Appendix G

ESATAN/TMG Demonstration

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Thermal & ECLS Software Workshop
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ESATAN™ / TMG

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ESATAN / TMG 1.0

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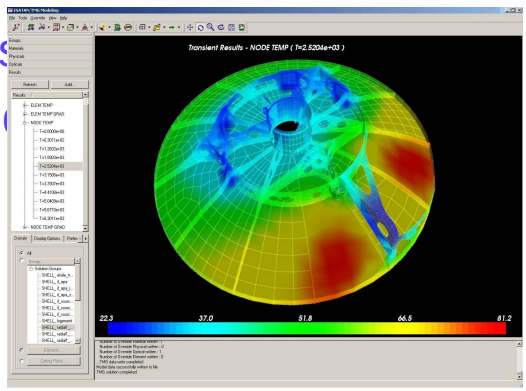
- ***ESATAN™/TMG*** combines strengths of ESATAN™ and TMG.
  - Versatility & robustness of ESATAN™
  - Powerful, FE like pre- and post-processing capabilities from TMG
  - An optimal solution for linking to FE based thermo-elastic analyses
- ***ESATAN™/TMG 1.0*** released September 2006



Courtesy of ALCATEL Alenia Space

- "Stand-alone" Solution -

ESATAN™ / TMG 1.0

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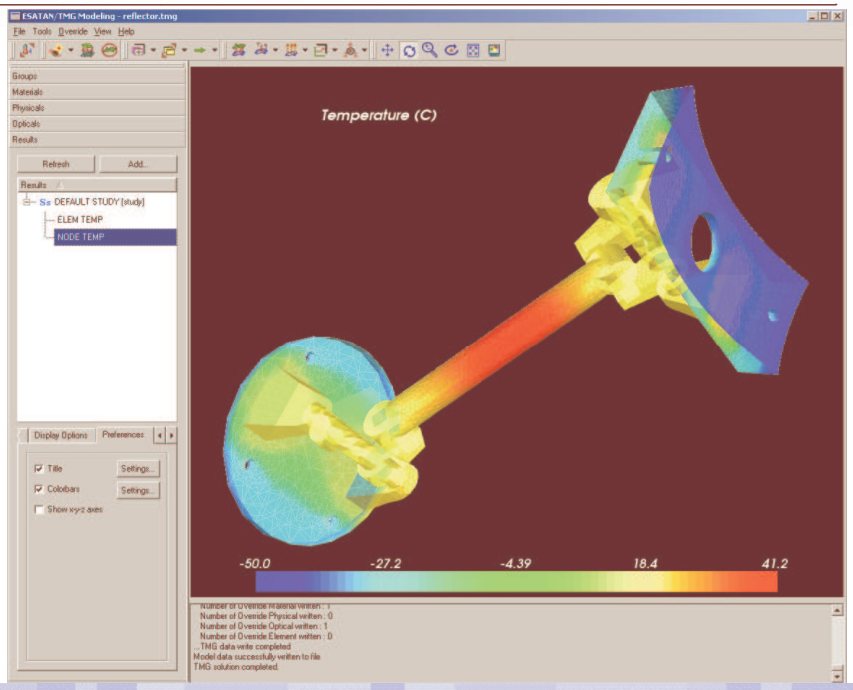
Demo ….



Perfect Interface to FEA Model

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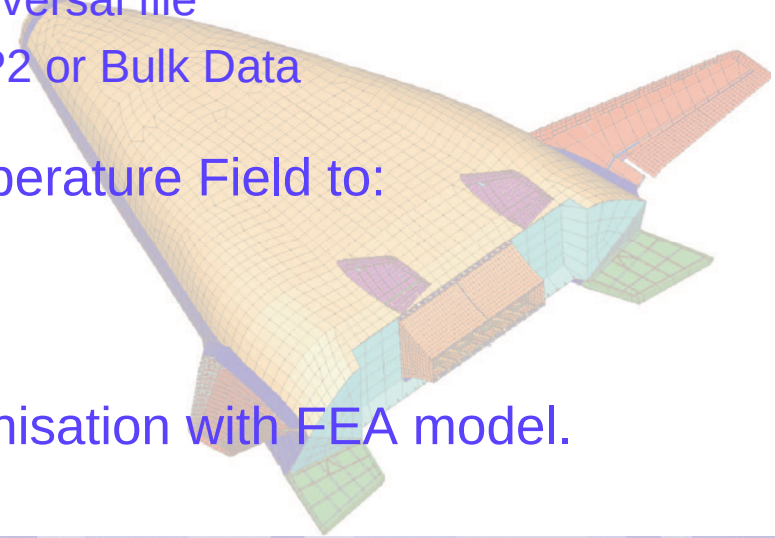
- Import of FE mesh and bulk data from:
  - I-DEAS Universal file
  - Nastran OP2 or Bulk Data
- Export Temperature Field to:
  - Nastran
  - ANSYS
- (re)Synchronisation with FEA model.



Rapid Definition of Model Data

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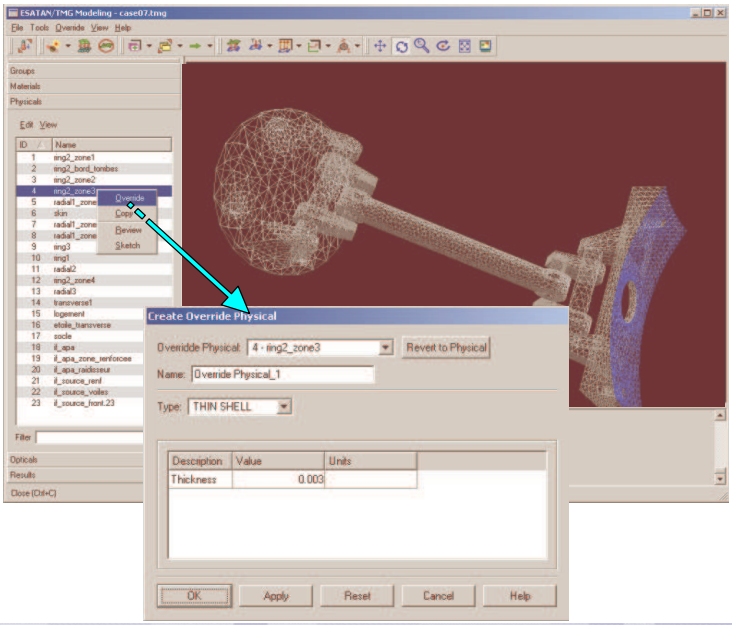
- Model data
  - Material
  - Physical
  - Optical
- Imported from the FE model
  - Override possible
- Create model data in ESATAN™/TMG



Boundary Conditions

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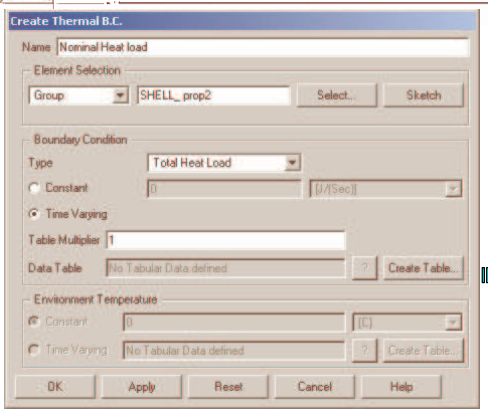
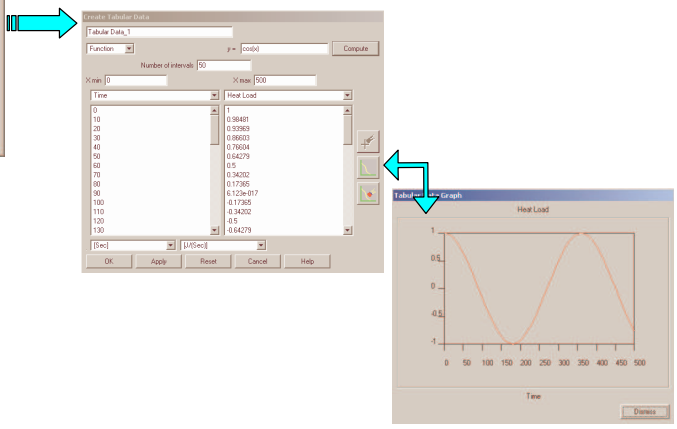
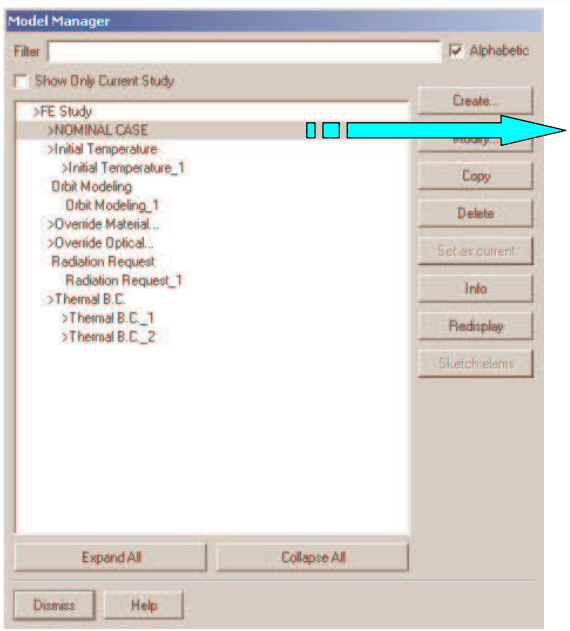


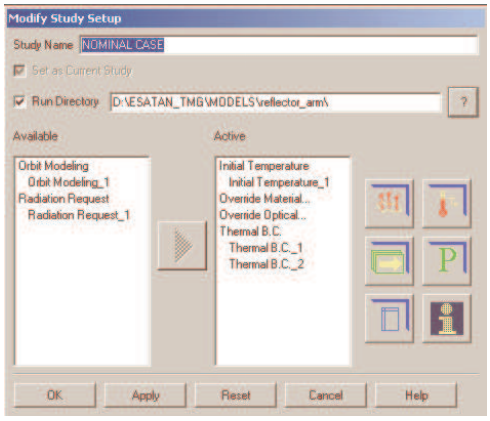
- Thermal boundary conditions
  - Temperature
  - Heat Loads / Flux
  - Radiative / Convective



- Tabular data
  - Data points
    - Linear interpolation
    - Constant interval
  - function

Study Management

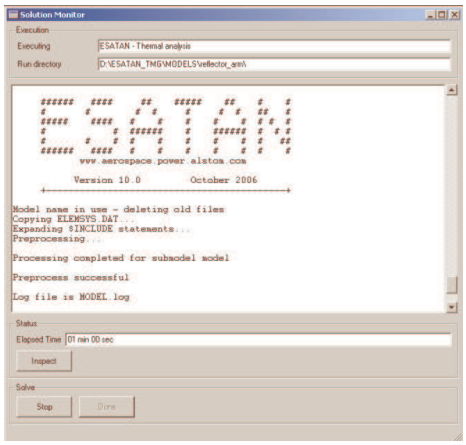




- Manage multiple sets of conditions
  - boundary cases
  - starting temperature
  - thermal couplings…

Thermal Solution

- Works with “standard” ESATAN™ but includes new ESATAN™ compatible FEMLIB library
  - Conjugate-Gradient Solver optimised for very large models
  - Interfacing routines for passing data back to the ESATAN/TMG environment
- Execution
  - Via interface
  - Run externally
  - Access to ESATAN™ input file



- Models can be exchanged with ESATAN™ Suite users

Review Results

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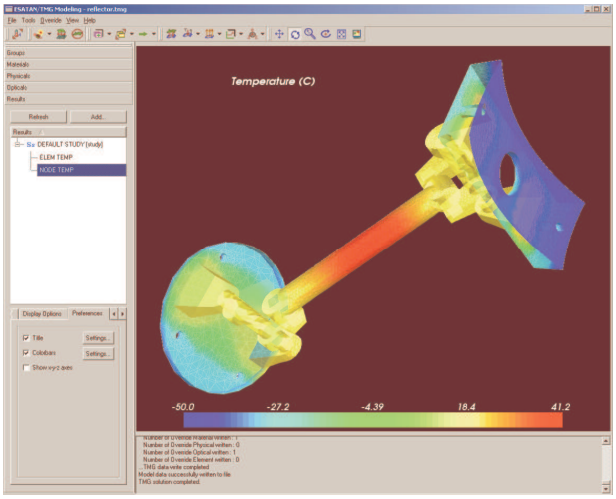
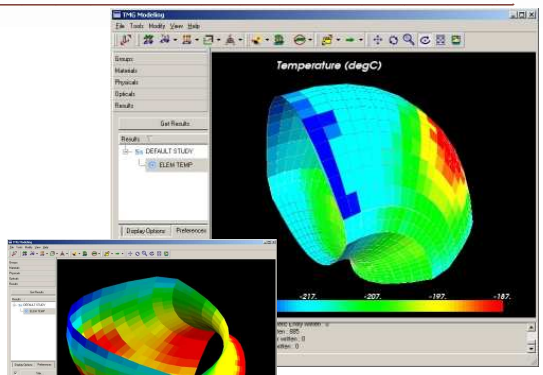
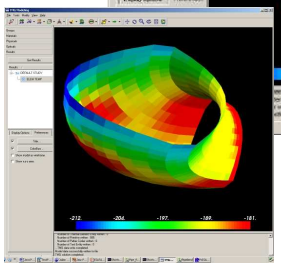
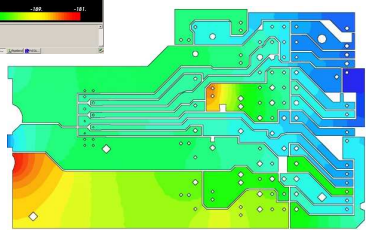
- Graphic Post-processing.









Map Temperature to FEA

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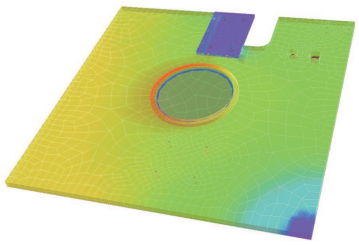
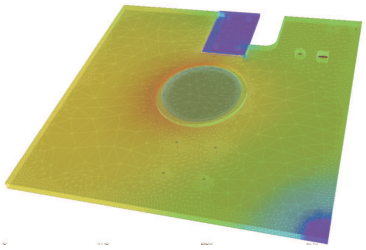
Mapping to MSC Nastran and ANSYS

Thermal Mesh



FE Mesh



- Dissimilar meshes: proximity based
  - Can use “zoning” of model.
  - Mapping to neutral axis
    - Transverse temperature gradient
    - Fixed offset.

For example, for thermo-elastic analysis

Other Key Features

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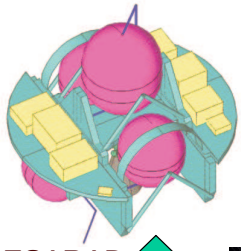
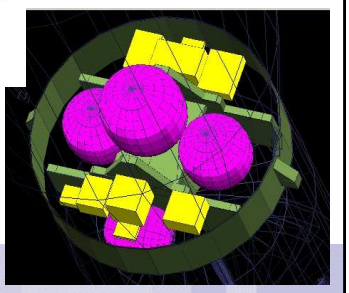
- Support for thin-shells, solid and beam elements.
- Import models from ESARAD, ThermicA and TSS.
- Non-geometric features.
- Element grouping.
- Element merging.



ESARAD

ESATAN-TMG



ESATAN/TMG: Summary

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ESATAN™ /TMG 1.0 Now available

- Retain
  - Flexibility and robustness of ESATAN
  - ESATAN™ users skills and knowledge
  - Model compatibility with ESATAN™ Thermal Suite
- Gain
  - Links with FEA
  - Analysis of arbitrary 3D geometry, including solids
  - Powerful pre/post-processing

Workshop & Support Team

- Next Training Session – 23-26 October 2006
- ESATAN™ / TMG User Workshop 27 Oct 2006

Support Contact Information:

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