

# **European Space Thermal Engineering Workshop 2018**

**Monday, 29 October 2018 - Wednesday, 31 October 2018**

## **Programme**

# Table of contents

Monday 29 October 2018 .....	1
Registration .....	1
Opening .....	1
ESA Roadmap .....	1
Coffee Break .....	1
Thermal Design (platforms, instruments) .....	1
Lunch .....	1
Thermal Design (platforms, instruments) .....	1
Thermal Analysis and Software Tools .....	1
Coffee Break .....	2
Thermo-elastic .....	2
Thermal Design (platforms, instruments) .....	2
Cocktail .....	2
Tuesday 30 October 2018 .....	3
Thermal Testing .....	3
Two phase heat transport technology .....	3
Coffee Break .....	3
Thermal Testing .....	3
Two phase heat transport technology .....	3
Lunch .....	4
Thermal Control Technologies .....	4
Thermal Analysis and Software Tools .....	4
Coffee Break .....	4
Thermal Analysis and Software Tools .....	4
Thermal Control Technologies .....	5
Transfer to Newton .....	5
Dinner .....	5
Wednesday 31 October 2018 .....	6
Thermal Engineering for Cubesats .....	6
Thermal Analysis and Software Tools .....	6
Coffee Break .....	6
Closure .....	6
Lunch .....	6

# Monday 29 October 2018

## Registration (09:00-10:30)

## Opening - Newton (10:30-11:00)

-Conveners: Rooijackers, Harrie (ESA/ESTEC, The Netherlands)

## ESA Roadmap - Newton (11:00-11:40)

## Coffee Break (11:40-12:10)

## Thermal Design (platforms, instruments) - Newton (12:10-13:00)

-Conveners: Rooijackers, Harrie (ESA/ESTEC, The Netherlands)

time	[id] title	presenter
12:10	[66] CHEOPS satellite thermal design and thermal vacuum test	PEYROU-LAUGA, Romain (ESA/ESTEC, The Netherlands)
12:35	[1] Sentinel-1 SAR Instrument — Detailed Flight Predictions based on measured in-Orbit Data	SAUER, Arne (Airbus Defence and Space GmbH, Germany)

## Lunch (13:00-14:00)

## Thermal Design (platforms, instruments) - Newton (14:00-15:40)

-Conveners: Peyrou-Lauga, Romain (ESA/ESTEC, The Netherlands)

time	[id] title	presenter
14:00	[46] Innovations in the design of the Eurostar Neo geosynchronous telecommunications satellite	WALKER, Andrew (AIRBUS, France)
14:25	[28] Thermal design, verification and modelling of Solar Orbiter Stood-Off Radiator Assembly	HERNDLER, Stefan (RUAG Space GmbH, Austria)
14:50	[71] Solar Orbiter PHI Electronics Unit Thermal Design	TORRALBO, Ignacio (IDR/UPM Universidad Politécnica de Madrid, Spain)
15:15	[43] Designing ECLAIRs and MXT thermal buses for the SVOM project	BAVESTRELLO, Henri (AIRBUS, France)

## Thermal Analysis and Software Tools - Einstein (14:00-15:40)

-Conveners: Rooijackers, Harrie (ESA/ESTEC, The Netherlands)

time	[id] title	presenter
14:00	[35] Thermal Analysis Workflow for Athena Telescope's X-IFU Instrument FPA-DM	VYAS, Shubham (SRON, The Netherlands)
14:25	[5] Satellite-Launcher interface — Coupled Load Thermal Analysis on Ariane	DAVY, Guillaume (ArianeGroup Les Mureaux, France) DE BRAS DE FER, Thibault (ArianeGroup Les Mureaux, France)

14:50	[19] Use of Nusselt Number Correlations for Cryogenic Launcher Cavities	ADAMCZYK, Anna (ArianeGroup GmbH, Germany)
-------	---	--

**Coffee Break (15:40-16:10)****Thermo-elastic - Einstein (16:10-17:50)**

-Conveners: Rooijackers, Harrie (ESA/ESTEC, The Netherlands); Laine, Benoit (ESA)

time	[id] title	presenter
16:10	[20] THERMOMECHANICAL PROCESS AUTOMATION ON A SPACECRAFT ANTENNA	CERVANTES , Yann (Thales Alenia Space, France)
16:35	[34] Improvement of methodologies for thermo-elastic predictions and verification	DE PALO, Savino (Thales Alenia Space, Italy) D'AMICO, Jurij (Thales Alenia Space, Italy)
17:00	[53] Accurate thermal mapping and Finite Element Model based Conductor Generation; extended method benchmarking guidelines	KOOT, Menno (ATG-Europe B.V., The Netherlands)

**Thermal Design (platforms, instruments) - Newton (16:10-17:50)**

-Conveners: Lapensée, Stéphane (ESTEC/ESA, The Netherlands)

time	[id] title	presenter
16:10	[64] JUICE thermal design and early verification with the Thermal Development Model (TDM) test in ESTEC	PEYROU-LAUGA, Romain (ESA/ESTEC, The Netherlands) LOPEZ-MATEOS, Javier (Airbus DS, Spain)
16:35	[65] JUICE MAG-Boom thermal design and STM thermal vacuum test	PEYROU-LAUGA, Romain (ESA/ESTEC, The Netherlands) ZABALETA ARAUJO, Janire (SENER, Spain)
17:00	[69] Thermal design for RWI and LP-PWI appendages onboard the JUICE spacecraft — trade-offs and analysis	KUCIŃSKI, Tomasz (Astronika, Poland)
17:25	[6] Design and Verification of the ExoMars CM Heater Power Limitation Algorithm	BEWICK, Russell (OHB System, Germany)

**Cocktail (18:00-19:30)**

## Tuesday 30 October 2018

### Thermal Testing - Newton (09:15-10:55)

-Conveners: Laneve, Vito (ESA)

time	[id] title	presenter
09:15	[16] SEOSAT-INGENIO PFM Thermal Vacuum Testing	SOTO ARMAÑANZAS, Isabel (SENER, Spain)
09:40	[67] Testing a Mars Rover — The ExoMars Rover Module STM Thermal Test	NELSON, Edward (Airbus, United Kingdom)
10:05	[23] Thermal modelling of the solar simulation infrared grid for the ExoMars Rover Module STM test	KATZENBERG, Joshua (Airbus, United Kingdom) TAMKIN, Luke (Airbus, United Kingdom)
10:30	[14] INSIGHT Mars mission — Thermal tests on SEIS instrument	ANDRE, Maxime (CNES, France)

### Two phase heat transport technology - Einstein (09:15-10:55)

-Conveners: Gunnar Sieber

time	[id] title	presenter
09:15	[8] Passive Bypass Valve for one and two Phase Fluid Loops for Space Applications	VAN BENTHEM, Roel (Netherlands Aerospace Centre, NLR, The Netherlands)
09:40	[17] Deployable Radiator development & qualification for multi-mission purpose	VERDONCK, Julo (Thales Alenia Space, France)
10:05	[50] Flat Plate Pulsating Heat Pipes embedded in space structures	BELFI, Federico (Argotec, Italy)
10:30	[62] Testing of high heat flux 3D printed aluminium evaporators	VAN GERNER, Henk Jan (NLR, The Netherlands)

### Coffee Break (10:55-11:20)

### Thermal Testing - Newton (11:20-13:00)

-Conveners: Laine, Benoit (ESA)

time	[id] title	presenter
11:20	[31] THERMAL DESIGN AND TEST OF THE WIDE RANGE THERMAL FACILITY FOR THE JUICE MISSION	THIBERT, Tanguy (Centre Spatial de Liège, University of Liege, Belgium)
11:45	[42] RPW antennas thermal qualification test campaigns	LIQUIÈRE, Nicolas (EPSILON, France)
12:10	[27] Challenging thermal model correlations — Lessons Learned	DALIBOT, Coraline (RAL Space, United Kingdom)
12:35	[52] Thermal Testing: Recent Experiences in Resistance Thermometry and in Bearing Thermal Conductance Measurements	GÓMEZ-HERNÁNDEZ, Cesar (ATG-Europe B.V., The Netherlands)

### Two phase heat transport technology - Einstein (11:20-13:00)

-Conveners: Jan Persson

time	[id] title	presenter
------	------------	-----------

11:20	[61] Multi-source miniaturized Loop Heat Pipes for electronics cooling	FOURGEAUD, Laura (IRT Saint-Exupery, France)
11:45	[70] Ground Testing and Flight Performance of Methanol-Copper Heat Pipes for Asteroid Lander MASCOT	SASAKI, Kaname (DLR Bremen, Germany)
12:10	[63] Transient modelling of pumped two-phase cooling systems: Comparison between experiment and simulation with R134a	VAN GERNER, Henk Jan (NLR, The Netherlands)
12:35	[18] Advanced Cooling Technologies for high dissipating ASIC/FPGA of Future Generation of Digital Processor	MICHARD, Frederic (Thales Alenia Space, France)

**Lunch (13:00-14:00)****Thermal Control Technologies - Einstein (14:00-15:40)****-Conveners: Peyrou-Lauga, Romain (ESA/ESTEC, The Netherlands)**

time	[id] title	presenter
14:00	[22] Development of Pyrolytic Graphite Applications in Spacecraft Thermal Control Systems	MAAS, Alexander (Airbus DS, The Netherlands)
14:25	[21] Passive thermal control by integrating phase change material into 3D printed structures	REISWICH, Martin (FH Aachen, Germany) RAMIN, Vincent Joel (FH Aachen, Germany)
14:50	[54] Optimized Phase Change Material Module for Thermal Regulation of Cycled Dissipative Units — A Feasibility Demonstration Study	DUDON, Jean-Paul (Thales Alenia Space, France) RAYNAUD, Martin (Thales Alenia Space, France)
15:15	[29] Development of highly efficient Spacer for MLI	RANZENBERGER-STINDL, Christian (RUAG Space GmbH, Austria)

**Thermal Analysis and Software Tools - Newton (14:00-15:40)****-Conveners: Vaughan, Matthew (ESA)**

time	[id] title	presenter
14:00	[41] Microcarb — Worst case research using genetic and krigeage optimal research algorithms	GASNIER, Denis (EPSILON, France)
14:25	[40] Simplification and Parametrisation of a Thermal Model with ESATAN Thermal Modelling Suite	DOMANSKI, Krzysztof (ITP Aero, United Kingdom)
14:50	[49] REAL ALBEDO COEFFICIENT AND EARTH INFRARED RADIATION DATA TREATMENT FOR POLAR SUMMER LONG DURATION BALLOON MISSIONS	GONZÁLEZ-BÁRCENA, David (IDR/UPM Universidad Politécnica de Madrid, Spain) GONZÁLEZ-LLANA, Arturo (IDR/UPM Universidad Politécnica de Madrid, Spain)
15:15	[26] Automatic linear conductances calculation for ESATAN-TMS thermal models	PIQUERAS, Javier (Universidad Politécnica de Madrid, Spain)

**Coffee Break (15:40-16:10)****Thermal Analysis and Software Tools - Newton (16:10-18:00)**

**-Conveners: Rooijackers, Harrie (ESA/ESTEC, The Netherlands); Etchells, James (ESA/ESTEC, The Netherlands)**

time	[id] title	presenter
16:10	[10] SYSTEMA — THERMICA	CAUGANT, Antoine (Airbus Defence and Space SAS, Toulouse, France) BAYEUX, Charlotte (Airbus Defence and Space SAS, Toulouse, France)
16:35	[7] Fast View Factor Determination for Thermal Modelling	GULDE, Max (System Solutions Department, Fraunhofer Institute for High-Speed Dynamics, Germany)
17:00	Transfer from Einstein	
17:05	[39] Post-processing of Thermal Model Data with ESATAN Thermal Modelling Suite	BROUQUET, Henri (ITP Aero, United Kingdom)
17:30	[15] Time extrapolation and near-real time correlation — advanced method implemented into DynaWorks for thermal test follow-up, based on GENETIK+ and SYSTEMA coupling	ANDRE, Maxime (CNES, France)
17:55	General Announcements	

#### **Thermal Control Technologies - Einstein (16:10-17:00)**

**-Conveners: Thierry Tirolien**

time	[id] title	presenter
16:10	[44] Modelling and testing of cryostats for space applications	BALLESTER, Mathieu (AIRBUS, France)
16:35	[25] Implementation of a high thrust mono-propellant engine on a propulsion module	GONIN, Charles (Airbus, United Kingdom)

#### **Transfer to Newton - Einstein (17:00-17:05)**

***Allow participants to join in Newton without disruption***

**Dinner (18:00-21:00)**

## Wednesday 31 October 2018

### Thermal Engineering for Cubesats - Einstein (09:05-11:35)

-Conveners: Walker, Roger (ESA); Hager, Philipp (ESA)

time	[id] title	presenter
09:05	[85] GOMX-4B thermal model correlation with in-flight data	KASJANOWICZ, Alicja (ESA/ESTEC, The Netherlands)
09:30	[30] Thermal Design, Analysis and Testing of the CASPA Cubesat	BUCKLE, James (Clyde Space, United Kingdom)
09:55	[60] Standardized Thermal Control Subsystems for Picosatellites	AVILA DE LUIS, Rodrigo (Delft University of Technology, The Netherlands)
10:20	[36] Thermal Experience and The Future Road for Thermal Analyses and Systems for CubeSats	BROUWER, Hugo (ISIS - Innovative Solutions in Space B.V., The Netherlands)
10:45	[33] CubeSat Camera — High performance adaptable thermal engineering on a budget	FEORE, Dylan (RAL Space, United Kingdom)
11:10	[38] Optimization of exterior surfaces of a nanosatellite with respect to thermo-optical properties	MUKUND SARAF, Anirudh (GOMspace, Denmark)

### Thermal Analysis and Software Tools: Data Exchange - Newton (09:30-11:35)

-Conveners: Vaughan, Matthew (ESA); Rooijackers, Harrie (ESA/ESTEC, The Netherlands)

time	[id] title	presenter
09:30	[47] Advances on exchange of thermal models	DARRAU, Alexandre (AIRBUS, France)
09:55	[59] Study of e-Therm / ESATAN TMM converter	BRUNETTI, François (DOREA, France)
10:20	[58] LHP system module and Modal model integration inside e-Therm using co-simulation	BRUNETTI, François (DOREA, France)
10:45	[12] Setup of Bepi Colombo Thermal Models for Operations	ETCHELLS, James (ESA/ESTEC, The Netherlands) WOLF, Sebastian (ESA/ESTEC, The Netherlands)
11:10	[9] EXOMARS EDM THERMAL FEEDBACK FROM FLIGHT	DE PALO, Savino (Thales Alenia Space, Italy)

### Coffee Break (11:35-12:10)

### Closure - Newton (12:10-13:00)

-Conveners: Rooijackers, Harrie (ESA/ESTEC, The Netherlands)

### Lunch (13:00-14:00)