

Appendix B

Presentation, demonstration of new TAS thermal software e-Therm and associated strategy

Thierry Basset Jean-Paul Dudon Patrick Hugonnot
(Thales Alenia Space, France)

François Brunetti
(DOREA, France)

Abstract


In Thales Alenia Space - Cannes, we have a long experience and expertise, in the thermal software development. Concerning this point, we work with external companies like DOREA. The subject concerns the presentation, the demonstration of a new thermal software in TAS Cannes (= e-Therm) and its associated strategy. This tool is funded entirely by Thales Alenia Space - Cannes and it should not have to be commercialised but freely distributed.

This presentation is an overview of e-Therm including videos - sequence of file operations on a science / observation case, a 3D conductive module case (pump) - listing of evolutions and functions created and defining the modularity and compatibility of e-Therm using market tools by directly plug in or data standard exchange STEP-TAS.

Then, we will talk about industrialization strategy especially based on using our thermal software and on the integration of expert tools (2D-3D conductive module, Thermal model reduction tool, friendly pre pro for telecom applications, CORAFILE , modelling / meshing) in order to improve and standardize the analysis process, in order to gain in cost and quality and for better input/output traceability. In the near future, we are going to integrate all other modules (radiative module, solver and all the pre and post-processing modules developed initially for CORATHERM).

In parallel with this industrialization strategy, we develop a strategy of openness of e-Therm by distributing software free of charge to TAS-Toulouse for antenna applications and TAS-Turin for infrastructures and instruments and more generally to TAS-Group and a lot of companies.

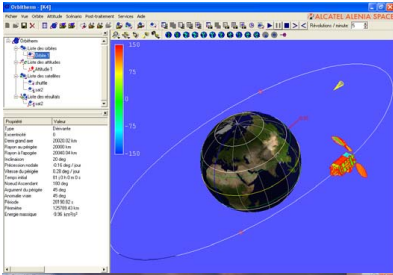
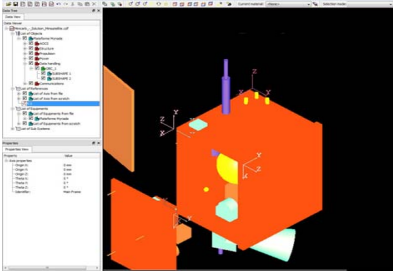
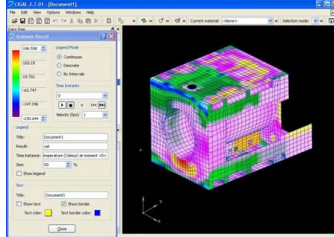
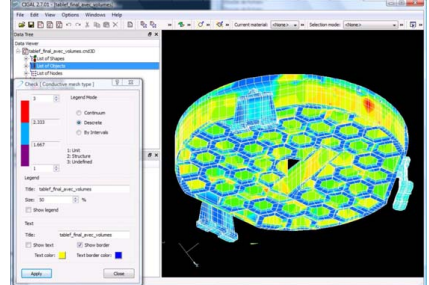
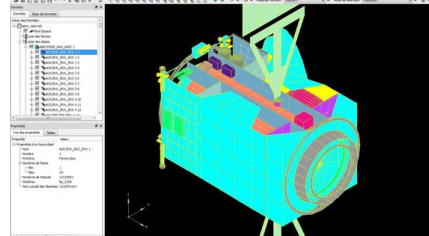
Moreover, it is possibly planned to extend e-Therm to other fields in physics: using in the electronic board calculation, using for simulating ESD on geostationary satellite, based on plasma / satellite interaction modelling ...




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**THALES ALENIA SPACE
CANNES**

T. BASSET,
J-P. DUDON,
P. HUGONNOT,
F. BRUNETTI (DOREA)

Thales Alenia Space



Schedule

- 1. Introduction & objectives: industrialization strategy for expert tools**
- 2. List of evolutions and function creation between reference release and e-Therm**
- 3. Videos of the e-Therm 2010 release : sequence of file operations on a science / observation case and 3D conductive case (pump)**
- 4. Modularity of e-Therm with market tools**
- 5. Presentation of e-Therm : Final release (2.0)**
- 6. Conclusion**

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1. Objectives : industrialization strategy

◆ Thermal software strategy focused on CORATHERM using and its industrialisation via e-Therm :

□ Improvement of efficiency and performance / Competitiveness

- To improve and to standardize the analyse process in order to reduce the cost
- Reactivity in term of user support and development control

□ Improvement of quality process : Industrialisation by implementation of expert tools

- 2010 : Implementation of conductive tool (PLATEAU 2D-3D/EQUIVALE), TMRT, new post-pro functionalities into CIGAL2 = e-Therm V1.0
- 2012 : integrate everything into e-Therm : radiative module, solver, all remaining pre and post-processing
- Better reliability, input / output files traceability and modularity

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1. Objectives : strategy of openness of e-Therm

◆ Presentation and free distribution of several of our modules (CIGAL2 pre and post-processing, 2D/3D conductive module), internally and externally (European community) :

□ Openness of e-Therm

- Investment in the data standard exchange (STEP-TAS)
- External distribution (workshop 2008 –2009)
- TAS Internal demonstrations : TAS - Toulouse for antenna applications, TAS - Turin for infrastructures and instruments, Thales Group : Electronic board applications division and electron tubes division, TAS Thermal Software Workshop 2010

□ Principles :

- TAS owns the sources with maintenance ensured & funded (as agreed with the NESTA group) by :
 - TAS Cannes for corrective maintenance
 - Different customers for specific needs (adaptive and evolutive maintenance)
 - The agencies for more general needs (evolutive maintenance) : e.g. STEP standard exchange

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2. List of evolutions between initial release and e-Therm V1.0 (2010)

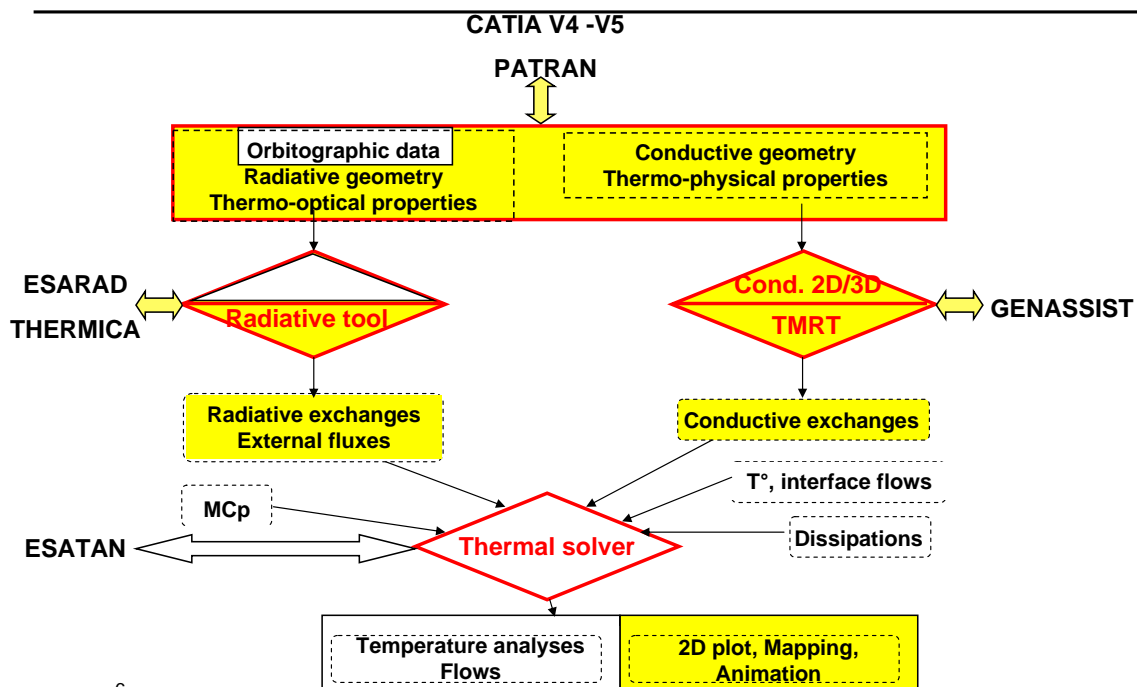
- ◆ **New functions of the model/mesh generator :**
 - Harmonization of primitives
 - Harmonization of material files (conductive)
 - Cross-section axes and planes in the model tree
 - Added the selection mode (cross-section plane and cross-section plane + mesh)
 - Radiative model management aids
 - In conductive session, distance calculation between elements, rotation function, rule implementation
 - Integrated heat pipe processing
- ◆ **Integration of thermal model reduction tool (TMRT) into e-Therm**
- ◆ **Integration of friendly pre pro for telecom applications into e-Therm**
 - Graphic construction of fully interactive model
 - Reading inputs issued from CAD (equipment, heat pipe)
- ◆ **Integration of 2D/3D conductive module into e-Therm**
 - Implementation of volumic mesh generator
 - Finite elements / TLP hybrid method processing for 3D conductive
- ◆ **Integration of interfaces with the market tools using the new exchange standard STEP-TAS V.6.0 (ESA funding via IITAS)**

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2. Overview of e-Therm 1.0



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3. Video of e-Therm (2010): sequence of file operations on [a science & observation case](#) & [3D conductive case](#) (pump)

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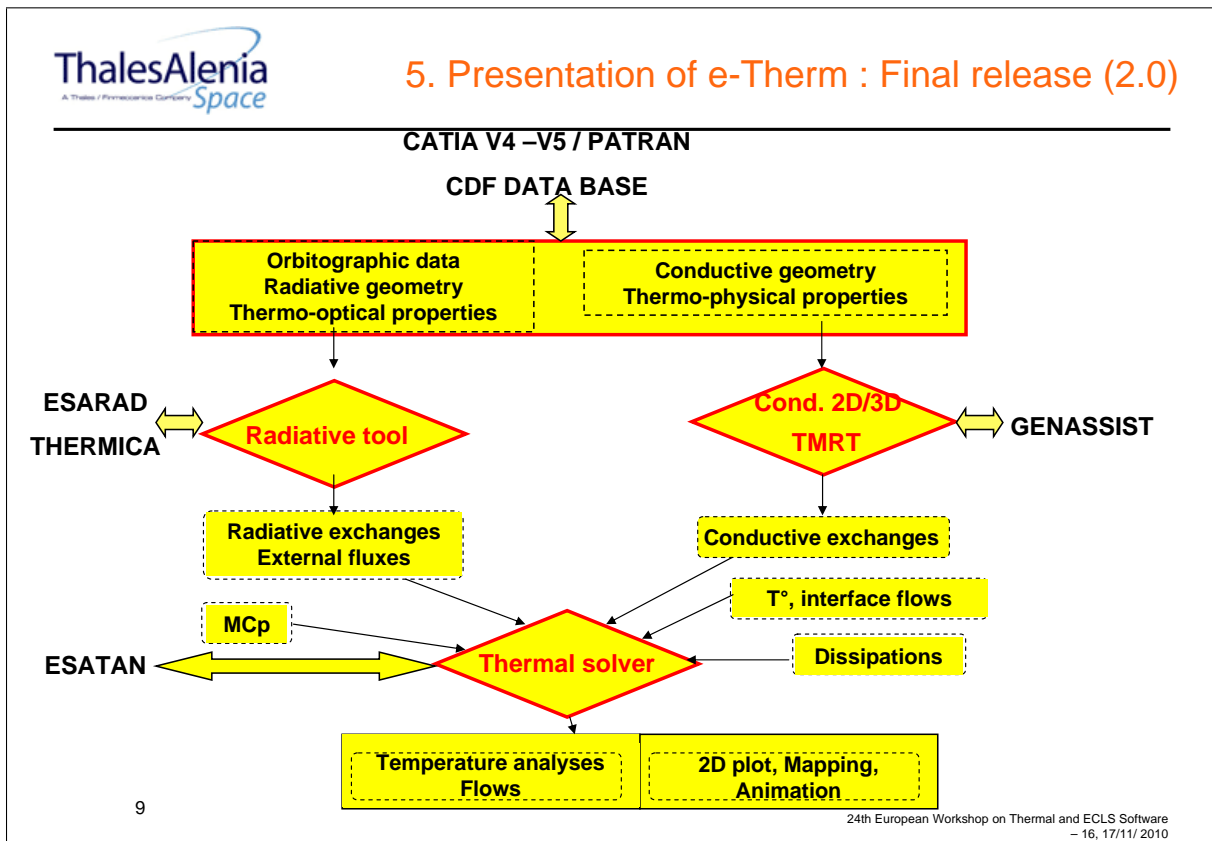
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4. Modularity of e-Therm with market tools

- ◆ **Modularity & compatibility**
 - with ESATAN (via plug-in) : presented during Workshop 2009, the video showed the substitution of the internal TAS solver by ESATAN
 - with ESARAD (via plug-in) : see previous video on science & observation case
 - with THERMICA : to be done

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6. Conclusion :

- ◆ **New e-Therm software available for free distribution :**
 - contact = thierry.basset@thalesaleniaspace.com
- ◆ **Principles : recall**
 - TAS owns the sources with maintenance ensured & funded (as agreed with the NESTA group) by :
 - ➔ TAS Cannes for corrective maintenance
 - ➔ Different customers for specific needs (adaptive and evolutive maintenance)
 - ➔ The agencies for more general needs (evolutive maintenance) : e.g. STEP standard exchange
- ◆ **Final release of e-Therm will be available on 2012**
- ◆ **Extension to other fields in physics**
- ◆ **ESA solicited for follow-on of STEP-TAS activities (GMM & TMM) : to be discussed during NESTA meeting ?**

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