

# 6th European Workshop on Thermal Protection Systems and Hot Structures

## PRELIMINARY PROGRAMME

Wednesday, 1 April 2009 - DLR Grosser Hörsaal

08:30	Registration	
09:15-11:00	<b>Opening Session Part 1</b>	
	<ul style="list-style-type: none"> <li>Welcome (IRS-ESA)</li> <li>Return, TPS and Hot structure technologies at DLR, L. Fröbel, DLR</li> <li>The IXV Programme - ESA's Atmospheric Re-Entry Technology Demonstrator, G. Tumino, ESA</li> <li>EXPERT - A European Aerothermodynamics In-Flight Testbed, J. Gavira, ESA</li> </ul>	
11:00-11:30	Coffee break	
11:30-13:00	<b>Opening Session Part 2</b>	
	<ul style="list-style-type: none"> <li>Thermal Protection System (TPS) and Hot Structures Activity within the FLPP Core Technology Project, G. Ramusat, ESA</li> <li>Experimental and Numerical Entry Simulation at IRS, G. Herdrich, Institut fuer Raumfahrtssysteme (IRS)</li> <li>Plasma Power Handling in the ITER Fusion Device, G. Federici, Fusion for Energy</li> </ul>	
13:00-14:15	Lunch break	
14:15-15:45	<u>IRS Room 1</u> <b>Session 3A: The Intermediate Experimental Vehicle (IXV)</b> Chair: S. Langlois	<u>IRS Room 2</u> <b>Session 3B: Plasma Testing - Campaigns and Capabilities</b> Chair: S. Loehle
14:15-15:45	<ul style="list-style-type: none"> <li>The Intermediate eXperimental Vehicle (IXV): the European Flight Opportunity for TPS&amp;HS Technologies, A. Denaro, NGL Prime S.p.A</li> <li>TPS &amp; HS Subsystem Activities for IXV PDR Preparation, M.T. Signorelli, Thales Alenia Space</li> <li>Thermo-Mechanical Design of the IXV Nose Assembly, R. Knoche, ASTRIUM Space Transportation</li> </ul>	<ul style="list-style-type: none"> <li>Thermal Non-Equilibrium in the Boundary Layer of a Flat Plate in RF Air Plasma, P. Boubert, CORIA</li> <li>ASA - A System Devoted to Hypersonic-Related Technologies, F. Fosssati, Thales Alenia Space, Italy</li> <li>On-going Capabilities and Developments of Re-Entry Plasma Ground Tests in EADS-Astrium, B. van Ootegem, ASTRIUM</li> </ul>
15:45-16:15	Coffee break	
16:15-18:15	<u>IRS Room 1</u> <b>Session 4A: TPS Technologies - Part 1</b> Chair: H. Hald, B. Behrens	<u>IRS Room 2</u> <b>Session 4B: In-flight Measurement Systems and Observations</b> Chair: G. Herdrich
14:15-15:45	<ul style="list-style-type: none"> <li>Thermal Protection Systems Portfolio of ASTRIUM GmbH - Recent Developments, W.P.P. Fischer, ASTRIUM Space Transportation</li> <li>CMC Thermal Protection System Pre-Development for Re-Entry Demonstrator Vehicles, T. Pichon, SNECMA Propulsion Solide</li> <li>Investigations of Passive to Active Oxidation on C/SiC Hot Structures, F. Infed, MT Aerospace</li> <li>TPS Joining Technologies, J. Marcos, Fundacion INASMET</li> </ul>	<ul style="list-style-type: none"> <li>Development and Verification of an Instrumented Aerothermal Thermal Protection System Heat Shield Plug for Flight on the Mars Science Laboratory, E. Martinez, NASA</li> <li>Advanced Heat Flux Measurement during Re-entry Flight using The Non-Integer System Identification (NISI) Procedure, S. Lohle, University of Stuttgart</li> <li>DEDALO: Thermo-Mechanical Monitoring by Fiber Optic Devices on UHTC Structures, V. Latini, S.A.B. Aerospace</li> <li>Airborne Re-Entry Observation Experiment SLIT: UV Spectroscopy During Stardust and ATV Re-entry, S. Lohle, IRS</li> </ul>
18:30-20:00	<b>Welcome drink (sponsored by DLR)</b>	

**Thursday, 2 April 2009**

09:00-10:30	<u>IRS Room 1</u> <b>Session 5A: The Sharp Edge Flight Experiment II (SHEFEX II) - Part 1</b>	<u>IRS Room 2</u> <b>Session 5B: High-Temperature Thermal Conductivity Measurements</b>
	<ul style="list-style-type: none"> <li>• The Sharp Edge Flight Experiment SHEFEX II, a Status Report, H. Weihs, DLR</li> <li>• Design and Thermo-Mechanical Analysis of the Aerodynamic Control Surfaces on SHEFEX-II, H. Elsässer, Institute of Structures and Design</li> <li>• SHEFEX II Flight Instrumentation, T. Thiele, DLR</li> </ul>	<ul style="list-style-type: none"> <li>• Thermal Conductivity Measurements under Non-Standard Conditions, S. Vidi, Bavarian Centre for Aerospace Research</li> <li>• High Temperature Thermal Conductivity Measurement Apparatus, M. Selzer, DLR</li> <li>• The Use of Flash Methods to Determine Thermal Conductivity, W. Hohenauer, Austrian Institute of Technology</li> </ul>
10:30-11:00	Coffee break	
11:00-13:00	<u>IRS Room 1</u> <b>Session 6A: The EXPERT Vehicle - Part 1</b> Chair: A. Thirkettle, A. Gulhan	<u>IRS Room 2</u> <b>Session 6B: Ablative Materials - Development and Characterisation</b> Chair: J-M. Bouilly
	<ul style="list-style-type: none"> <li>• TPS Design Methodology for the EXPERT capsule, J. Thoemel, ESA</li> <li>• TPS Design, Development and Verification Approach for EXPERT Program, E. Brach Prever, Thales Alenia Space, Italy</li> <li>• Thermal-Structural Performances of the EXPERT Thermal Protection System, J. Fatemi, Dutch Space</li> <li>• Thermo-Mechanical Design of The Expert Nose and Testing of The Load Introductions, T. Reimer, DLR</li> </ul>	<ul style="list-style-type: none"> <li>• Development of a European Ablative Material for Heatshields of Sample Return Missions, H. Ritter, ESA</li> <li>• Enhanced Ablative TPS Study for High-Energy Entry Missions, F. Fossati, Thales Alenia Space Italy</li> <li>• Mechanical and Ablative Properties of Silica-Phenolic Composites for Thermal Protection Systems, M.L. Gregori, Inst. Of Aeronautics and Space</li> <li>• Estimating Properties of Materials Interacted with High-Enthalpy Gas Flow by Inverse Problems Technique, A.V. Nenarokomov, Moscow Aviation Institute</li> </ul>
13:00-14:15	Lunch break	
14:15-16:15	<u>IRS Room 1</u> <b>Session 7A: The EXPERT Vehicle - Part 2</b> Chair: F. Ratti, E. Brach-Prever (TBC)	<u>IRS Room 2</u> <b>Session 7B: Numerical Modelling of Ablation Processes</b> Chair: J. Beck
	<ul style="list-style-type: none"> <li>• Status of the IRS EXPERT Instrumentations PYREX, PHLUX and RESPECT, G. Herdrich, University of Stuttgart</li> <li>• EXPERT Open Flap Assembly and its Instrumentation, A. Gulhan, DLR</li> <li>• Thermal Measurement Techniques for Movable Control Surfaces in Re-entry Vehicles, C. Pereira, RUAG Aerospace</li> <li>• Qualification of a ceramic fin for flight on European Experimental re-entering capsule EXPERT, A. Del Vecchio, CIRA</li> </ul>	<ul style="list-style-type: none"> <li>• Ablation Response of Fibrous Materials with Different Matrices: Modeling, Comparison, and Application, J. Lachaud, NASA Ames Research Center</li> <li>• Design and Numerical Modelling of Charring Ablators for Re-Entry Applications, T. van Eekelen, SAMTECH SA</li> <li>• Navier-Stokes Simulations with Graphite Surface Ablation for Atmospheric Entry, D. Bianchi, La Sapienza University, Rome</li> <li>• Numerical Rebuilding of Ablative Test Cases Using KCMA, P. Reynier, ISA</li> </ul>
17:30-22:00	Visit Schloss Ludwigsburg and Workshop dinner	

**Friday, 3 April 2009**

09:00-10:30	<u>IRS Room 1</u> <b>Session 8A: The Sharp Edge Flight Experiment II (SHEFEX II) - Part 2</b> Chair: H. Weihs	<u>IRS Room 2</u> <b>Session 8B: Component Testing</b> Chair: J. Persson
	<ul style="list-style-type: none"> <li>• ASTRIUM's TPS Experiments on SHEFEX II - Design &amp; Analyses, W.P.P. Fischer, ASTRIUM</li> <li>• Design and Layout of the Combined Sensor System COMPARE for SHEFEX II, A. Preci, Univ. of Stuttgart</li> <li>• Heat Balance of the Transpiration-Cooled Heat Shield Experiment AKTiV on SHEFEX II, H. Boehrck, DLR</li> </ul>	<ul style="list-style-type: none"> <li>• Upgrade of three Laboratory Test Setups to measure Material Properties and Antenna Models at High Temperatures occurring during Re-entry Vehicle Flights, P. Kabacis, Wroclaw University of Technology</li> <li>• Computed Tomography for Non-Destructive Inspection of TPS Components, T. Ullmann, DLR</li> </ul>
10:30-11:00	Coffee break	
11:00-13:00	<u>IRS Room 1</u> <b>Session 9A: TPS Technologies - Part 2 (Concepts and Modelling)</b> Chair: D. Jaredson	<u>IRS Room 2</u> <b>Session 9B: Atmospheric Entry at Mars</b>
	<ul style="list-style-type: none"> <li>• Film Cooling Investigation of a Double Wedge Model in Hypersonic Flow, K.A. Heufer, RWTH</li> <li>• UHTC Thermal Sprayed Coating as a TPS for Re-Entry Vehicles, M. Tului, Centro Sviluppo Materiali</li> <li>• Analysis and Design of UHTC Hot Structures for Ground and Flight Tests, M. De Stefano Fumo, University of Naples</li> <li>• Modeling Elastic and Thermal Properties of 2.5D Carbon Fiber C/SiC Hybrid Matrix Composites by Homogenization Method, L. Pardini, CTA, IAE</li> </ul>	<ul style="list-style-type: none"> <li>• Computational Aeroheating Analyses of a Capsule in Martian Atmosphere, G. Pezzella, CIRA</li> <li>• Thermal Protection System of the ExoMars Entry Probe, J-M. Bouilly, EADS ASTRIUM Space Transportation</li> <li>• Dust Particle Erosion during Mars Entry, K. Keller, HPS</li> <li>• Particle Erosion Tests on an Ablative Material in Martian Atmosphere, B. Esser, DLR</li> </ul>
13:20-14:00	<b>Visits of Institutes at DLR &amp; IRS</b>	