



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

Integrating and strengthening the European Research Area

Specific Support Action
EUROTURBO7

**Support to the Seventh European Conference on Turbomachinery - Fluid
Dynamics and Thermodynamics, Athens, March 2007.**

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FINAL REPORT

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EUROTURBO7 Coordinator**

PUBLISHABLE FINAL ACTIVITY REPORT

FINAL TECHNICAL ACTIVITY REPORT

1. Report concerning the ETC 7 Conference main issues:

The ETC 7 Conference has taken place in agreement to the dates that have been initially chosen, from March 5 to 9, 2007, in Athens, Greece.

The Conference venue was established at the Athens Park Hotel in a central location in Athens, allowing the participants to be quite close to their accommodation (the Athens Park Hotel and nearby hotels with varying prices).

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

All information concerning the Conference venue, communicated before the event, is presented in **Annex 1**

2. Report concerning the ETC 7 Conference Sessions

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

According to the number of papers that were finally selected and to the ETC policy, the Conference was divided in two parallel sessions. Only on Thursday afternoon, an additional session was organized, in order to accommodate the total number of selected papers.

Each session was chaired by a "Session Chairman" chosen among the ETC Committee members and some of the "Review Organisers" of the conference, trying to involve, whenever possible, representatives from the European turbomachinery industry

Two exhibitors (software houses) presented their products during the conference meeting hours, namely **Numeca** and **Ansys**.

During the Conference, two special meetings were organised for the European Turbomachinery Committee members, in order to discuss the evaluation of the present conference, the venue of the next conference, as well as other matters concerning the European Turbomachinery Committee's present and future activities.

The number of participants that paid the corresponding fee was 208. The amount of participants such as students mainly from Greece or organising committee member organisations who fulfilled the requirements set by the ETC Committee, that paid no fee was 20. The total amount of participants was 228.

Each participant received:

- The final program with all sessions, paper titles and author's affiliation (see attached file in **Annex 2**)
- The Conference Proceedings (hard copy).
- A CD Rom with all Conference papers
- A questionnaire concerning the Conference.

ANNEX 1: INFORMATION CONCERNING THE CONFERENCE VENUE

General Information

The 7th European Conference on Turbomachinery Fluid Dynamics and Thermodynamics (ETC 7) is being organised in March 2007 in Athens (GR), beginning on Monday, March 5 and concluding on Friday, March 9. The 5-days technical program is supplemented with a series of social events over the week, fostering international friendship, discussions and collaborative ventures.

The Conference city is Athens, located in the south-east part of Europe.

Conference Venue

The conference will be held in the five star hotel PARK, located in the heart of the city near the Athens Archeological Museum and opposite to the second largest Garden Park of Athens.

Athens PARK HOTEL
10, Alexandras Ave.,
10682 Athens, Greece
Tel.: 0030-210-8894500
0030-210-8832711
Fax: 0030-210-8238420
Email: info@athensparkhotel.gr

The small exhibition, which is organised, will be located near the Conference rooms.

Travel to Athens

By plane:

It is the most convenient way. Direct flights to "Eleftherios Venizelos" International Airport serve the totality of passenger airlines arriving in Athens. From there:

. By Metro

Take the METRO-line 3 (Direction MONASTIRAKI) and then change (at MONASTIRAKI station) to METRO-line 1 (Direction KIFISSIA). Exit at VICTORIA station, 5 min. walking to the PARK HOTEL.

. Alternatively

Use the Suburban Railway (line Airport-Larissa Railway Station) and change at the NERATZIOTISSA Station for METRO-line 1 (Direction PIRAEUS). Exit at VICTORIA Station.

. By Taxi

Taxis leave from outside Door 4 of the Arrivals level. The drive should take around 30 min. and the fare should cost approximately 25-30 Euro up to the Athens PARK HOTEL.

By other transportation means:

If conference attendees desire to utilize other transportation means, they should contact the Local Organizing Secretariat.

Hotel Accommodation:

Please make your hotel reservation using the web site of the Conference: www.itt.ntua.gr/ETC7 the hotel registration form at the end of this preliminary program. The deadline for reservation is February 10, 2007. After this date you will have to contact the local Organizing Secretariat (Mrs A. DERMITZAKI), in order to arrange a booking, or organize yourself your stay in Athens. The local Organizing Secretariat is proposing the **Athens PARK HOTEL**, where the Conference will take place (mentioned above), as well as the following hotels given below, most of which are located in the vicinity of the Conference Venue (walking distance). The hotel prices are indicated in the Hotel Booking Form at the end of the present program. More details concerning the hotels are indicated on the website of the Conference.

Stanley Hotel Athens

Odyseos Street, Karaiskaki Square,
Athens, Greece 10437
Tel.: 0030-210-5241611
Fax: 0030-210-5244611
Email: information@hotelstanley.gr
(20 min. from PARK Hotel, if the Metro is used)

Hotel Stanley Athens is a 4 star Luxury Hotel located 700 meters from the center of Athens and a 45 min. drive from the Airport. The hotel was built in 1966 and renovated its rooms in 1998.

City Plaza Hotel

78, Acharnon street, Athens, Greece.

Tel.: 0030-210-8225111

Fax: 0030-210-8225116

Email: info@city-plaza.gr

(15 min. walking to Park Hotel)

The Hotel is conveniently located in the business and commercial heart of Athens, only a few steps away from the Metro in Victoria Square.

Kaningos 21

12, Chalkokondyli Street,
Athens, Greece.

Tel.: 0030-210-3300775

Fax: 0030-210-3300771

(10 min. walking to Park Hotel)

The hotel is situated in the center of Athens at Kaningos Square, 300m from Omonia Square and 400m from the Archeological Museum. All rooms are air-conditioned with sound proof windows.

A Youth Hotel address is also provided below:

Hotel Diethnes

52, Peoniou Street,

Athens 10440, Greece.

Tel.: 0030-210-8836855

Fax: 0030-210-8230582

(10 min. walking to Park Hotel)

Additional information concerning the hotels mentioned above is provided in the Hotel Accommodation Information Section.

Registration :

To register, please use the website of the Conference: www.itt.ntua.gr/ETC7 or tick properly the registration form enclosed at the end of the Preliminary Conference program and send it to the Local Organising Secretary :

Mrs A. DERMITZAKI

NTUA/LTT (ETC7)

9, Iroon Polytechniou Str.,

15780 Athens, Greece

Tel.: 0030-210-7721638

Fax: 0030-210-7721658

Email: alexandra@itt.ntua.gr

Please note that your registration can only be accepted if you have paid by one of the methods indicated in the registration form.

Participants may pick up the Conference material at the registration desk. **Pre-registration will be accepted until February 10th, 2007.**

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 of the Registration and Hotel Booking Section of this site. 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 Cocktail. The fees do not include the Conference Gala dinner on Wednesday evening; reservations for this event will be made at the On-Site Registration desk. The Day visitor fee allows attending the Conference sessions on the selected day. The accompanying person fee includes the access to Monday's Welcome Reception Cocktail (see Registration Form).

Conference Registration and Information Desk

The Registration Desk will be open from 8:00 AM until the early afternoon, from Monday, March 5 at the Conference venue.

Conference Proceedings

The Conference Proceedings will be available on-site for attendees, as well as the additional copies, which have been ordered until February 21st, 2007 (see the registration form included in this program).

Purchase of Additional Copies of the Proceedings

Additional copies of the Proceedings, which may not be available on-site, may be ordered on site and sent by mail; the mailing charge is 15 Euros.

Payment

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

Enquiries

Eventual enquiries can be addressed to :

Prof. K.D. PAPAILIOU
NTUA/LTT (ETC7)
9, Iroon Polytechniou Str.,
15780 Athens, Greece
Tel.: 0030-210-7721634
Fax: 0030-210-7721658
Email: etc7@litt.ntua.gr

Updated information will be available at the conference website

The Conference

Final Conference Technical Program

The Final Technical Program is provided in this leaflet.

Exhibition

A small exhibition is organised near the Conference Sessions, in one of the Erato rooms.

Speaker's Briefing

The authors who are presenting their paper and the session chairs will meet for a short briefing five minutes before the starting of their session in the session room. Please, attend on the day of your session only.

Timing of Presentation

Each paper will be allocated 30 minutes (including introduction and question-and-answer period) except where noted otherwise. Concurrent sessions will maintain uniform starting times.

Audio-visual equipment

Each session room will be pre-set with the following equipment: a overhead projector, a computer projection system, a screen, a microphone and a 35mm slide projector. Special audio-visual equipment which has already been requested will be available.

Messages and Information

Messages will be recorded and posted on a bulletin board in the registration area. The telephone number for reaching the Conference Administration Desk is +30-210-8894500.

Internet

Internet facilities will be available to the Conference attendees.

Smoking Policy

Smoking is not allowed in the Conference rooms.

Restrictions

Video-taping or audio-recording of any session during this conference is prohibited. The sale of any publication not authorised by ETC7 is also prohibited.

Social Events

Welcome Reception Cocktail

Attendees and guests are invited to start the ETC7 Conference on Monday evening with a Welcome Reception Cocktail which will give you a chance to renew acquaintances and meeting new friends. The Cocktail will be held from 7.30 pm at the restaurant "ST'ASTRA", top level of the PARK Hotel with a very nice view to the Acropolis.

Conference Gala Dinner

Wednesday night will offer you the opportunity to enjoy the Conference Gala Dinner hosted in the Athens PARK Hotel.

Technical Tours

One technical tour will be organized in the afternoon of Friday March 9, 2007. Details will be provided at the Conference.

Accompanying Persons Program

Indicatively a few tours appear on this website in the appropriate section, organized by the Agency supporting the ET Conference, which is

Vougas Associates Ltd.
29, Sinopis Str., 11527 Athens, Greece.
Tel.: 0030-210-7799261
Fax: 0030-210-7711768
Email: info@vougas.gr

Additional tours may be discussed and arranged with the above indicated Agency.

Interested persons may book tickets for the **Athens Concert Hall** addressing themselves to the above mentioned Agency. The **Athens Concert Hall** program is indicated on the website of the Conference. It is strongly advised to book as early as possible.

ANNEX 2: CONFERENCE FINAL PROGRAMME

Monday, March 5, 2007

9:30-10:15	10:15-11:15	11:30-12:00	12:00-12:30	12:30-13:00
Opening Ceremony	Invited Lecture Prof. John Chew, Univ. Of Surrey (UK) Towards CFD simulation of a full turbine system including air system and multistage interaction effects	A123 A grid enrichment and movement strategy for a posteriori error analysis in viscous flows Zervogiannis, T.; Liakopoulos, P.I.K.D.; Papadimitriou, D.I.; Giannakoglou, K.C.; NTUA, Greece	A85 Two-dimensional engine performance simulation using streamline curvature component models Pachidis, V.; Piliadis, P.; Uni Cranfield, UK; Templalexis, I.; Kotsiopoulos, P.; Hellenic Air Force, Greece	A91 Simulation of a compression system with centrifugal compressor including cases of compressor surging Theotokatos, G.P.; TEI of Athens, Greece
15:00-15:30	15:30-16:00	16:30-17:00	17:00-17:30	17:30-18:00
A-02: Measurement Techniques (1), Chair: F.	A-03: Optimisation (1), Chair : O. Léonard, Univ. de Liège (BE)	B-01: Turbines - Heat transfer (1), Chair: B. Haller, Siemens Power Gen. (UK)	B-03: Diffusers, Chair : M. Manna, Univ. Naples (IT)	
A129 Experimental and numerica analysis of a highly loaded low aspect ratio compressor stator cascade Nerger, D.; Saathoff, H.; Radespiel, R.; TU Braunschweig, Germany	A21 Influence of experimental setup and measuring technique on turbocharger mapping Pucher, H.; Grigoriadis, P.; Vogt, M.; TU Berlin, Germany	B133 Effects of concave and convex curvature on the cooling efficiency of effusion cooled multi-layer plates Bohn, D.; Krewinkel, R.; RWTH Aachen, Germany	B214 Modelling of three- dimensional jet impingement cooling on a concave surface Craft, T.J.; Iacovides, H.; Mostafa, N.A.; UMIST, UK	B111 Analysis of the cooling performance on a showerhead cooled blunt body using the wall cooling effectiveness Colombo, E.; Wagner, G.; EPFL - LTT, Switzerland von Woltersdorf, J.; University Stuttgart, Germany; Ott, P.; EPFL-LTT, Switzerland
A129 Experimental and numerica analysis of a highly loaded low aspect ratio compressor stator cascade Nerger, D.; Saathoff, H.; Radespiel, R.; TU Braunschweig, Germany	A115 Aerodynamic design of compressor airfoils using hierarchical, distributed, metamodel-assisted evolutionary algorithms Karakasis, M.K.; Giannakoglou, K.C.; Koubogiannis, D.G.; NTUA, Greece	B133 Effects of concave and convex curvature on the cooling efficiency of effusion cooled multi-layer plates Bohn, D.; Krewinkel, R.; RWTH Aachen, Germany	B214 Modelling of three- dimensional jet impingement cooling on a concave surface Craft, T.J.; Iacovides, H.; Mostafa, N.A.; UMIST, UK	A151 Aerodynamic study on linear cascades of straight, arc-swept and twisted blades Rábai, G.; Vad, J.; Lohasz, M.M.; Budapest University, Hungary
B-02: Turbines – CFD, Chair: F. Martelli, Univ. of	B-03: Diffusers, Chair : M. Manna, Univ. Naples (IT)	B133 Effects of concave and convex curvature on the cooling efficiency of effusion cooled multi-layer plates Bohn, D.; Krewinkel, R.; RWTH Aachen, Germany	B214 Modelling of three- dimensional jet impingement cooling on a concave surface Craft, T.J.; Iacovides, H.; Mostafa, N.A.; UMIST, UK	B148 Augmentation of axial-radial and axial-axial diffusers for improved design and off- design turbine performance Kreitmeier, F.; Alstom, Switzerland; Lücking, P. Wilhelmshaven University, Germany; Benim, A.C.; Düsseldorf University, Germany
B110 Brush seal porosity modelling - Applicability and limitations Neef, M.; Hepermann, F.; Sürken, N.; Schettel, J.; Siemens Power Generation, Germany	B139 Aeroelastic stability investigation of wind turbine blades by coupling a 2D Navier-Stokes solver and a beam finite element method Nikolaou, I.G.; Politis, E.S.; Chavariopoulos, P.K.; Centre for Renewable Energy Sources, Pikerini, Greece	B34 Experimental investigation of the flow through an aggressive intermediate turbine duct downstream of a transonic turbine stage Göttlich, E.; Marr, A.; University Graz, Austria; Malzacher, F.; MTU, Germany; Schennach, O.; Heitmeir, F.; University Graz, Austria	B5 The experimental investigation of the influence of the flow swirl and the tip clearance jet on aerodynamic characteristics of exhaust hoods Tajc, L.; Bednar, L.; Sikova, I.; Skoda Power Ltd, Czech Republic; Feldberg, L.A.; Goudkov, E.I.; OAO "NPO CKTI", Russia	

10:00-10:30	10:30-11:00	11:00-11:30	11:30-12:00	12:00-12:30	8:00-9:30
A-04: Turbines – Heat Transfer (2), Chair: R. Moenig, DLR-Cologne, (DE)					
<p>A79 Aero-thermal tests on a shrouded, high pressure turbine Hilditch, M.; Anderson, J.; Cook, M.; Qinetiq, UK; Haller, B.; Siemens, UK</p>	<p>A120 Heat transfer experiments on a heavily film cooled nozzle guide vane Jonsson, M.; Ott, P.; EPFL - LTT, Switzerland</p>	<p>A33 Computation of film cooling from a new geometrical converging slot holes Azzi, A.; Khorsi, A.; University USTO - Oran, Algeria; Jubran, B.A.; Ryerson University, Canada</p>			<p>Registration</p>
B-04: Active and Passive Control, Chair: J.M. Gély, Snecma Groupe Safran (FR)					
<p>B198 Experimental and numerical investigations on passive device for tip-clearance induced noise reduction in axial flow fans Corsini, A.; Perugini, B.; Rispoli, F.; University Roma 1 La Sapienza, Italy; Sheard, A.G.; Kinghorn, I.R.; Fläkt Woods Ltd, UK</p>	<p>B44 Axial compressor stage detailed measurements with application of discrete tip injection to increase surge margin Kefalakis, M.; Papailiou, K.D., NTUA, Greece</p>	<p>B216 Velocity and turbulence measurements in a separating boundary layer with and without passive flow control Satta, A.; Simoni, D.; Ubaldi, M.; Zunino, P.; University Genova, Italy Bertini, F.; Spano, E.; Avio SpA, Italy</p>	<p>B143 Casing treatment simulations with the elsA software Lepot, I.; Geuzaine, P.; Cernaero, Belgium; Hiernaux, S., Techspace Aero, Belgium</p>	<p>B211 Parametric study of an aspirated diffuser Godard, A.; Burguburu, S.; ONERA, France; Leboeuf, F.; ECL, France</p>	<p>A24 Experimental facility for investigating flow in radial turbine cascades Luxa, M.; Dvorak, R.; Institute of Thermomechanics, Cz AS, Czech Republic</p>
14:30-15:00					
<p>B30 Porous media simulating the stator row in steam turbine inlet flow calculations Sievrt, R.; Musch, C.; Stoff, H.; University Bochum; de Lazer, A.; Siemens Power Generation, Germany</p>					

15:00-15:30	A-05: Compressors – Secondary Flows, Chair:	A103 Investigation of different end-wall part-clearance configurations on a low-speed compressor cascade Clemen, C.; Gümmel, V.; Rolls Royce Deutschland, Germany; Neger, D.; Saathoff, H.; TU Braunschweig, Germany	A195 A numerical investigation of the effect of endwall boundary layer skew on the aerodynamic performance of low aspect ratio, high turning compressor cascade Böhle, M.; University Wuppertal, Germany; Stark, U.; University Braunschweig, Germany	A222 The impact of laminar-turbulent transition to shock-boundary-layer interactions on a fan blade Swoboda, M.; Becker, B.; Rolls-Royce Deutschland, Germany; Reyer, M.; TU-Berlin, Germany	A54 Predicted and measured performance and stability of two variants of a military fan Ginder, R.B.; Calvert, W.J.; Emmerson, P.R.; Qinetiq, UK	A87 Advanced axial flow fan stage for power stations with environmental equipment Cyrus, V.; Wurst, P.; AHT Energetika Ltd, Czech Republic; Polansky, J., Wets Bohemia University, Czech Republic	8:30-9:30	Invited Lecture – Dr. S. Eury, Snecma Groupe Safran (FR) <i>Aeronoise in engine; The new frontier of control and modelling</i>
15:30-16:00	A-06: Compressors and Fans, Chair: F. Leboeuf, E.C. Lyon (FR)	B106 Rotating stall in the vaneless diffuser of a radial flow pump Dazin, A.; Couderc, S.; Dupont, P.; Caignaert, G.; Bois, G.; ENSAM Lille, France; Levjar, S.; De Lange H.C.; University Eindhoven, The Netherlands	B06: Pumps, Chair: M. Sen, Tech. Univ. Istanbul (TR)	B95 Experimental investigation of a multiple disk centrifugal pump Manna, M.; Unich, A.; University Napoli, Italy	B74 On the influence of external geometrical modifications on the flow behaviour of a rotor-stator system: numerical and experimental investigation Dhaudt, E.; ENSAM Lille, France; Della Gatta, S.; University Florence, Italy; Debuchy, R.; Bois, G.; ENSAM Lille, France; Martelli, F.; University Florence, Italy		16:30-17:00	
17:30-18:00								

10:30-11:00	11:00-11:30	11:30-12:00	12:00-12:30	14:00-14:30	14:30-15:00
A-07: Turbines – Unsteady Flows (2), Chair: M. Swoboda, Rolls-Royce Deutschland (DE)					
<p>A112 Experimental investigation of combined/simultaneous gust and oscillating turbine row unsteady aerodynamics in transonic flow Beretta, A.; EPFL - LTT, Switzerland; Rotmeier, F.; APCO Technologies, Switzerland; Olt, P.; EPFL - LTT, Switzerland</p>	<p>A76 Investigation of unsteady flow phenomena in a single-stage transonic turbine by time-accurate RANS simulations and experimental data Schnell, R.; DLR - Cologne, Germany; Burguburu, S.; ONERA, France</p>	<p>A70 Influence of rotor loading on the unsteady flowfield downstream of an HP turbine stage Geetani, P.; Persico, G.; Osnaighi, C.; Politecnico di Milano, Italy</p>	<p>A181 Investigation of wake-induced transition mechanism in linear blade cascade Elsner, V.; Zarzycki, R.; Technical University Czestochowa, Poland</p>	<p>A232 Analyses on the flow distortion caused by tip clearance of a small centrifugal compressor Tang, J.; Turunen-Saaresti, T.; Lajola, J.; University Lappeenranta, Finland</p>	<p>A17 Tip clearance effects on HP compressor stage matching Domecq, O.; Escuret, J.F.; Snecma, France</p>
B-07: Optimisation (2), Chair: R. Van den Braembussche, von Karman Institute (BE)					
<p>B125 Total pressure losses minimization in turbomachinery cascades, using a new continuous adjoint formulation Papadimitriou, D.I.; Giannakoglou, K.C.; NTUA, Greece</p>	<p>B47 Optimisation of turbomachinery blade shape using 3D viscous flow computations Yershov, S.V.; Rusanov, A.V.; Yakovlev, V.A.; NASU, Ukraine</p>	<p>B49 System improvement of turbomachines by the method of inverse problems solution searching Ugryumova, K.M.; Prokofiev, S.A.; Ugryumov, M.L.; Tronchuck, A.A.; National Aerospace University "Kharkov Aviation Institute", Ukraine; Menyeylov, A.V.; Motor Sich JSC, Ukraine</p>	<p>B82 Axisymmetric design of axial turbomachines: an inverse method introducing profile losses Rosa Taddei, S.; Larocca, F.; Politecnico di Torino, Italy</p>	<p>B200 Stator clocking influence on secondary flows in a low-pressure turbine stage Nurzia, F.; Palomba, C.; Puddu, P.; University Cagliari, Italy</p>	<p>B83 Modulation of the rotor-stator interactions due to clocking Paniagua, G.; VKI, Belgium; Persico, G.; Politecnico di Milano, Italy; Billiard, N.; VKI, Belgium; Denos, R.; DG Research, EC</p>

15:30-16:00	16:30-17:00	17:00-17:30	17:30-18:00	8:30-9:30	10:00-10:30
<p>A-08: Turbines – A135 Influence of laminar and turbulent viscosity on the unstable flow pattern in a rotating cavity Bohn, D.; Ren, J.; RWTH Aachen, Germany</p>	<p>A-09: Turbines – Design, Chair: R. Baier, MTU Aero Engines (DE) A14 Thermodynamic analysis of H₂O₂ solid oxide fuel cell - steam turbine cycle Petr, V.; Czech Technical University in Prague, Czech Republic</p>	<p>A145 Performance analysis of a transonic high pressure turbine Yasa, T.; Paniagua, G.; VKI, Belgium; Bussolin, A.; Avio SpA, Italy</p>	<p>A155 Performance of a small scale prototype of a high solidity Wells turbine Torres, M.; Camporeale, S.M.; Pascazio, G.; Politecnico di Bari, Italy</p>	<p>Invited Lecture Dr. A. Torre – Ansaldo (IT) Latest developments and perspectives in the optimised design of LP steam turbines at ANSALDO</p>	<p>A55 Numerical modelling of the 3D viscous flow through a vibrating turbomachine blade row Gnesin, V.I.; Kolodyazhnaya, L.V.; NASU, Ukraine; Rzadkowski, R.; Polish Academy of Sciences, Poland</p>
<p>B-08: Pumps – CFD, B77 Numerical simulation of the flow in a Pelton turbine using the meshless method SPH - A new simple solid boundary treatment Marongiu, J.C.; Leboeuf, F.; EC Lyon - LMFA, France; Parkinson, E.; ANDRITZ VA TECH Hydro, Switzerland</p>	<p>B-09: Centrifugal Compressors, Chair: M. Casey, Univ. Stuttgart (DE) B208 Comparisons of steady and unsteady results for impeller-vaned diffuser interactions in a centrifugal compressor stage He, N.; Cranfield University, UK; Tourlidakis, A.; University Western Macedonia, Greece; Elder, R.; PCA Engineers, UK</p>	<p>B113 Using a 3D hub to avoid the jet-wake flow structure Rochuon, N.; Trébinjac, I.; Kullisa, P.; EC Lyon - LMFA, France Billonnet, G.; ONERA, France</p>	<p>B18 Numerical and experimental study of the unsteady flow in centrifugal fan Younsi, M.; Bakir, F.; Kouidri, S.; Rey, R.; ENSAM-LEMFI, France</p>		<p>B26 Accounting for losses and definitions of efficiency in turbomachinery stages Casey, M.V.; University Stuttgart, Germany</p>

11:00-11:30	11:30-12:00	12:00-12:30	14:00-14:30	14:30-15:00	15:00-15:30
A-10: Measurement Techniques (2), Chair: R. Obertacke, Siemens AG (DE)					
<p>A130 3D surface temperature measurements on engine components using thermal paints Andral, R.; Lempereur, C.; Onera DMAE/MH, France, Prudhomme, J.Y., TURBOMECA, France</p>	<p>A215 Fast response aerodynamic probes for measurements in turbomachines Brouckaert, J.F.; VKI, Belgium</p>	<p>A63 Advanced evaluation of transient heat transfer experiments using thermochromic liquid crystals Poser, R.; von Wolfersdorf, J.; University Stuttgart, Germany; Lutum, E.; MTU, Germany</p>	<p>A31 Aerothermal efficiency of a ribbed channel in an internal gas turbine blade cooling system Shevchuk, I.; Jenkins, S.; von Wolfersdorf, J.; Weigand, B.; University Stuttgart, Germany</p>	<p>A213 Numerical investigation of flow and heat transfer in ribbed square duct applying LES Vass, P.; Rambaud, P.; Arts, T.; Benocci, C.; VKI, Belgium</p>	<p>A225 Combined heat transfer and flow field analysis in rib-roughened cooling passages for turbine blades Casarsa, L.; University Udine, Italy; Arts, T.; VKI, Belgium</p>
B10: Steam Turbines (1), Chair: M. Statsny, Pizen (CK)					
<p>B59 Experimental and theoretical investigation of steam condensation in LP part of a large power turbine Gardzilewicz, A.; Institute of Fluid-Flow Machinery PAS, Poland; Kolovratnik, M.; Technical University in Prague, Czech Republic; Wroblewski, W.; Silesian University of Technology, Poland; Marcinkowski, S.; Institute of Fluid-Flow Machinery PAS, Poland; Petr, V.; Technical University in Prague, Czech Republic; Dykas, S.; Silesian University of Technology, Poland</p>	<p>B104 Determination of the heterogeneous nuclei in the superheated steam using a new sampling technique Hrubý, J.; AS CR, Prague, Czech Republic; Kolovratnik, M.; Technical University in Prague, Czech Republic; Zdimal, V.; AS CR, Prague, Czech Republic; Jiricek, I.; Bartos, O.; Moravec, P.; AS CR, Prague</p>				
<p>B108 Investigation of cavitation phenomena in suction part of radial-flow multistage pump Sedlar, M.; Bajorek, M.; Soukal, J.; SIGMA Research and Development Institute, Czech Republic</p>	<p>B164 Development of a CFD procedure for the axial thrust evaluation in multistage centrifugal pumps Salvadori, S.; Della Gatta, S.; Adami, P.; University Firenze, Italy; Bertolazzi, L.; WEIR Gabbioneta Srl, Italy</p>	<p>B3 Numerical calculation of unsteady flow phenomena in a radial centrifugal pump stage with minimum stage diameter Roclawski, H.; Hellmann, D.H.; TU Kaiserslautern, Germany</p>			

16:30-17:00	17:00-17:30	17:30-18:00	8:30-9:30	10:00-10:30	10:30-11:00
A-12: Pumps, Chair: G. Kosyna, Techn. Univ. Braunschweig (DE)					
<p>A80 On the performance of a miniature rotary shaft pump (RSP) Rossetti, A.; University of Padova, Italy</p>	<p>A105 Rotor-stator interactions in a radial flow pump Pavesi, G.; Cavazzini, G.; University of Padova, Italy; Dupont, P.; Couderc, S.; Caignaert, G.; Bois, G.; ENSAM Lille, France; Arizzon, G.; University of Padova, Italy</p>	<p>A65 A study on impeller-diffuser interactions in a radial pump Feng, J.; Benra, F.K.; Dohmen, H.J.; University of Duisburg-Essen, Germany</p>	<p>Invited Lecture Dr. R. Denos DG Research, EC <i>The contribution of European programmes to research and technology developments in gas turbines</i></p>	<p>A36 Dynamic features of partial admission: outcomes from rotating measurements Fridh, J.; KTH, Sweden; Wikström, R.; Siemens, Sweden; Fransson, T.; KTH, Sweden</p>	<p>A221 A method for the measurement and prediction of entropy generation rates in turbulent boundary layers Walsh, E.J.; University Limerick, Ireland; Mc Eligot, D.M.; University Stuttgart, Nolan, K.; University Limerick, Ireland</p>
B-12: Steam Turbines (2), Chair: J. Krzyzanowski, P.A.S. (PL)					
<p>B9 Flow field in the last steam turbine stage Staszny, M.; Consultant Plzen, Martinu, P.; Tech Soft Engineering; Tajc, L.; Bednar, L.; Skoda Power, Safarik, P.; University of Prague, Czech Republic</p>	<p>B42 Prediction of losses in flow through the last stage of LP steam turbine Dykas, S.; Wroblewski, W.; Lukowicz, H.; Chmielniak, T.; Silesian University of Technology, Poland</p>	<p>B96 Numerical investigation of partial admission phenomena at midspan of an axial steam turbine Hushmandi, N.B.; Hu, J.; Fridh, J.E.; Fransson, T.; KTH, Sweden</p>			
C-12: Turbines – Heat Transfer (4), Chair: P. Ott EPF Lausanne (CH)					
<p>C57 Heat transfer study in a rotor stator system air gap with an axial inflow Pellé, J.; Harmand, S.; Université de Valenciennes et Hainaut Cambrésis, France</p>	<p>C29 An experimental investigation of an improved film-cooling configuration at a turbine vane endwall to reduce the amount of coolant Giess, P.A.; Mullaert, A.; DLR - Goettingen, Germany</p>	<p>C153 Inlet turbulence intensity effects on secondary flows and adiabatic effectiveness of a film cooled endwall Barigozzi, G.; Franchini, G.; Perdicchizzi, A.; University of Bergamo, Italy</p>			<p>B176 Predictions of non-equilibrium phase transition in a model low pressure steam turbine Gerber, A.G.; Sigg, R.; Völker, L.; Casey, M.V.; University Stuttgart; Sürken, N.; Siemens, Germany</p> <p>B116 Condensing steam flow computations – Validation problems Wróblewski, W.; Dykas, S.; Gępert-Niedobecka, A.; Silesian University of Technology, Poland</p>

9:30-10:00	10:00-10:30	14:00-14:30	14:30-15:00	15:00-15:30	15:30-16:00
A-11: Turbines – Secondary Flows and Leaks, Chair: L. Mareto, Ansaldo Energia (IT)					
A-13: Turbines – Secondary Flows, Chair: P. Schiffer, Univ. Darmstadt (DE) A62 Relative position influence on the interaction of a cylinder wake with a curved duct secondary flow Georgiou, D.P.; Xenos, T.P.; Theodoropoulos, N.; University of Patras, Greece	A61 The effectiveness of slot injection cooling near the junction point of a horseshoe configuration Georgiou, D.P.; Xenos, T.P.; Theodoropoulos, N.; University of Patras, Greece	A13 CFD models for blade tip and diaphragm gland leakage flow in turbines of disc-and-diaphragm design Sadovnichiy, V.N.; Alhaj, O.; Binner, M.; Seume, J.R.; University of Hannover, Germany	A165 Analysis of the shroud leakage flow and main flow interactions in high-pressure turbines using an unsteady CFD approach Adami, P.; Martelli, F.; Cecchi, S.; University of Firenze, Italy	A209 Labyrinth seal improvement on the basis of numerical investigations Karelin, A.; Fischer, Y.; Lomakin, N.; Alstom Power Uniturbo Ltd, Russia	
B-11: Compressors – Design and Analysis, Chair: K. Engel, MTU Aero Engines (DE)					
B78 Vane cooling optimisation Nowak, G.; Wroblewski, W.; Silesian Uni of Technology, Poland	B86 Off-design operation of fuel cell-gas turbine hybrid system Miller, A.; Milewski, J.; Salacinski, J.; Warsaw University of Technology, Poland	B81 Intake-compressor performance characteristic under inlet flow total pressure distortion Templalexis, I.K.; Kotsiopoulos, P.; Hellenic Air Force Academy, Greece; Pachidis, V.; Cranfield University, UK	B180 Systematic investigation on swept and leaned transonic compressor rotor blades Biallo, R.; Benini, R.; University of Padova, Italy	B191 Numerical and experimental investigation of rotor-stator interaction in automotive engine cooling fan systems Moreau, S.; Henner, M.; Valeo Thermal Systems, France; Brouckaert, J.F.; VKI, Belgium; Neal, D.; Michigan State University, USA	B122 Experimental analysis of wet compressor axial compressor stage Roumeliotis, I.; Mathioudakis, K.; NTUA, Greece
12:30-13:00					
A-14: Compressors – Stall and Surge, Chair: F. Nurzia, Univ. of					
A178 Influence of the rotor tip stagger angle on axial compressor stall inception Dobrzynski, B.; Saathoff, H.; Kosyna, G.; TU Braunschweig, Germany					
B-14: Operational Experience, Chair: K. Mathioudakis, Nat.					
B182 The advantages of off-line thermal and flow diagnostics in power industry Gluch, J.; Polish Academy of Science, Poland	B41 Wet and dry compression of soda gas: Comparison of the industrial turbocompressor performances Krylowicz, W.; Univ. Lodz, Poland; Klonowicz, W.; Turboservice Sp. Z.o.o., Poland; Kaszak, A.; Janikosoda S.A., Poland				
C-11: Turbulence Modelling and Transition, Chair: J. Coupland, Rolls-Royce plc (UK)					
C193 Response of separation bubble to velocity and turbulence wakes Hourmouzizadis, J.; Hofman, G.; Berlin University of Technology, Germany	C27 Application of modern turbulence models to steady transitional flow Sanz, W.; Pecnik, R.; Trainig, A.; Heitmeir, F.; Graz University of Technology, Austria	C93 Application of a multimode transition model to turbomachinery flows Kozulovic, D.; Röber, T.; Nümburger, D.; DLR - Cologne, Germany	C68 Validation of a dynamic intermittency model for the prediction of wake-induced transition on turbine blades Lodefer, K.; Dick, E.; Ghent University, Belgium; Piotrowski, W.; Eisner, W.; Czestochowa University of Technology, Poland		

8:00-8:30	8:30-9:00	9:00-9:30
<p>A218 Numerical and experimental investigation of two stages gas turbine with bowed vanes Granovskiy, A.; Kostege, M.; ALSTOM Power Uniturbo, Russia; Krupa, V.; Rudenko, S.; Central Institute of Aviation Motors, Russia</p>	<p>A146 Numerical investigation of the flow in a two-stage axial test-turbine with open and closed cavities Pau, M.; University of Cagliari, Italy; Congiu, F.; Alstom Switzerland, Switzerland; Cambuli, F.; Mandas, N.; University of Cagliari, Italy</p>	<p>A92 A parametrical analysis of the effects produced by leaning and bowing techniques on turbine cascades flow field D'Ippolito, G.; Dossena, V.; Mora, A.; Politecnico di Milano, Italy</p>
<p>B156 Designing turbine blade rows by means of an iterative time-lagged inverse design method Páscoa, J.C.; Mendes, A.C.; University of Beira Interior, Portugal</p>	<p>B234 Multidisciplinary optimization of a radial turbine for micro gasturbine application Verstraete, T.; Garreau, M.; Alsalhi, Z.; Van den Braembussche, R.; VKI, Belgium</p>	<p>B159 Gas turbine components optimised for use in hybrid SOFC-GT systems Sieros, G.; Papailiou, K.D.; NTUA, Greece</p>
<p>11:00-11:30</p>	<p>11:30-12:00</p>	<p>12:00-12:30</p>
<p>A43 Pressure field at the tip of rotor blades before and during rotating stall Levy, Y.; Pismenny, J.; Technion, Israel; Schrapp, H.; Stark, U.; Saathoff, H.; TU Braunschweig, Germany</p>	<p>A16 Detailed CFD analysis of a grooved casing treatment on an axial subsonic compressor Perrot, V.; Touyeras, A.; Lucien, G.; Snecma, Groupe Safran, France</p>	<p>A50 Detection of surge precursors in a centrifugal compressor with a wavelet method Horodko, L.; Technical University Lodz, Poland</p>
<p>B163 Comparative analysis of GPA diagnostic techniques : DOCCGPA and combinatorial approach Della Gatta, S.; Adami, P.; Martelli, F.; University of Firenze, Italy</p>	<p>B10 Diagnostics of the steam turbine fluid-flow system condition on the basis of vibration trends analysis Galka, T.; Institute of Power Engineering, Poland</p>	<p>B137 Turbofan engine health assessment by combining steady and transient state aerothermal data Kamboukos, Ph.; Mathioudakis, K.; NTUA, Greece</p>