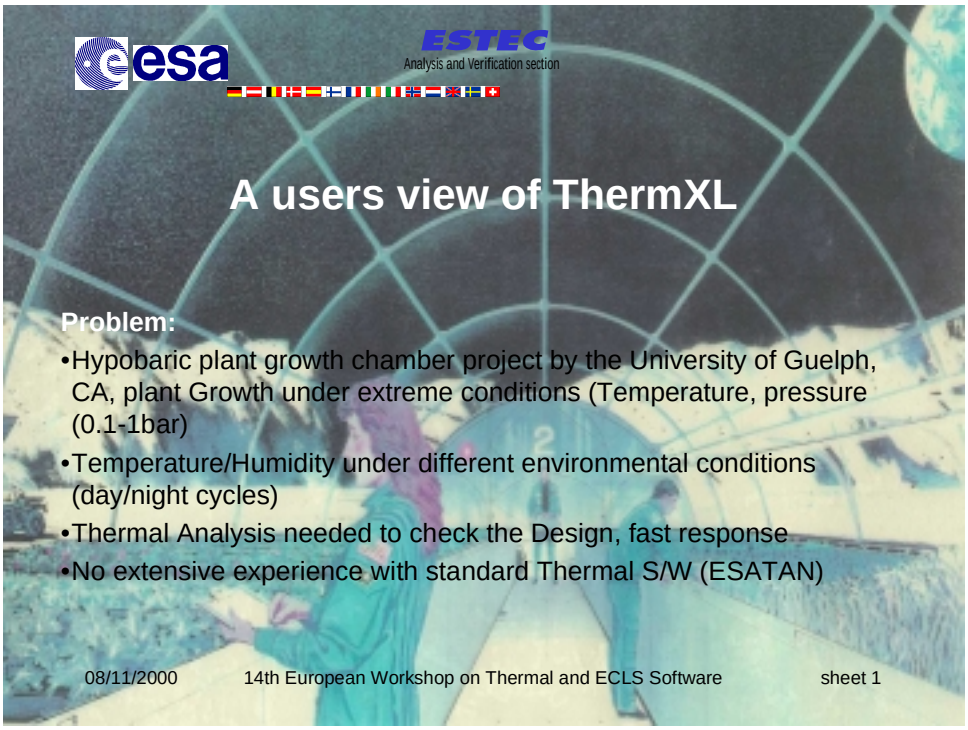


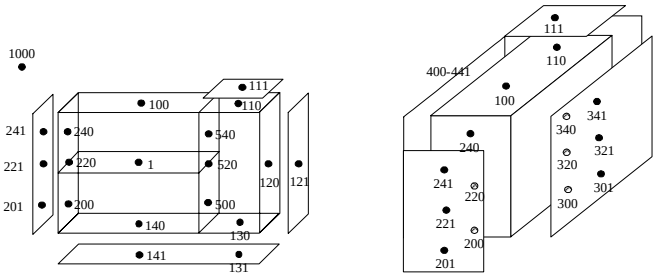
esa ESTEC Analysis and Verification section

The model

- water transpiration from plants
- Illumination from Natrium lamps modeled as heatsource and boundary node (illumination glass temperature)
- Condenser & Heat exchanger for Temperature & Humidity Control modeled as heat sink/source
- 42 nodes

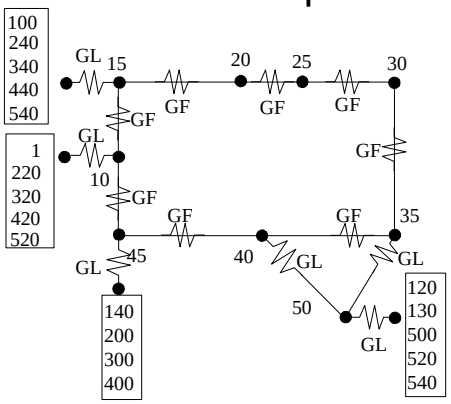
ESTEC
Analysis and Verification section

Nodal Breakdown (1)
Structure



ESTEC
Analysis and Verification section

Nodal Breakdown (2)
Fluid Loop



ESTEC
Analysis and Verification section

Which tool?

- EcosimPro
- Esatan
- ThermXL

ESTEC
Analysis and Verification section

Choice of Tool

ThermXL was the tool of choice due to

- Fast implementation
- Learning curve not “obstructed” by Data Handling etc.

ESTEC
Analysis and Verification section

Results

- Heat dissipation assumed by the Designers are too high(cooked veggies) =>check design & assumption about heat input
- First guidelines for the dimensioning of the Condenser/Heater
- First guidelines for humidity levels dependant on pressure

ESTEC
Analysis and Verification section

Downsides

- Calculation did not converge with the steady state Solver, why?
- Implementation of thermohydraulic Calculations/Humidity Control time consuming, no predefined Routines available

Conclusions

- ThermXL is an easy to use tool for a first assessment
- Ideal for getting started with Nodal networks
- Data presentation and postprocessing easy ("everybody knows Excel...")