

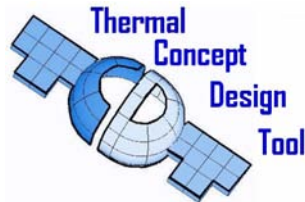
## Appendix P

### Thermal Concept Design Tool

Matteo Gorlani  
(Blue Engineering, Italy)



# Thermal Concept Design Tool Distribution & Maintenance



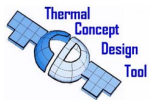
**Matteo Gorlani**

Blue Engineering, Torino, Italy

**Harrie Rooijackers**

European Space Agency, Noordwijk, The Netherlands

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Sheet 1

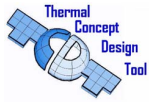


## Overview

- **Background**
- **TCDT Overview**
- **TCDT Web Pages**
- **TCDT Package**
- **TCDT Team**

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## Background (1/2)

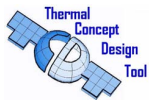
### **BLUE ENGINEERING & THALES ALENIA SPACE TORINO** developed for **ESA** **THE THERMAL CONCEPT DESIGN TOOL (TCDT)**

- Provide a flexible and easy environment to investigate a large number of different configurations and TCS options
- Increase the integration between the TCS discipline and other disciplines, in order to speed-up the S/C optimisation
- Support a change of method in the S/C and in particular TCS design, moving toward a design oriented approach
- Exploit the functionalities of ESATAN, ESARAD, ThermXL, ARTIFIS and TOPIC by allowing the user to use them at a higher level

#### Activity

- started in 2004
- closed in 2007

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## Background (2/2)

### **ESA awarded to BLUE ENGINEERING the contract to** **DISTRIBUTE & MAINTAIN the TCDT:**

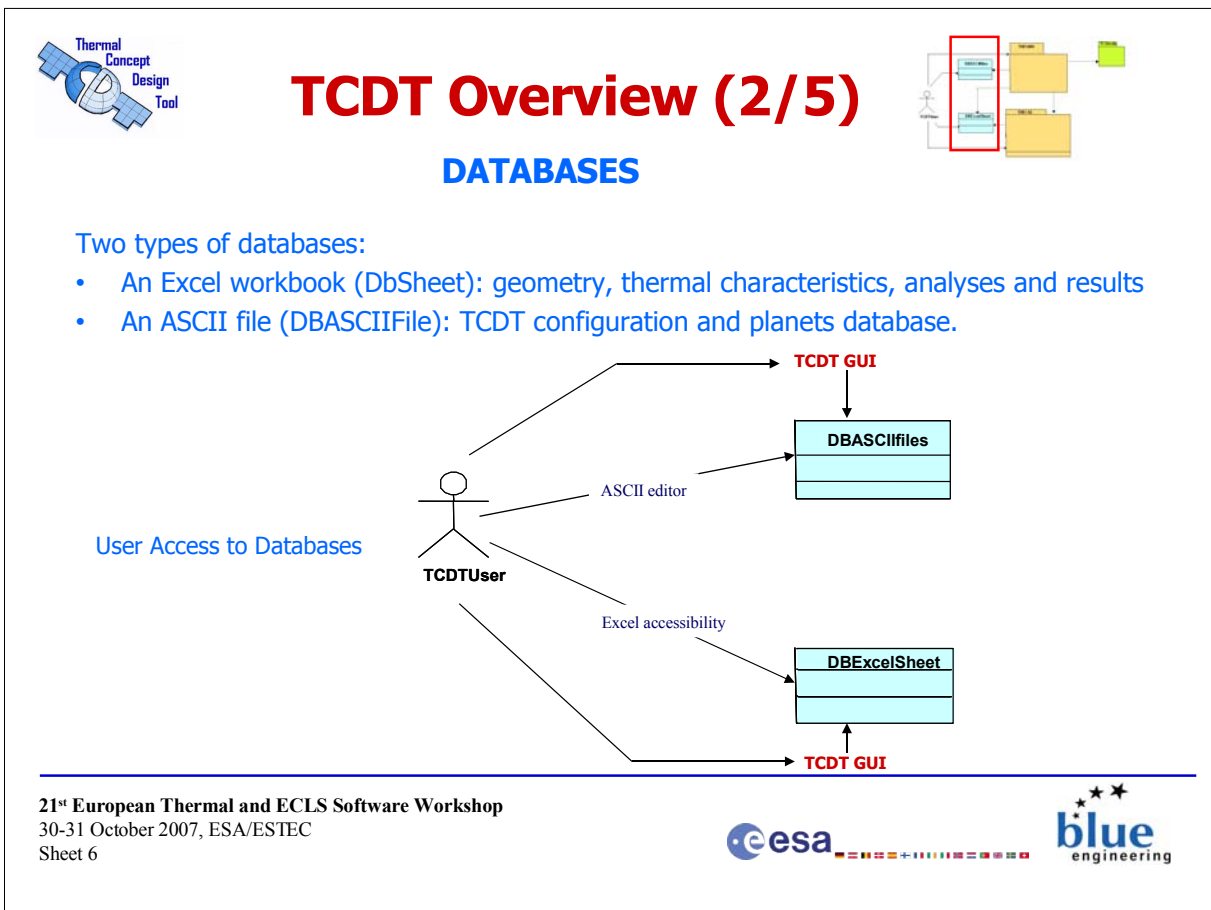
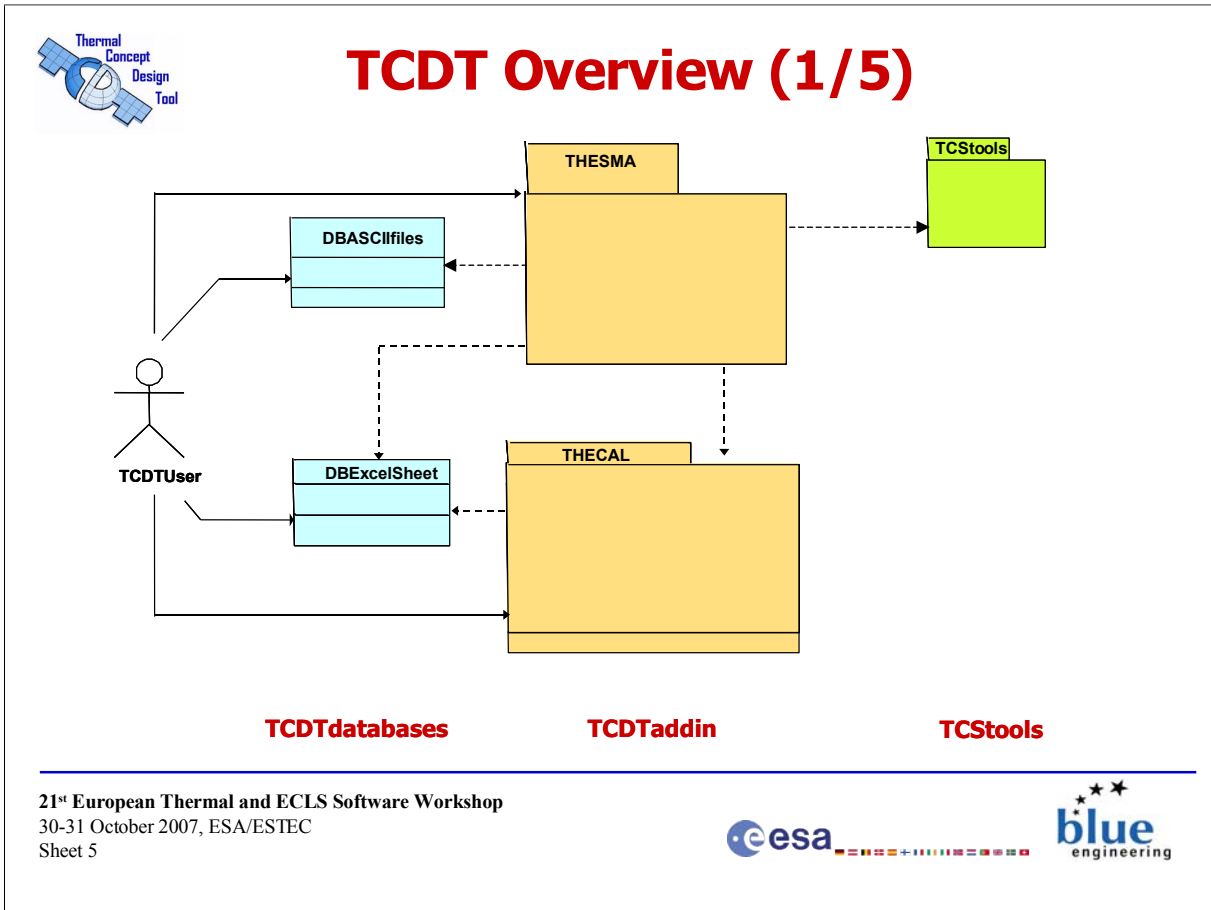
- Distribution will start after the WorkShop
- TCDT Web Pages are available for
  - Registration/TCDT licence request
  - Problem Reporting
  - New Feature request
- TCDT Support by TCDT Team at BLUE

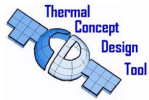
#### Activity

- started in 2007
- foreseen up to 2011

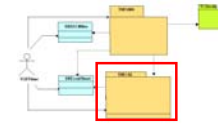
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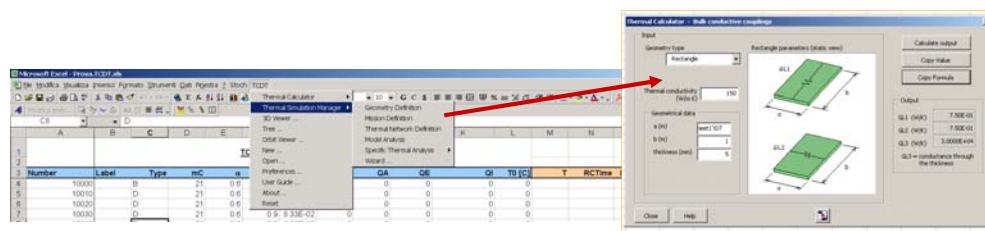


## TCDT Overview (3/5)



### THERMAL CALCULATOR

- Calculate Mass (M), Centre of Gravity, Moments of Inertia and thermal capacitances
- Calculate conductive couplings and contact conductance
- Calculate radiative conductors and external fluxes
- Calculate sink temperatures, heat exchanged for nodes and group of nodes according to data in the DBsheet
- Select among possible Insulation and thermal interface

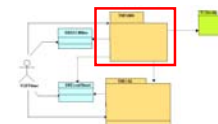


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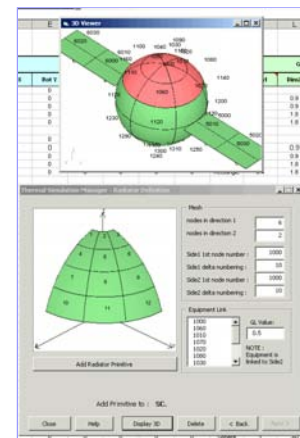
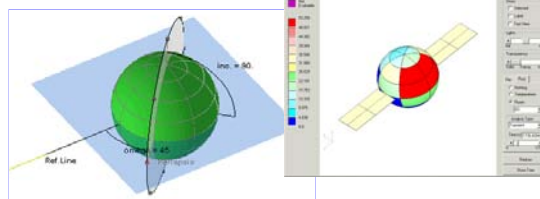


## TCDT Overview (4/5)

### THERMAL SIMULATION MANAGER




- Build geometrical and thermal mathematical models
- Create input files for the external tools
- Define missions, radiative and thermal analysis cases
- Run analysis cases with the external tools
- Retrieve the results of analysis cases Perform specific analysis and design tasks on pre-built geometrical/thermal typical configurations
- Perform parametric analyses (e.g. for extreme cases assessment)

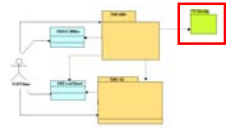


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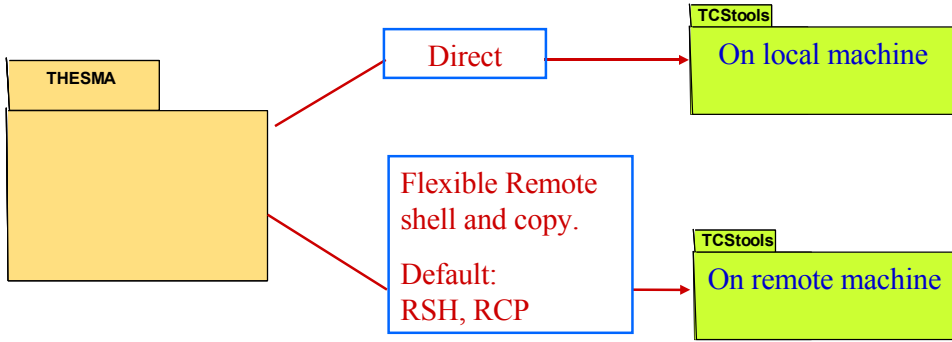


# TCDT Overview (5/5)





## TCS TOOLS


- TCS TOOLS are not distributed within the TCDT package.
- ESATAN, ESARAD and ThermXL are commercial tools, contact the manufacturer for more information.
- Artifis and Topic are tools in use at ESTEC, contact ESA for more information and availability.



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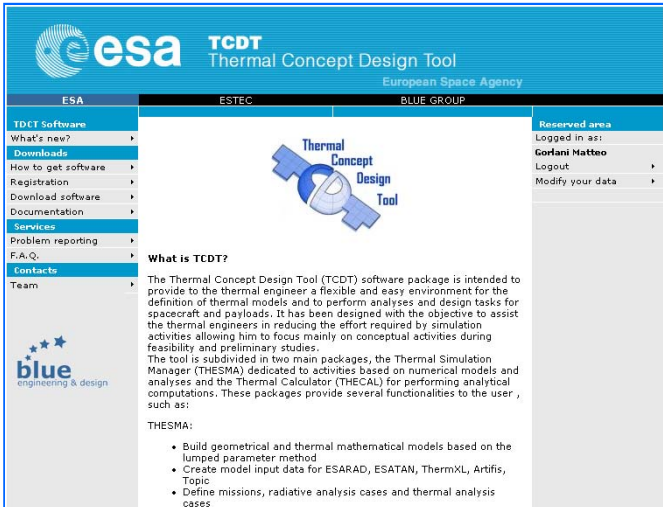
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# TCDT Web Pages (1/4)



## INTRODUCTION TO THE TCDT AND NEWS (Public Area)




<http://www.blue-group.it/TCDT/>

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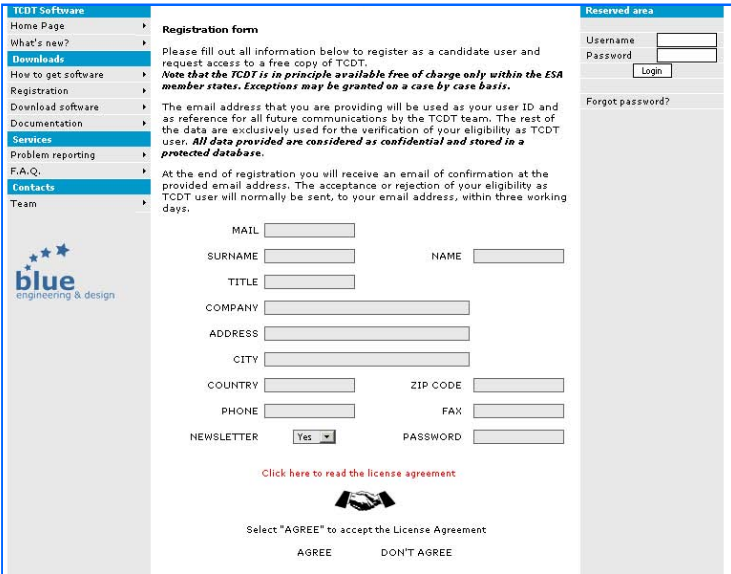
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## TCDT Web Pages (2/4)

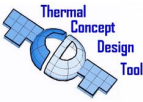
### REGISTRATION (Public Area)



The TCDT is in principle available free of charge only within the ESA member states. Exceptions may be granted on a case by case basis.

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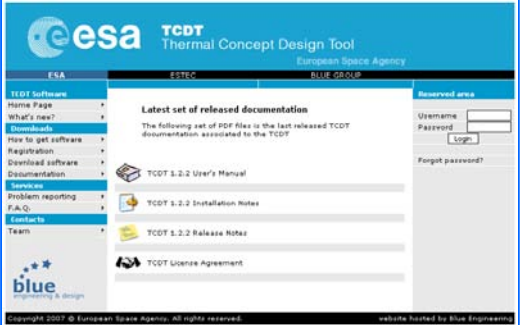
## TCDT Web Pages (3/4)

### TCDT PACKAGE DOWNLOAD

TCDT Package download page (Private Area)



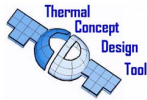
TCDT Documentation download page (Public Area)



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## TCDT Web Pages (4/4)

### PROBLEM REPORTING AND FEATURE REQUEST (Private Area)

Each TCDT User can:

- Open a SPR (Public or Private)
- Check SPR resolutions for all public SPRs

Each TCDT User can:

- Add a new FR
- View all added FRs

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## TCDT Package (1/2)

### PACKAGE CONTENTS

TCDT: the main programs

- ThermXL Version
- Non ThermXL Version

TCDTuseraddin: a user customizable addin based upon TCDT

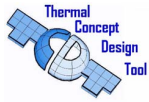
- ThermXL Version
- Non ThermXL Version

TCDT Help

- User Manual
- Programmers reference manual
- Theoretical manual
- Tutorials
- Release notes
- Installing notes

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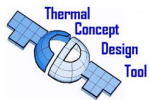


## TCDT Package (2/2)

### PLATFORMS AND HARDWARE

Component	Minimum requirements
Computer and processor	Personal computer with a 1000-MHz Pentium III Processor
Operating System and additional software	<ul style="list-style-type: none"> <li>• Microsoft Windows 2000 with Microsoft Excel 2000</li> <li>• Microsoft Windows XP with Microsoft Excel 2003</li> </ul>
Memory	256 Mb
Hard disk	100 MB of available hard-disk space
Drive	CD-ROM drive
Display	Super VGA (1280 × 1024)
Local Area Network (LAN)	A local network connection is required for certain functionalities (I/F and exchange data with external software installed on other platforms)

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## TCDT Team (1/2)

### DEVELOPMENT

BLUE ENGINEERING S.R.L.

**Matteo Gorlani** - Project Manager  
**Andrea Tosetto** - Software Development

THALES ALENIA SPACE TORINO

**Valter Perotto** - Project Manager  
**Luca Tentoni** - Software Development

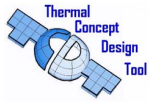
ESA - ESTEC

**Dr. Olivier Pin** - Head of Thermal Analysis and Verification Section  
**Dr. Harrie Rooijackers** - Project Manager

**Many THANKS to ThalesAlenia Team**  
A Thales / Finmeccanica Company *Space*

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## TCDT Team (2/2)

### DISTRIBUTION & MAINTENANCE

BLUE ENGINEERING S.R.L.

**Matteo Gorlani** - Project Manager

[m.gorlani@blue-group.it](mailto:m.gorlani@blue-group.it)

**Andrea Tosetto** - Software Development

[a.tosetto@blue-group.it](mailto:a.tosetto@blue-group.it)

**Support**

[tcdtsw@blue-group.it](mailto:tcdtsw@blue-group.it)

Blue Group - Engineering & Design

WEB: <http://www.blue-group.it>

ESA - ESTEC

**Dr. Olivier Pin** - Head of Thermal Analysis and Verification Section

[olivier.pin@esa.int](mailto:olivier.pin@esa.int)

**Dr. Harrie Rooijackers** - Project Manager

[harrie.rooijackers@esa.int](mailto:harrie.rooijackers@esa.int)

ESTEC-D/TEC-MCV

WEB: <http://www.esa.int>

Enjoy your
FREE licence

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