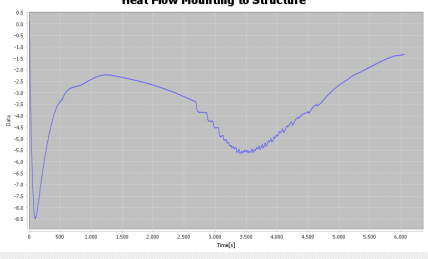
Thermal Node Attributes: Temperature

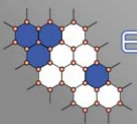


Unit 1



Heat Flow Mounting to Structure

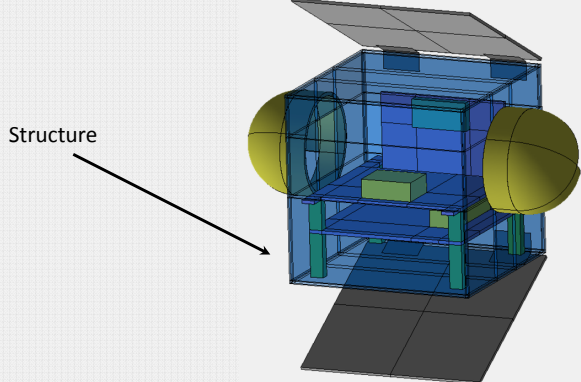


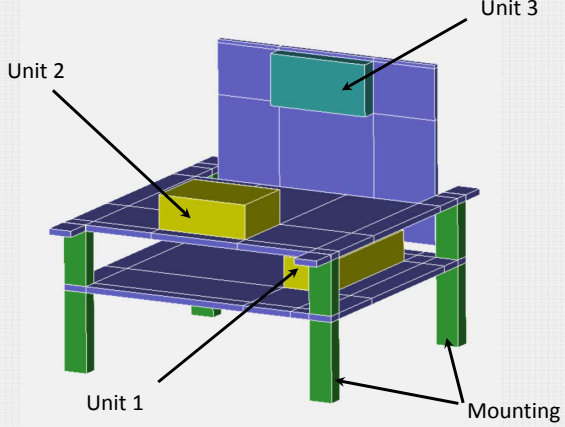


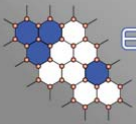
Example use-case - CubeSat

Requirements → Demo → Questions

- Heater on unit 3 with minimum T = 60 DegC
- Fixed heat load on units 1 and 2
- Post-process unit temperatures during analysis
- Investigate heat flow between units, mounting and structure





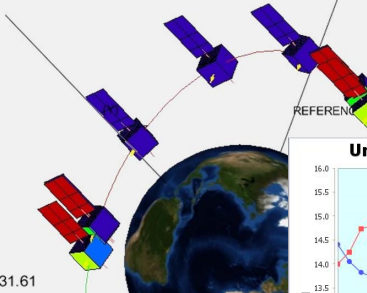


ESATAN-TMS
thermal modelling suite

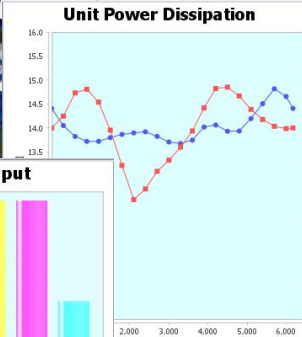
Integrated Post-Processing

Requirements → Demo → Questions

- Single environment to post-process results
 - Display results on geometry or on charts
 - Multiple charts and windows
 - Plot temperatures, heat sources, ...any node attribute
 - Plot derived results - min-max values, heat flow/balance, ...
 - Line, min-max or bar charts
 - Tightly coupled to geometry
 - Attribute Charts and Heat Charts supported



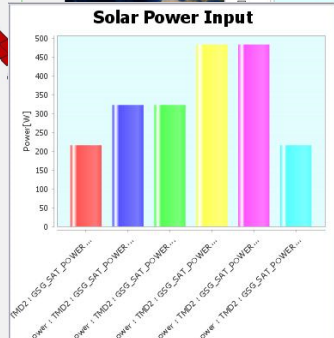
1031.61
967.13
902.66
838.18
773.70
709.23
644.75
580.28
515.80
451.33
386.85
322.38
257.90
193.43
128.95
64.48
0.00



Unit Power Dissipation

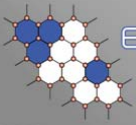
Power [W]

Time [s]



Solar Power Input

Power [W]

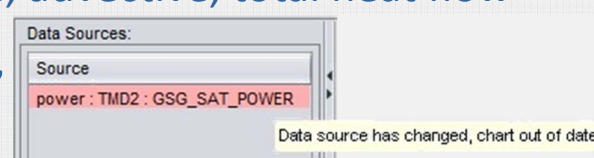



ESATAN-TMS
thermal modelling suite

Integrated Post-Processing

Requirements → Demo → Questions

- Heat Chart presents flow between entities
 - Between nodes, surface, Geometry, Groups, ...
 - Display linear, radiative, advective, total heat flow
- Chart status displayed, easy update
- Export chart as image or CSV file
- Chart data saved with model (Save/ Open)
- Can also Export and Import Chart data






Time for questions

Background → Requirements → Demo → Questions

Thanks for your attention

Any Questions?



ESATAN-TMS support

- Discussions/feedback from customers
 - Difficulties in migrating model to newer version
- Maintain specified versions for 3 years
 - Apply only bug fixes to maintained version
- New functionality released within new versions

