



**COMMISSION OF THE EUROPEAN COMMUNITIES
RESEARCH DIRECTORATE-GENERAL**

Integrating and strengthening the European Research Area

Specific Support Action
EUROTURBO6

**Support to Sixth European Conference on Turbomachinery - Fluid
Dynamics and Thermodynamics, Lille, March 2005.**

ASA4-CT-2005-016055
Contract Number 016055
FINAL REPORTS

**Gerard BOIS
LML ENSAM
EUROTURBO6 Coordinator**

PUBLISHABLE FINAL ACTIVITY REPORT

Report concerning the ETC 6 Conference main issue:

ETC 6 Conference has taken place according to the dates that have been initially chosen, from March, 7-11 2005, in Lille, France.

The conference location was at the “Nouveau Siècle” in the very centre of the town, allowing the participants to be quite close to their accommodations.

The conference rooms were all equipped with microphones, overhead projectors, projectors and laptops.

All information about the conference venue is given in Annexe 1

Report concerning the ETC 6 Conference Sessions

Four invited lectures have been planned at the beginning of each day.

According to the number of papers that were chosen and to the ETC policy, the conference was divided in two parallel sessions.

Each session was chaired by a “Session Chairman” chosen among the ETC Scientific Committee members and also among some of the “Review Organiser” of the conference.

A set of 5 exhibitors was open during the conference meeting hours.

During the conference, special meetings have been organised for the board of the Committee members in order to define the location of the next conference, the new ETC Chairman and the list of papers that will be offered for a special issue of IMechE publication.

The number of participants that paid the corresponding fee was 205. The amount of participants like students or organising committee members from Lille’s university that paid no fee was 25. The total amount of participants was 230.

Each participant has received:

- A final program with all the sessions and paper’s titles (see attached files in Annexe 2)
- The conference proceedings on hard copies
- A CD Rom
- A questionnaire

General Information

The 6th European Conference on Turbomachinery Fluid Dynamics and Thermodynamics (ETC 6) is being organised in March 2005 in Lille (FR), beginning on Monday, March 7 and concluding on Friday, March 11. The 5-days technical program is supplemented with a series of social events over the week fostering international friendships, discussions and collaborative ventures.

The conference city is Lille, located in the very heart of Europe, 250 km north of Paris, 100 km from Brussels, 240 km from London.

Conference Venue

The conference will be held at « Nouveau Siècle », located in the heart of the city near the main hotels and restaurants, railways stations and highway entrances.

Le Nouveau Siècle
8 place Mendès France
59800 Lille - France
Phone : + 33.3.28.82.69.00

The exhibition will be located in the close vicinity of the Conference rooms.

Travel to Lille

By road:

From Motorway A1(Lille/Paris), A22(Lille/Gent Brussels), A25(Lille/Dunkerque), A23(Lille/Valenciennes), Exit Center of Lille and park at Nouveau Siècle (parking with charge)

By plane :

Direct flights to Lille Airport or Arrival at Paris Roissy Charles de Gaulle Airport. Then take the TGV rapid train at Roissy 2 terminal to the LILLE EUROPE railway station (one hour travel). Then follow the way indicated below

By rail

The LILLE EUROPE or LILLE FLANDRES Railway Stations are located in the town center, at 15 minutes walking distance to the Conference venue.

Hotel Accommodation :

Please make your hotel reservation using the web site of the Conference : www.euroturbo.org or the hotel registration form at the end of this preliminary program.

OFFICE DU TOURISME DE LILLE –
Congress Department
Palais Rihour – Place Rihour – BP 205
59002 LILLE CEDEX – FRANCE
Phone : + 33.3.59.57.94.00
Fax : + 33.3.59.57.94.04
e-mail : a.obin@lilletourism.com

Registration :

To register, please use the web site of the Conference : www.euroturbo.org, or tick properly the registration form enclosed at the end of the present program and send it to the Local Organising Secretary :

S. ROBBE, ENSAM/ETC-6
8 Boulevard Louis XIV, 59046 LILLE
Phone : + 33.3.20.62.22.22
Fax : + 33.3.20.62.22.40
Email : robbe@lille.ensam.fr

Please note that your registration can be only be accepted if you have paid by one of the methods indicated in the registration form, or if you have supplied a valid order number so that an invoice can be prepared.

Pre-registrants may pick up the Conference material at the registration desk. **Pre-registration will be accepted until January 28, 2005.**

On-site registration

A Registration Form to be used for On-Site Registration will be available at the registration desk.

Registration Fees

The Registration fees are indicated on the registration form included in this program. The full, Student and East Country registration fees include a copy of the Conference Proceedings, the access to the Conference sessions and to the Monday's Welcome Reception buffet. The fee does not include the Conference Gala dinner on Wednesday evening; reservations for this event has to be made using the registration form. The Day visitor fee allows to attend the Conference sessions of the selected day. The accompanying person fee includes the access to Monday's Welcome Reception buffet.

Conference Registration and Information Desk

The Registration Desk will be open from 8:00 AM until the early afternoon, from Monday, March 7 at the Conference venue.

Cancellations

Delegates who cancel their registration before January 28, 2005 will have their fees refunded minus an administration charge of 25 euros. No refund will be made after this date. Replacement delegates will be accepted.

Conference Proceedings

The Conference Proceedings will be available on-site for pre-registrant attendees. Additional copies, if not available on-site, will be mailed ; the mailing charge is 15 euros.

Purchase of Additional Copies of the Proceedings

Additional copies of the Proceedings may be ordered until February 18th, 2005 (see the registration form included in this program)

Payment

All payments on-site are required in euros. Major Credit Cards are accepted.

Enquiries

Eventual enquiries can be addressed to :

Prof. G. BOIS
ENSAM, 8 Boulevard Louis XIV, 59046 LILLE
Phone : 33 3 20 62 22 23
Fax : 33 3 20 62 22 40
Email : bois@lille.ensam.fr

Updated information will be available at the following web address : [http :// www.euroturbo.org](http://www.euroturbo.org).

ANNEXE 2 : FINAL PROGRAM

Monday, March 7, 2005		Morning
8:30 – 10:00	Registration	
10:00 – 10:10	Opening Ceremony	
10:15 – 11:15	Invited Lecture : Latest developments and perspectives of computational models for the optimized design of turbofan components at SNECMA. Dr Christian MARI, Chairman & CEO of TEUCHOS, SNECMA Group (FR)	
A-01 : Axial Flow Compressors (1) Chairman : J.M. Gely (Sneema Moteurs, FR)		B-01 : Axial Flow turbines (1) Chairman : R. Baier (MTU, DE)
AFC – 001_01 / 2 Experimental study of sweep and dihedral effects on compressor cascade performance Y. Song, G. Zhao, F. Chen, Z. Wang, Harbin Institute of Technology, China	11:30	AFT – 018_01 / 138 Aerodynamic optimisation of a HP turbine cascade blade for heavy-duty gas turbine applications <i>P. Cardamone, M. Pfitzner, Universität der Bundeswehr München, Germany, M. Loetzerich, ALSTOM Power, Switzerland</i>
AFC – 002_02 / 48 A synthetic method for judging the validity of a CFD tool applied to axial flow cascades <i>J. Vad, A. Vassatis, M.M. Lohász, G. Rábaj, N. Rác, A. Tajti, Budapest University of Technology and Economics, Hungary, A. Corsini, University of Rome "La Sapienza", Italy</i>	12:00	AFT– 019_02/98 Experimental study of reverse compound lean in a linear turbine cascade. D.A. Bagshaw, G.L. Ingram, D.G. Gregory-Smith, School of Engineering, University of Durham, M.R. Stokes, Rolls-Royce plc, UK.
AFC – 003_03 / 172 Numerical simulation of turbulent flows in 3D decelerating cascades using second moment closure modelling <i>D. Borello, F. Rispoli, University of Rome "La Sapienza", Italy, K. Hanjalic, Technical University of Delft, The Netherlands</i>	12:30	AFT – 020_03 / 124 The loss behaviour of milled turbine blades <i>B. Schreyer, J.R. Seume, University of Hannover, Germany</i>
13:00 – 14:30 : LUNCH		

Monday, March 7, 2005		Afternoon
A-02 : Turbulence and Transition (1) Chairman : J. Coupland (Rolls Royce, UK)		B-02 : Measurement Techniques (1) Chairman : K. Chana (Qinetiq, UK)
TT – 067_01 / 29 Extension of the Spalart-Allmaras model to account for wall roughness. Application to flow over the T106 blade <i>X. de Saint Victor, R. Houdeville, B. Aupoix, ONERA, France</i>	14:30	MT – 086_10 / 100 Method for analysis of showerhead film cooling experiments on highly curved surfaces <i>G. Wagner, E. Schneider, P. Ott, EPFL, Switzerland, J. von Wolfensdorf, B. Weigand, University of Stuttgart, Germany</i>
TT – 068_02 / 19 Numerical study of turbulent flow in rotor-stator cavities using the linear and non-linear k-ε models <i>M. Raisee, A. Saneei, University of Tehran, Iran, H. Iacovides, UMIST, United Kingdom</i>	15:00	MT – 087_02 / 165 Low-temperature, high-speed pyrometry measurements on a turbocharger compressor impeller <i>J. Nickel, IAV GmbH, H. Pucher, TU Berlin, Germany D. Eastwood, Holset Engineering, United Kingdom</i>
	15:30	MT – 088_03 / 149 The dual thin-film probe for high frequency flow temperature measurements <i>V. Iliopoulou, T. Arts, von Karman Institute, Belgium</i>
16:00 : COFFEE BREAK		
A-03 : Pumps (1) Chairman : H. Jaberg (U. Graz, AT)		B-03 : Steam Turbines (1) Chairman : P. Walker (Alstom, CH)
P – 051_01 / 205 Numerical and experimental investigations on the unsteady flow field and noise generation in a centrifugal pump impeller <i>G. Pavesi, G. Ardizzone, G. Cavazzi, University of Padova, Italy</i>	16:30	ST – 038_01 / 22 Losses prediction in the wet steam flow through the rotor blade row using different numerical methods <i>T. Chmielniak, W. Wróblewski, S. Dykas, H. Lukowicz, Silesian University of Technology, Poland</i>
P – 052_02 / 166 Numerical analysis for the optimal fluid dynamic design of a two blade solid self-priming solid-handling centrifugal pump <i>M. Pinelli, University of Ferrara, Italy</i>	17:00	ST – 039_02 / 4 Experimental and computational investigation of flow phenomena in a steam turbine with radial control stage and two axial stages <i>L. Tajc, L. Bednar, Skoda Energo Ltd., J. Polansky, P. Kovarik, University of West Bohemia</i>
P – 053_03 / 107 3D quasi-unsteady flow simulation in a centrifugal pump. Influence of splitter blades in velocity and pressure fields <i>M. Asuaje, F. Bakir, F. Kenyery, R. Noguera, R. Rey, ENSAM Paris, France</i>	17:30	ST – 040_03 / 132 Effect of partial admission on the flow field in the wheel chamber of an industrial steam turbine <i>R. Willinger, M. Pikbougoum, Vienna University of Technology, Austria</i>

Tuesday, March 8, 2005		Morning
8:30 – 9:30	Invited Lecture : State of the Art and Future Developments of Stationary Gas Turbines Dr. Brian Haller, Manager Turbine Technology and Methods, Industrial-Turbines Siemens (UK)	
A-04 : Axial Flow Compressors (2) Chairman : M. Lötzerich (Alstom Power, CH)		B-04 : Axial Flow Turbines (2) Chairman : F. Martelli (U. Florence, IT)
AFC – 004_04 / 33 Effect of mean line shape, sweep and dihedral on stator performance of a highly loaded single-stage axial-flow low-speed compressor <i>C. Clemen, Rolls Royce Deutschland, U. Stark, G. Kosyna, TU Braunschweig, J. Friedrichs, MTU, S. Baumgarten, KSB, Germany</i>	10:00	AFT – 021_04 / 156 Impact of suction side cooling on the losses of a highly loaded high pressure turbine blade <i>L. Homeier, Universität der Bundeswehr München, F. Haselbach, Rolls Royce Deutschland, Germany</i>
AFC – 005_05 / 49 Effects of blade skew in an axial flow rotor of controlled vortex design <i>J. Vad, A.R.A. Kwedikha, K. Watanabe, G. Kristóf, M.M. Lohász, G. Rábai, N. Rácz, Budapest University of Technology and Economics, Hungary</i>	10:30	AFT – 022_05 / 43 The flow field and performance of a model low pressure steam turbine <i>L. Volker, M. Casey, University of Stuttgart, M. Neef, H. Stüer, Siemens Power Generation, Germany</i>
AFC – 006_06 / 119 Blade camber surface optimization for turbomachinery design <i>M. Ferlauto, H. Telib, A. Iollo, L. Zannetti, Politecnico di Torino, Italy</i>	11:00	AFT – 023_06 / 7 Preliminary measurements from a new experimental facility for aerodynamic research <i>E.J. Walsh, D. Hennon, M.R.D. Davies, University of Limerick, Ireland, D.M. McEligot, University of Arizona, USA</i>
AFC – 007_07 / 11 A throughflow analysis tool based on the Navier-Stokes equations <i>J.F. Simon, O. Léonard, University of Liège, Belgium</i>	11:30	AFT – 024_07 / 1 Study of the entrainment coefficient of the fluid in a rotor-stator cavity <i>S. Poncet, M.P. Chauve, P. Le Gal, University of Marseille I and II, France</i>
AFC - 008_08 - / 213 Numerical analysis of the flow in the fans of the S1-Modane large wind tunnel <i>A. Fourmaux, A. Giacchetto, ONERA, France</i>	12:00	AFT – 025_08 / 97 Use of vortex generators to control hub stall in Wells turbine <i>R. Williams, L. He, D.G. Gregory-Smith, University of Durham, United Kingdom</i>
12 :30 – 14:00 : LUNCH		

Tuesday, March 8, 2005		Afternoon
A-05: Turbulence and Transition (2) Chairman : M. Manna (University of Naples, IT)		B-05 : Heat Transfer (1) Chairman : R. Moenig (DLR, DE)
TT – 070_04 / 28 Improvement of URANS calculations for blade row interaction using DES method and k-v model <i>X. de Saint Victor, R. Houdeville, B. Aupoix, ONERA, France</i>	14:00	HT – 074_01 / 54 Blade-tip heat transfer in a transonic turbine <i>S.J. Thorpe, S. Yoshino, G.A. Thomas, R.W. Ainsworth, University of Oxford, N. Harvey, Rolls Royce, United Kingdom</i>
TT – 071_05 / 66 Modelling of wake induced transition with dynamic description of intermittency <i>K. Lodefier, E. Dick, University of Ghent, Belgium, W. Piotrowski, W. Elsner, Czestochowa University of Technology, Poland</i>	14:30	HT – 075_02 / 93 Flow measurements inside a large scale model of turbine blade internal cooling passage with high blockage turbulators <i>C. Tsang, Rolls-Royce, D. Gillespie, P. Ireland, University of Oxford, United Kingdom</i>
TT – 072_06 / 187 A spectral vanishing viscosity technique as large eddy simulation of transitional rotor-stator flows <i>E. Séverac, E. Serre, P. Bontoux, MSNM-L3M CNRS Marseille, France, B.E. Launder, UMIST, United Kingdom</i>	15:00	HT – 076_03 / 117 Film cooling experiments using steady state and transient infrared thermography <i>D. Brauckmann, H. Lipowsky, J. von Wolfensdorf, University of Stuttgart, Germany</i>
TT – 073_07 / 176 The effect of wake parameters on the transitional boundary layer on turbine blade <i>R. Zarzycki, W. Elsner, Czestochowa University of Technology, Poland</i>	15:30	HT – 077_04 / 201 Aerodynamic measurements over a film cooled nozzle vane endwall <i>G. Barigozzi, G. Benzoni, G. Franchini, A. Perdichizzi, University of Bergamo, Italy</i>
16:00 : COFFEE BREAK		
A-06 : Pumps (2) Chairman : G. Bois (ENSAM, FR)		B-06 : Steam Turbines (2) Chairman : G. Dibelius (DE)
P – 054_04 / 209 Analysis of pressure transients in a water pumping system <i>P.K. De, D. Misra, K.N. Saha, S.C. Roy, S. Ghosal, Jadavpur University, Kolkata, India</i>	16:30	ST – 041_04 / 45 CFD analysis of a steam turbine stage using real gas status equations by means of an lut approach <i>M. Cirri, P. Adami, F. Martelli, University of Florence, Italy</i>
P – 055_05 / 139 Wake-boundary layer interaction on the vaned diffuser of a centrifugal stage <i>E. Canepa, A. Cattanei, M. Ubaldi, P. Zunino, University of Genova, Italy</i>	17:00	ST – 042_05 / 225 Nucleation of steam in high pressure nozzle experiments <i>G. Gyarmathy, ETH Zurich, Switzerland</i>
P – 056_06 / 52 Stator design improvement in a multistage helico-axial pump <i>A. Akhras, R. Vilagines, P. Pagnier, Institut Français du Pétrole, France</i>	17:30	ST – 043_06 / 50 The effect of expansion rate on the steam flow with hetero-homogeneous condensation in nozzles <i>M. Stastny, Czech Technical University in Prague, M. Sejna, PC Progress, Czech Republik</i>

Wednesday, March 9, 2005		Morning
8:30 – 9:30	Invited Lecture : Advanced Compressor Design using Active Flow Control Mr. Eckart Henrich, Head Aerodynamics & Performance, MTU (DE)	
A-07 : Unsteady Flows in Compressors Chairman : F. Leboeuf (ECL, FR)		B-07 : Radial Turbines Chairmen: G.Bois (ENSAM,FR), N.Baines(Concepts,UK)
UFC – 013_01 / 63 Proper orthogonal decomposition (POD) - Application to rotor-stator interaction analysis <i>N. Rochuon, I. Trebinjac, Ecole Centrale de Lyon, France</i>	10:00	RT – 063_02 / 167 Radial turbines - an integrated design approach <i>N. Baines, Concepts NREC, United Kingdom</i>
UFC – 014_02 / 193 3D rotor-stator interaction in automotive engine cooling fan systems <i>S. Moreau, M. Henner, Valeo Motors and Actuators, France, D. Neal, Michigan State University, USA</i>	10:30	RT – 064_03 / 27 Influence of variable guide vane nozzle on the design parameters of a radial turbine stage <i>N. Binder, X. Carbonneau, P. Chassaing, ENSICA Toulouse, France</i>
UFC – 015_03 / 39 Experimental study of the unsteady flows and turbulence structure in an axial compressor from design to rotating stall conditions <i>G.J. Michon, H. Miton, N. Ouayhaya, LEMFI, Université Pierre et Marie Curie, France</i>	11:00	RT – 065_04 / 65 An assessment of stator vane leakage in a variable geometry radial turbine <i>J.W. O'Neill, S.W.T. Spence, Queens University Belfast, Northern Ireland</i>
UFC – 016_04 / 30 Experimental and computational investigations of the unsteady flow in an axial flow low speed compressor stage <i>A. Witkowski, T. Chmielniak, M. Stozik, M. Majkut, J. Zukowski, Silesian University of Technology, Poland</i>	11:30	RT – 066_05 / 46 Off design performance analyses of a turbocharger mixed flow turbine <i>M. Abidat, M. Hachemi, Université des Sciences et de la Technologie d'Oran, Algeria</i>
UFC – 017_05 / 73 Spike-type stall inception in axial-flow compressors <i>A. Deppe, H. Saathoff, U. Stark, TU Braunschweig, Germany</i>	12:00	
12 :30 – 14:00 : LUNCH		

Wednesday, March 9, 2005		Afternoon
A-08 : Axial Flow Compressors (3) Chairman : K. Engel (MTU, DE)		B-08 : Unsteady Flow in Turbines (1) Chairman : C. Scrivener (Rolls Royce, UK)
AFC – 009_09 / 35 Enhancement of highly-loaded axial compressor stage performance using rotor blade tip tailoring - Part 1 : Numerical design studies <i>M. Goller, V. Gümmer, C. Clemen, M. Swoboda, Rolls Royce Deutschland, Germany</i>	14:00	UFT – 029_01 / 121 Effect of vane-rotor interaction on the unsteady flow field downstream of a transonic HP turbine <i>R. Dénos, G. Paniagua, von Karman Institute, Belgium</i>
AFC – 010_10 / 47 Enhancement of highly-loaded axial compressor stage performance using rotor blade tip tailoring - Part 2 : Experimental results <i>H. Rohkamm, G. Kosyna, H. Saathoff, U. Stark, TU Braunschweig, Germany</i>	14:30	UFT – 030_02 / 56 Numerical investigation of the VKI turbine blade by Large Eddy Simulation <i>F. Magagnato, J. Rachwalski, M. Gabi, University of Karlsruhe, Germany</i>
AFC – 011_11 / 188 Reduction of the secondary losses in compressor cascades using a leading edge bulb modification <i>R. Müller, K. Vogeler, Dresden University of Technology, Germany</i>	15:00	UFT – 031_03 / 226 Study of unsteady losses in axial steam turbines using numerical simulations <i>E. von Lavante, M. Moczala, University of Duisburg-Essen, M. Parvizinia, Siemens Power Generation, Germany</i>
AFC – 012_12 / 96 A study of large tip clearance in a row of low speed compressor blades <i>M. Walker, D. Gregory-Smith, L. He, University of Durham, UK</i>	15:30	UFT – 032_04 / 164 Numerical investigation of the unsteady flow through a transonic turbine stage using an innovative flow solver <i>P. Pieringer, E. Göttlich, J. Woisetschläger, W. Sanz, F. Heitmeir, Graz University of Technology, Austria</i>
16:00 : COFFEE BREAK		
A-09 : Aero-Mechanical Phenomena Chairman : T. Fransson (KTH, SE)		B-09 : Diffusers Chairman : L. Maretto (Ansaldo, IT)
AMP – 105_01 / 62 Aeroelastic design of turbine blades - ADTurBII Overview <i>R. Elliott, J.S. Green, Rolls-Royce, United Kingdom, E. Seinturier, Turbomeca, France</i>	16:30	D – 048_01 / 26 Loss in air intakes components of industrial gas turbines <i>T. Biesinger, W. Kappis, Alstom, Switzerland, B. Matyschok, B. Stoffel, Darmstadt University of Technology, Germany</i>
AMP – 106_02 / 111 Combined/simultaneous gust and oscillating turbine row unsteady aerodynamics in subsonic flow <i>A. Beretta, EPFL, F. Rottmeier, APCO Technologies SA, P. Ott, EPFL, Switzerland</i>	17:00	D – 049_02 / 34 Numerical investigations of the three dimensional flow field in a s-shaped transition duct containing struts of different thickness <i>C. Clemen, V. Gümmer, T. Tschirner, Rolls-Royce Deutschland, Germany</i>
AMP – 107_03 / 169 Genetic algorithms for the evaluation of the mistune effects on turbomachine bladed disks <i>G. Scarselli, L. Lecce, University of Naples "Federico II", Italy</i>	17:30	

Thursday, March 10, 2005		Morning
8:30 – 9:30	Invited Lecture : AITEB – Key Results of a European Project on Aerodynamics and Cooling of Turbines Dr. Frank Haselbach, Manager Turbine Aerodynamics & Cooling, Rolls-Royce Deutschland (DE)	
A-10 : Operational Experience Chairman : J. Krzyzanowski (Polish Academy of Sciences, PL)		B-10 : Unsteady Flow in Turbines (2) Chairman : J. Ulizar (ITP, SP) – L. Tajc (Skoda, CZ)
OPE – 092_01 / 78 Gas turbine behaviour assessment using non-linear model based analysis and neural networks <i>M. Schmitz, P. Escher, EscherTec Ltd, Switzerland</i>	10:00	UFT – 033_05 / 151 Steady flow simulations of rotor-stator interactions with an unsteady deterministic model <i>D. Charbonnier, F. Leboeuf, Ecole Centrale de Lyon, France</i>
OPE – 093_02 / 72 Advanced gas turbine condition monitoring using an innovative diagnostic tool <i>S. Bellagamba, B. Riga, D. Dalle Mura, S. Massa, ENEL Pisa, Italy</i>	10:30	UFT – 034_06 / 145 Unsteady boundary layer studies on ultra-high lift low pressure turbine blades <i>X.F. Zhang, H.P. Hodson, University of Cambridge, N. Harvey, Rolls Royce, United Kingdom</i>
OPE – 094_03 / 15 Aerodynamic causes of stator vanes damage of the Alstom gas turbine compressor in the gasification combined cycle using brown coal <i>V. Cyrus, K. Rehak, AHT Energetika Ltd, J. Polansky, University of West Bohemia, Czech Republik</i>	11:00	UFT – 035_07 / 104 Numerical investigation of unsteady flow in a partial admission control stage of a 200 MW turbine <i>P. Lampart, M. Szymaniak, R. Kwidzinski, Polish Academy of Sciences, Gdansk, Poland</i>
OPE – 095_04 / 10 Compressor performance impact on rundown characteristics <i>G.B. Tveit, L.E. Bakken, Norwegian University of Science and Technology, T. Bjørge, Statoil ASA, Norway</i>	11:30	UFT – 036_08 / 177 Experimental investigations of rotating flow instabilities in the last stage of a low pressure model steam turbine during windage <i>W. Gerschütz, M. Casey, University of Stuttgart, F. Truckenmüller, Siemens Power Generation, Germany</i>
OPE – 096_05 / 57 Multiple rows brush seal testing for steam turbine applications with high temperature and high pressure conditions and long service intervals <i>T. Osterhage, Alstom Power, Switzerland, S. Büscher, G. Kosyna, J. Glienicke, TU Braunschweig, Germany, K. Urlichs, Siemens DDIT, Germany</i>	12:00	UFT – 037_09 / 40 Flow measurements for low engine order excitations in a high pressure turbine stage <i>A. Kessar, M. Jöcker, T.H. Fransson, Royal Institute of Technology, Sweden, H.J. Rehder, F. Kost, DLR Göttingen, Germany</i>
12:30 – 14:00 : LUNCH		

Thursday, March 10, 2005		Afternoon
A-11 : Optimisation Chairman : O. Léonard (U. Liège, BE)		B-11 : Heat Transfer (2) Chairman : P. Ireland (U. Oxford, UK)
OPTI – 097_01 / 148 Application of multipoint optimization to the design of multistage turbomachinery blades <i>A. Demeulenaere, C. Hirsch, Numeca International, Belgium</i>	14:00	HT – 078_04 / 94 Combined use of turbulators and enlarged pedestals in trailing edge cooling systems: an experimental and numerical analysis <i>A. Bacci, B. Facchini, L. Innocenti, L. Tarchi, University of Florence, Italy</i>
OPTI – 098_02 / 162 Optimisation of a 3D radial turbine by means of an improved genetic algorithm <i>J. Harinck, Delft University of Technology, The Netherlands, Z. Alsalhi, von Karman Institute, Belgium, J.P. Van Buijtenen, Delft University of Technology, The Netherlands, R.A. Van den Braembussche, von Karman Institute, Belgium,</i>	14:30	HT – 079_05 / 58 A programme to investigate the effects of film cooling in a high pressure aeroengine turbine stage <i>K. Chana, U. Singh, QinetiQ, United Kingdom</i>
OPTI – 099_03 / 90 Using 3D CFD and optimisation methods for the design of Francis hydraulic turbine runner <i>V.A. Skorospelov, Sobolev Institute of Mathematics SB RAS, Novosibirsk, D.V. Chirkov, S.G. Cherny, Institute of Computational Technologies SB RAS, Novosibirsk, I.M. Pylev, A.A. Sotnikov, Leningradsky Metallichesky Zavod, St Petersburg, Russia</i>	15:00	HT – 080_06 / 70 Measurements of flow and local heat transfer in an internally cooled turbine blade <i>M. Fenot, Université de Poitiers, L.E. Brizzi, ENSMA Poitiers, J.J. Vullierme, E. Dorignac, Université de Poitiers, L. Descamps, Snecma Moteurs, France</i>
OPTI – 100_04 / 133 Optimisation techniques applied to automatic thermo-mechanical model validation D. Benito, G. Clayton, Rolls-Royce, United Kingdom	15:30	HT – 081_07 / 113 Cooling structure optimization of turbine blade <i>G. Nowak, T. Chmielniak, Silesian University of Technology, Poland</i>
16:00 : COFFEE BREAK		
A-12 : Measurement Techniques (2) Chairman : J. Woisetschläger (U. Graz, AT)		B-12: Axial Flow Turbines (3) Chairman : C. Sieverding (VKI, BE)
MT – 089_05 / 144 Accuracy of an improved optical-pneumatic probe for droplet-size and velocity-vector measurements in wet-steam flows <i>A. Seibold, Seibold Engineering, Nattheim, M. Casey, University of Stuttgart, Germany</i>	16:30	AFT – 026_09 / 150 Comparison of turbine tip leakage aero thermal flows for flat tip and squealer tip geometries at high speed conditions - experimental and numerical investigation <i>T. Arts, von Karman Institute, Belgium, P. Ginibre, Snecma Moteurs, France, O. Oksuz, V. Iliopoulou, N. Key, von Karman Institute, Belgium</i>
MT – 090_04 / 9 Blade axial displacement measurement on aero-engine by optical means <i>F. Ravet, V. Leignel, A. Leroux, Snecma-Moteurs, France</i>	17:00	AFT – 027_10 / 85 The impact of rotor labyrinth seal leakage flow on the loss generation in an axial turbine <i>J.E. Anker, J.F. Mayer, M. Casey, University of Stuttgart, Germany</i>
MT – 091_06 / 103 Recording local density fluctuations in turbine flows using laser vibrometry <i>B. Hampel, J. Woisetschläger, N. Mayrhofer, E. Göttlich, F. Heitmeir, Graz University of Technology, Austria</i>	17:30	AFT – 028_11 / 178 An experimental and numerical investigation of the tip leakage flow and heat transfer using a rotor tip gap model <i>S.K. Krishnababu, University of Cambridge, P.J. Newton, University of Bath, B. Dawes, University of Cambridge, G. Lock, University of Bath, H.P. Hodson, University of Cambridge, United Kingdom</i>

Friday, March 11, 2005		Morning
A-13 Noise Chairman : M. Roger (ECL, FR)		B-13 Radial Compressors Chairman : M. Casey (U. Stuttgart, DE)
NOI - 101_02/184 Numerical study of the discrete frequency noise generation in an axial flow fan K.M. Argüelles Diaz, J.M. Fernandez Oro, C. Santolaria, P. Fernandez Coto, University of Oviedo, Spain	8:00	RC - 057_01 / 71 Theoretical design of a high speed low power radial turbocompressor <i>J. Schiffmann, D. Favrat, EPFL, Switzerland</i>
NOI - 102_03 / 110 Aeroacoustic analysis using a hybrid finite element method <i>M.C. Duta, A. Laird, M.B. Giles, University of Oxford, United Kingdom</i>	8:30	RC - 058_02 / 81 Rotating stall in a two-dimensional vaneless diffuser flow <i>S. Ljevar, H.C. de Lange, A.A. van Steenhoven, Eindhoven University of Technology, The Netherlands</i>
NOI - 103_04 / 186 Liner optimization using a hybrid finite element method <i>L. Lafronza, W. Song, A. McAlpine, R.J. Astley, A.J. Keane, University of Southampton, United Kingdom</i>	9:00	RC - 059_03 / 115 Effect of pinch on the performance of a vaneless diffuser in a centrifugal compressor <i>T. Turunen-Saaresti, A. Reunanen, J. Larjola, Lappeenranta University of Technology, Finland</i>
NOI - 104_05 / 14 Vibroacoustic tools for noise abatement strategy of a pumping plant <i>L. Coutaz, L. Gavric, A. Badie-Cassagnet, CETIM, Senlis, France</i>	9:30	RC - 060_04 / 92 Investigation of centrifugal compressor surge with wavelet methods <i>L. Horodko, Technical University of Lodz, Poland</i>
	10:00	RC - 061_05 / 146 Operating point dependent velocity fields in a side channel blower measured by particle-image velocimetry <i>C.M. Heilmann, P.U. Thamsen, Technical University of Berlin, Germany</i>
10:30 : COFFEE BREAK		
A-14 Heat Transfer (3) Chairman : P. Ott (EPFL, CH)		B-14 Steam Turbines (3) Chairman : M. Stastny (Skoda, CZ)
HT - 082_09 / 147 Application of an unstructured flow solver to the calculation of conjugate heat transfer problems in turbine blades <i>A. Demeulenaere, J.C. Bonaccorsi, A. Patel, C. Hirsch, Numeca International, Belgium</i>	11:00	ST - 044_07 / 198 Hot wire investigation of the unsteady wet steam flow downstream the LP stage of a 210 MW turbine <i>P. Jonas, O. Mazur, V. Uruba, AS CR, Czech Republik</i>
HT - 083_10 / 24 Computational analysis of flow and heat transfer in a direct-transfer pre-swirl system <i>A.C. Benim, M. Cagan, Duesseldorf University of Applied Sciences, C. Bricaud, University of Karlsruhe, B. Bonhoff, Siemens Power Generation, Germany, D. Brillert, Siemens Westinghouse Power Corp, Orlando, USA</i>	11:30	ST - 045_08 / 109 Influence of a tip clearance jet on a swirling flow in an axial-radial diffuser <i>S. Becker, Siemens Power Generation, E.C. Gretschel, M. Casey, University of Stuttgart, Germany</i>
HT - 084_11 / 222 Numerical investigation on flow and heat transfer in an internal cooling channel with high blockage ratio <i>R. Phibel, E. Laroche, ONERA, France, L. Casarsa, T. Arts, von Karman Institute, Belgium</i>	12:00	ST - 046_09 / 163 Numerical investigations of the turbine last stage - exhaust hood flow <i>A. Gardzilewicz, J. Badur, M. Karcz, J. Swirydczuk, Polish Academy of Sciences, Gdansk, Poland</i>
HT - 085_12 / 41		ST - 047_10 / 122

Influence of production imperfection on flow field and effectiveness in film cooling <i>M.B. Jovanović, H.C. de Lange, A.A. van Steenhoven, Technical University Eindhoven, The Netherlands</i>	12:30	The design of an annular bend in spiral casing of the low-pressure part steam turbines <i>P. Kocarnik, S. Jirku, Czech Technical University in Prague, Czech Republik</i>
---	--------------	---