ESA SP-536
IEEE 03TH8776
October 2004

Proceedings of the

7th European Conference
on

Radiation and its Effects on Components and Systems

RADECS 2003

15 – 19 September 2003
Noordwijk, The Netherlands

In cooperation with the Radiation Effects Steering Group
of the IEEE Nuclear Plasma Sciences Society

European Space Agency
Agence spatiale européenne

Committee

General Chairman	R. de Marino	ESA
Vice Chairman	E. Daly	ESA
Technical Chairman	R. Harboe Sørensen	ESA
Short Course Organiser	A. Mohammadzadeh	ESA
Poster Session	W. Hajdas	Paul Scherrer Institut, CH
Awards	G. Berger	Université Catholique de Louvain, B
RADECS Liaison	P. Calvel	Alcatel Space Industries, F
IEEE NPSS Liaison	A. Johnston	Jet Propulsion Laboratory, USA
Technical Exhibition	R. de Marino	ESA
	T. Farris	Aeroflex UTMC, USA
Logistics & Local Arrangements	G. Elfering	ESA Conference Bureau
Technical Arrangements & Website	R. Nickson	ESA
Editor in Chief	R. Sharp	EBIS Iotron Ltd., UK
IEEE TNS Liaison Editor	J.L. Autran	Université Aix-Marseille, F
IEEE TNS Editor	P. Dressendorfer	Sandia National Laboratories, USA
Advisory Committee	L. Adams	Brunel University, UK
	A. Campbell	Naval Research Labs, USA
	R. Creasey	ESA
	M. Labrunée	CNES, F
	H. Ohyama	Kumamoto National College of Technology, JPN
Technical Committee	L. Baguena	Alcatel Space Industries, F
	F. Bezerra	CNES, F
	A. Chugg	MBDA, UK
	C. Dyer	Qinetiq, UK
	D. Flandre	Université Catholique de Louvain, B
	S. Mattsson	Saab Ericsson Space, S
	M. Melotte	Alcatel ETCA, B
	J. Nagel	Astrium, D
	O. Saint-Pé	Astrium, F
	E. Simoen	IMEC, B

Publication:	Proceedings of RADECS 2003 Noordwijk, The Netherlands (ESA SP-536, October 2004) IEEE Catalog Number: 03TH8776
Compiled by:	K Fletcher
Published and distributed by:	ESA Publications Division, ESA/ESTEC, Postbus 299, 2200 AG Noordwijk The Netherlands Tel: +31 71 565 3400 Fax: +31 71 565 5433
Printed in:	The Netherlands
Price:	€70
ISBN No:	92-9092-846-8
ISSN No:	0379-6566
Copyright:	© 2004 European Space Agency

Contents

Session A

Photonic Devices and Integrated Circuits

Chairpersons: Olivier Saint-Pe, Astrium and Guy Berger, UCL

Session A Posters

Session B

Hardness Assurance

Chairperson: Andrew Chugg, MBDA

Session B Posters

Session C

Single Events Effects

Chairpersons: Stanley Mattsson, Saab Ericsson Space AB and Sophie Duzellier, ONERA

Session C Posters

Session D

Technology and Design Hardening

Chairperson: Louis Baguena, Alcatel Space

Session D Posters

Session E

Basic Mechanisms

Chairpersons: Joerg Nagel, Astrium Space, and Joerg Rieling, Astrium Space

Session E Posters

Session F

Dosimetry and Facilities

Chairperson: Eddy Simoen, IMEC

Session F Posters

Session G

Devices and Integrated Circuits

Chairperson: Françoise Bezerra, CNES

Session G Posters

Session H

Radiation Environments

Chairperson: Clive Dyer, Qinetiq

Session H Posters

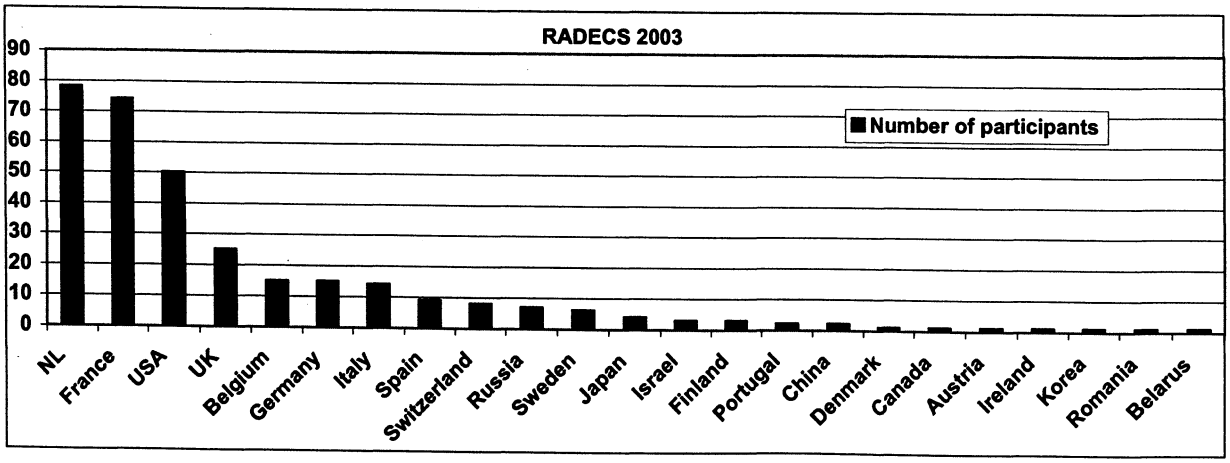
Late News Papers

Chairperson: Michel Melotte, Alcatel ETCA

RADECS 2003 Statistics

Papers submitted	143
Papers accepted	45 oral + 64 posters
Withdrawn before conference	3 oral
Withdrawn after conference	3 oral + 2 posters
Late News accepted	7 posters
Published in Proceedings	111

Total number of participants	322
Number of Short Course participants	220
Number of countries	23
Participants per group:	
Component manufacturers	40
Industry	67
Academic Institutions	82
Government organisations	29
Space agencies	104 (73 from ESA)



RADECS 2003 Conference Overview

The seventh European Conference on Radiation and its Effects on Components and Systems (RADECS '03) was held September 15 – 19, 2003, at Huis ter Duin, Noordwijk, The Netherlands. Organised by the European Space Agency (ESA), this conference gathered together specialists dealing with radiation effects on electronic components, systems and a host of related areas. As a truly international conference it attracted more than 320 attendees from 23 countries all over the world, with particularly strong representations from the Netherlands, France, the United States, Belgium and Germany. Participants were scientists, engineers and students, working in industry, government organisations and research institutions.

A one-day short course on radiation and its effects was followed by four days of technical sessions. This year the conference programme featured a particularly large number of papers in the areas of Single Event Effects, Photonics and Integrated Circuits, Hardness Assurance and Basic Mechanisms.

On Monday, the short course "Radiation Engineering Methods for Space Applications", organised and introduced by A. Mohammadzadeh (ESA/ESTEC) and split into four sessions, was attended by more than 220 participants. Largely following the development phases of a space project, the course was designed as a highly pragmatic tutorial on how to address EEE component radiation issues in the design and development of spacecraft electronic systems and in the procurement of components. The individual sessions and their presenters were:

"Environment (Mission) Analysis and Specification"	*R. Mangeret, EADS ASTRIUM SAS, France*
"Radiation Effects Analysis" subdivided into Total Ionising Dose, Displacement Damage and Single Event Effects	*J. Cueto Rodriguez, Alcatel Espacio, Spain* *G. Hopkinson, Sira-Electro-Optics, UK* *S. Duzellier, ONERA (DESP), France*
"Component Characterisation and Testing" subdivided into Total Ionising Dose, Displacement Damage and Single Event Effects	*J. Cueto Rodriguez, Alcatel Espacio, Spain* *G. Hopkinson, Sira-Electro-Optics, UK* *S. Duzellier, ONERA (DESP), France*
"Radiation Hardness Assurance for Space Systems"	*C. Poivey, NASA GSFC, USA* *S. Mattsson, SAAB Ericsson Space AB, Sweden*

The RADECS '03 technical sessions included 111 papers (42 oral presentations, 62 posters and 7 'Late-News' papers) subdivided into 10 sessions.

Three invited speakers gave colourful, video-supported presentations, addressing space-research, historical, and local general-interest topics (the abstracts are below).

J.C. Boudenot, THALES Research and Technology, France, in his talk "The Birth of Radiation Physics" commemorated the 100th anniversary of Pierre and Marie Curie, together with Henri Becquerel, winning the third physics Nobel Prize; reviewing their particular achievements and discoveries about the nature of radioactivity in the context of the work leading to the first and second physics Nobel prizes.

J. Eijking, Director and Horticultural Advisor of the International Flower Bulb Centre (IFBC) in Hillegom, The Netherlands, in his talk "Tulips from Amsterdam" acquainted the audience with the vast varieties of bulb flowers and gave astonishing insights into flower bulb farming and its flourishing trade contributing to Holland's fame.

F. De Winne, ESA Astronaut, presented "The Odissea Mission to the International Space Station – November 2002". With captivating pictures and video footage he shared his experiences of testing the new Soyuz TMA-1 spacecraft during its flight to the ISS, and talked about life, work and experiments performed on the Space Station.

The poster sessions organised by W. Hajdas, PSI, Switzerland, and introduced by the session chairpersons, featured a large variety of high quality presentations providing valuable insights and test data.

An industrial exhibition, with 21 booths occupied by component manufacturers, parts procurement agencies, test facilities and service providers as well as space agencies and professional organisations, was an important meeting forum for the exchange of information.

The conference also offered the possibility of numerous side meetings to discuss the status of existing collaborative efforts and the prospects for new initiatives.

A Technical Tour of the test facilities at ESA's European Space Research and Technology Centre (ESTEC) in Noordwijk, and the nearby Space Expo museum, completed the technical programme on Friday afternoon.

Thanks to the exemplary efforts of contributing authors, numerous reviewers, invited speakers and the Technical Committee we were able to compile a very informative and educational conference programme, sharing the most recent research results and relevant engineering achievements with the international radiation effects community. Emphasising its international scope, it was also the first time that a RADECS conference has taken place outside of France, an example that will hopefully find its successors in the future.

According to the feedback received, the conference was highly appreciated for its technical content, pleasant ambiance and social programme. For this encouraging perception, we would like to thank all the conference attendees, all the presenters, invited speakers and exhibitors for their excellent contributions and support to another successful RADECS conference.

Our particular thanks go also to all members of the organisation, the technical and advisory committees and to all of the reviewers, as well as to the ESA Conference Bureau and many others involved, for their excellent work and dedication.

On behalf of the IEEE Nuclear and Plasma Sciences Society Radiation Effects Committee and the RADECS Association we thank again all the participants for the success of this conference.

Ralf de Marino, General Chairman,
Reno Harboe Sørensen, Technical Chairman
ESA/ESTEC, Noordwijk, The Netherlands

List of Official Reviewers

Len Adams, Brunel University
Jean-Marc Armani, CEA
Louis Baguena, Alcatel Space
Catherine Barillot, Alcatel Space
Janet Barth, NASA-GSFC
Sophie Barthe, Astrium
Mark Baze, Boeing
Joe Benedetto, UTMC
Guy Berger, UCL
Francoise Bezerra, CNES
Jan Bogaerts, Fill Factory
Daniel Boscher, ONERA/DESP
Younes Boulghassoul, Vanderbilt University
Steve Buchner, NASA-GSFC
Michel Bugaud, DIMRI/CEA
Philippe Calvel, Alcatel Space
Marie-Catherine Calvet, EADS Launch Vehicles
Art Campbel, Naval Research Laboratory
Andrea Cester, Universita di Padova
Andrew Chugg, MBDA UK Ltd
Cor Claeys, IMEC
Lewis Cohn, DTRA
Juan Cueto-Rodriguez, Alcatel Spacio
Eamonn Daly, ESA/ESTEC
Frederic Darracq, Université Bordeaux
Jean-Pierre David, ONERA DESP
J. Deen, McMaster University
Andrea Denker, HMI Berlin
Dominic Doyle, ESA/ESTEC
Laurent Dusseau, Université Montpellier
Sophie Duzellier, ONERA
Clive Dyer, QinetiQ
Robert Ecoffert, CNES
Hugh Evans, ESA/ESTEC
Joe Fabula, Xilinx
Federico Faccio, CERN
Denis Flandre, UCL
Kurt Forslund, Alcatel Space
Rosine Germanicus, CNES
Greg Ginet, AFRL/VSBX
Alain Giraud, CEA
Bo Granbom, Saab Avionics
Leif Granholm, SSC
Thomas Granlund, Saab Avionics
Hector Guerrero, INTA
Wojtek Hajdas, PSI
Reno Harboe-Sørensen, ESA/ESTEC
Dominique Hervé, SODERN
Daniel Heynderickx, BIRA
Laurent Hili, ESA/ESTEC
Gordon Hopkinson, SIRA EO
Burkhard Jaehn, Astrium Space Infrastructure
Allan Johnston, Jet Propulsion Lab
Harjinder Jolly, QinetiQ
Rodri Jones, MBDA UK Ltd
Anthony Jordan, Aeroflex
Andy Kent, Astrium
Rocky Koga, Aerospace
Juha Kuitunen, PATRIA
Ken LaBel, NASA-GSFC
Jean-Luc Leray, CEA
Erhard Lorne, Defence R&D Canada
Florence Malou, CNES
Renaud Mangeret, Astrium
Ronan Marec, Alcatel Space
Ralf de Marino, ESA/ESTEC
Stanley Mattsson, SES
Peter McNulty, Clemson Univ.
Michel Melotte, Alcatel ETCA
A. Mercha, IMEC
Stefan Metzger, Fraunhofer Institute
Olivier Mion, Alcatel Space Industries
Ali Mohammadzadeh, ESA/ESTEC
Joerg Nagel, Astrium Space
Bob Nickson, ESA/ESTEC
Michael Nicolaidis, iROC
Petteri Nieminen, ESA/ESTEC
Duc Nguyen, Jet Propulsion Lab
Eugene Normand, Boeing Radiation Effects Lab
Ole Pedersen, Astrium
Daniel Peyre, Astrium
Christian Poivey, NASA-GSFC
V. Re, University of Bergamo
Steven Redant, IMEC
Nicole Reinecke, Astrium
Joerg Rieling, Astrium Space Infrastructure
Guy Rolland, CNES
Keith Ryden, QinetiQ
Olivier Saint-Pe, Astrium
Eddy Simoen, IMEC
John Sorensen, ESA/ESTEC
E.G. Stassinopoulos, NASA-GSFC
Philippe Sylvestre, iROC
Larry Townsend, Univ of Tennessee
Peter Truscott, QinetiQ
Marco Van Uffelen, SCK-CEN
Craig Underwood, Univ. of Surrey
Nick v Vanno, Intersil
François Vasey, CERN
Raoul Velazco, TIMA
Jean Louis Venturin, CNES
Ari Virtanen, University of Jyvaskyla
Thijs Wijnands, CERN
Theodore Wrobel, Sandia National Labs
Etienne Van Wynendale, Alcatel ETCA
Mike Xapsos, NASA-GSFC
Candice Yui, Jet Propulsion Lab

Abstracts of the Invited Speakers

The Birth of Radiation Physics

J.C. Boudenot
THALES

A century ago (1903), Pierre and Marie Curie, together with Henri Becquerel, received the third physics Nobel Prize in history. This event is being celebrated in many places throughout 2003. Because of the impact of this discovery on our radiation community, this talk recalls that great period of physics. The late years of the nineteenth century were the dawn of the nuclear age, with the discovery of x-ray and radioactivity. In this talk, Jean-Claude Boudenot will focus on the works of the physicists who won the first three Nobel Prizes for physics: Wilhelm Röntgen (1901); Hendrick Antoon Lorentz & Peter Zeeman (1902); Henri Becquerel and Pierre & Marie Curie (1903).

Jean-Claude Boudenot is currently in charge of the team dedicated to III-V components research at THALES Research and Technology. He also teaches physics at engineering schools, mainly at the Institut Superieur d'Electronique de Paris (ISEP).

Jean-Claude Boudenot has a particular passion for 'history of physics'. He has authored more than 20 papers in this field as well as two books: "Histoire de la physique et des physicians" and "Max Planck". He is currently writing the first biography of Hendrick Antoon Lorentz (one of the most famous Dutch physicists) and will launch a new biography collection of physicists in the frame of the "2005 world year of physics".

Tulips from Amsterdam

J. Eijking
IFBC

Although a wide range of flower bulbs have been grown in the Netherlands for over 400 years, none of them is native to the country. Over the years, the Dutch collected species from all over the world and tried to imitate the original growing conditions as far as possible.

Due to experience, optimal growing conditions, breeding and research, nowadays the Dutch grow about 21.000ha with thousands of varieties that are hardly comparable with the original species in nature.

In this talk, Jos Eijking will provide us with some insights into flower bulb farming and trade, a literally flourishing trade located in this region of Holland.

Jos Eijking grew up in a bulb-growing family and graduated from the Horticultural College for Flower Bulb Culture at Lisse. As the Director and Horticultural Advisor of the International Flower Bulb Centre (IFBC) in Hillegom, he is the prime ambassador of the Dutch flower bulb sector, and is responsible for its international promotion activities.

The Odissea Mission to the International Space Station – November 2002

F. De Winne
ESA astronaut

In this talk, ESA astronaut Frank De Winne will describe his experiences during the Odissea Mission to the International Space Station (ISS). The Odissea mission, on board the Soyuz spacecraft, included Mission Commander Sergey Zaletkin, and flight engineers Yuri Lonchakov and De Winne. The Russian Soyuz rocket lifted off from Baikonur in Kazakhstan on 30 October 2002, testing the new Soyuz TMA-1 spacecraft. The primary task of the mission was to replace the old TM-34 Soyuz vehicle attached to the Station with the modernised new 'lifeboat' Soyuz TMA-1.

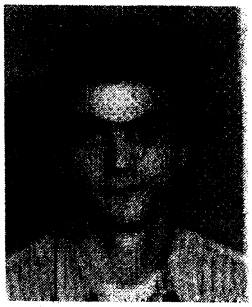
During the mission, Frank performed a series of science and technology related experiments including work on the Microgravity Science Glovebox.

Frank De Winne, born in the Belgian city of Ghent in 1961, graduated from the Royal School of Cadets, Lier, in 1979. He received a Masters degree in telecommunications and civil engineering from the Royal Military Academy, Brussels, in 1984. In 1991, he completed the Staff Course at the Defence College in Brussels, gaining the highest distinction. In 1992, he graduated from the Empire Test Pilots' School (ETPS) in Boscombe Down, England, where he was awarded the McKenna Trophy.

Frank De Winne logged more than 2300 hours flying at the controls of Mirage, F16, Jaguar and Tornado high-performance aircraft before joining ESA's European Astronaut Corps in January 2000. Frank De Winne is currently performing Odissea postflight activities which make this de-briefing possible.

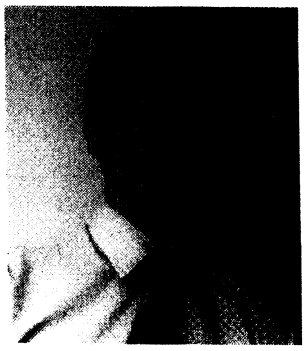
Short Course Presenters

Ali Mohammadzadeh received his B.S. and M.S. (1993) from the University of Bergen (Norway) and his Ph.D. in Physics from Brunel University, West London (UK) in 1997. In 1996 Dr. Mohammadzadeh joined the European Southern Observatory (Munich, Germany) as a CCD specialist. Since the end of 1997 he has been working at the European Space Agency (ESTEC, The Netherlands) as a Radiation Effects Engineer. Within the Radiation Effects and Component Analysis Techniques Section, his responsibilities include the support of ESA projects on EEE component radiation issues, the preparation and implementation of relevant R & D and radiation test activities. His main expertise is in Total Ionising Dose (TID) and Displacement Damage effects. Dr. Mohammadzadeh has authored and co-authored more than 20 papers.



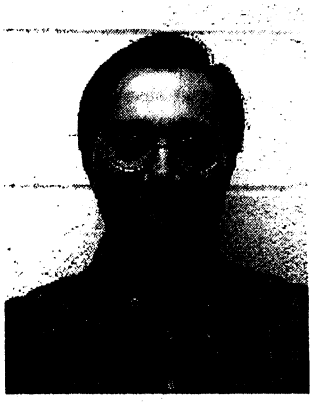
Renaud Mangeret received his Ph.D. in Electronics from the Paul Sabatier University, Toulouse (France) in the Materials and Components for Electronics department in 1992. After receiving his Ph.D., he worked at the IBM Almaden Research Center, California, as a visiting scientist working on non-linear optics (NLO) polymers. From 1993-1995 Dr. Mangeret worked at Giat Industries, Toulouse as a research and development engineer. Since 1995 Dr. Mangeret has been the radiation specialist at Matra Marconi Space/ EADS Astrium SAS, Toulouse (France). He is responsible for all aspects of Radiation hardness assurance solutions for use of sensitive devices in Space programmes (telecommunications, earth observation, interplanetary scientific, launchers). His tasks include: radiation environment definition, study of radiation effects in electronics and opto-electronics components and materials, study of shielding properties of materials and structures for space applications, etc. Dr. Mangeret is a member of IEEE and has served as session chair at previous RADECS events.

Juan Cueto Rodríguez has an Engineering Telecommunications Degree from Polytechnic University of Catalonia (UPC) in Barcelona (Spain). He entered TIMA-CMP (Grenoble, France) in 1998 as Project Engineer in charge of hardening and testing electronics for space applications. In 2000, he joined the Space Environment and Radiation Effects group in CNES (Toulouse, France) as a principal investigator for the ICARE and COMRAD radiation monitors. Since 2001 he has been working at Alcatel Espacio (Madrid, Spain) as the responsible for radiation effects on Alcatel Espacio space projects.

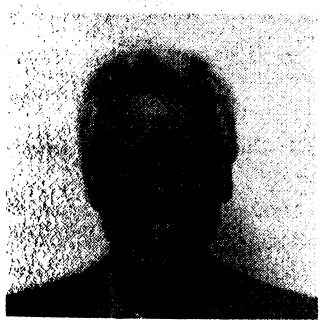


Gordon Hopkinson received his B.Sc. and Ph.D. degrees in physics from the University of Manchester, UK. He then worked on astronomical applications of solid state arrays, first at Durham University and then at the X-ray Astronomy Group of the University of Leicester. Dr. Hopkinson joined Sira Electro-Optics (Chislehurst, Kent, UK) in 1983 to work on the use of CCDs in star trackers and other space-based applications. He started working on radiation effects in 1988 and has conducted numerous studies on effects in CCDs, active pixel sensors and IR detector arrays, as well as support electronics, such as ADCs. Dr. Hopkinson has served as a session chair or co-chair at NSREC 1996, ESCCON 2000, RADECS 2000 and 2001 and is Awards Chairman for NSREC 2003. He has authored or co-authored over 30 publications and received the NSREC Outstanding Paper Award in 1994.

Sophie Duzellier graduated from the Institut National des Sciences Appliquées Toulouse (INSA) in 1986. She received a degree of 'Docteur ingénieur' from the University Paul Sabatier (Toulouse) in 1989. Dr. Duzellier then joined ONERA as a research engineer in the Electronics group of the Space Department (DESP). She carried out simulation and experimental work on Single Event Effects in electronic devices. Her current activities include testing methods and modelling the proton and heavy ion response of complex integrated circuits. She has served as session chair for the IEEE NSREC and RADECS conferences and on the technical committees of several RADECS events. She has authored or co-authored over 30 scientific publications.



Christian Poivey graduated from l'Institut des Sciences de l'Ingenieur de Clermont-Ferrand, France, in 1985. Then he carried out research work on electrical simulation tools in the Commissariat à l'Energie Atomique (CEA), Centre d'Etudes de Bruyeres Le Chatel. In 1988 he was awarded the degree of 'docteur ingenieur' from the University of Clermont-Ferrand II for this work. In 1988 he joined Matra Marconi Space. From 1988 to 1992, he worked as a parts engineer. His main task was the evaluation of parts for the SPOT4/HELIOS program. In 1992, he joined the Matra Marconi Space radiation group to perform R&D and testing on Single Event Effects. From 1995 to 2000 he was the radiation group leader. In 2000, he joined the radiation group of NASA Goddard Space Flight Center. He is responsible for radiation related issues on the ST5 and other flight data analysis projects. He also conducts R&D studies on Single Event Transient effects on linear analog devices. Dr Poivey was a 2002 NSREC short course instructor and is the author or co-author of more than 20 papers.



Stanley Mattsson received his Master of Physics degree (1973) and his Doctorate degree in Physics/Nuclear Physics (1979) from the University of Gothenburg/Chalmers University of Technology (Gothenburg, Sweden). From 1979 to 1981 Dr. Mattsson worked as a Visiting Scientist at CERN. From 1981-1983 he was Scientific Associate and from 1983-1989 an Associate Professor at Chalmers University of Technology (Gothenburg, Sweden). Since 1989 Dr. Mattsson has worked at SAAB Ericsson Space AB (Gothenburg, Sweden), initially managing the Radiation Effects Group. Subsequently he became the manager of the Component Section, comprising the Components Technology group, the Components Analysis Group and the Material Analysis Group. In 1996 he became Head of the Components Department, and he is currently the Technical Manager of the Production Division. Dr. Mattsson has published and co-authored numerous publications.

Comments from the Awards Chairman

My sincere appreciation and thanks go to the Awards Committee members who applied themselves fully to the task and devoted their knowledge, experience, consideration and discipline to a difficult, laborious call. I am quite confident that we have come up with a fair evaluation of oral and poster presentations on their technical merit as well as clarity of presentation.

Out of 45 oral presentations, 11 reached and exceeded a score of 70%, while three posters were rated similarly well. As in many of these cases the scores were quite close, the nominated papers are listed below in the alphabetical order of their sessions and not in the order of their marks.

Guy Berger
Awards Committee Chairman
Université Catholique de Louvain, Belgium

Awards Committee Members

Louis Baguena	Alcatel Space Industries, F
Janet Barth	NASA GSFC, USA
Guy Berger	Université Catholique de Louvain, B
Françoise Bezerra	CNES, F
Andrew Chugg	MBDA Ltd, UK
Eamonn Daly	ESA/ESTEC
Jean Paul David	ONERA-DESP, F
Sophie Duzellier	ONERA CERT, F
Clive Dyer	QinetiQ, UK
Rémi Gaillard	RADECS Association, F
Wojtek Hajdas	Paul Scherrer Institut, CH
Gordon Hopkinson	SIRA Technology Ltd., UK
Alan Johnston	JPL, USA
Rocky Koga	Aerospace Corporation, USA
Ken Label	NASA GSFC, USA
Jean Luc Leray	CEA, F
Renaud Mangeret	EADS Astrium SAS, F
Paul Marshall	NASA GSFC, USA
Stanley Mattsson	Saab Ericsson Space, S
Michel Melotte	Alcatel ETCA, B
Alessandro Paccagnella	Universita di Padova, I
Philippe Paillet	CEA, F
Eddy Simoen	IMEC, B
Ron Shrimpf	Vanderbilt University, USA
Gary Swift	JPL, USA
Marco Van Uffelen	SCK-CEN, B
Raoul Velazco	TIMA, F
Ari Virtanen	University of Jyväskylä, FIN

The RADECS 2003 Awards

Nominated Oral Presentation Papers

B4 Identification of Radiation-Induced Parasitic Leakage Paths Using Light Emission Microscopy
Shaneyfelt, Marty; Tangyunyong, Paiboon; Hill, Thomas A.; Soden, Jerry M.; Flores, Richard S.; Schwank, James R.; Dodd, Paul E.; Hash, Gerald L.
Sandia National Laboratories

C2 Validity of Using a Fixed Analog Input for Evaluating the SEU Sensitivity of a Flash Analog-to-Digital Converter
Buchner, Stephen[1]; Campbell, Arthur[2]; Sternberg, Andrew[3]; McMorrow, Dale[2]; Massengill, Lloyd[3]; Dyer, Clive[4]
[1]NASA/GSFC, [2]NRL, [3]Vanderbilt University, [4]QinetiQ

D4 Proposal for a Radiation Test of Virtex-based ALUs
Alderighi, Monica[1]; Casini, Fabio[2] ; D'Angelo, Sergio[1]; Faure, Fabien[3]; Mancini, Marcello[1]; Pastore, Sandro[2]; Sechi, Giacomo[1]; Velazco, Raoul[3]
[1]CNR/IASF,[2]Sanitas E.G.,[3]TIMA

D5 Space Processor Radiation Mitigation and Validation Techniques for an 1800 MIPS Processor Board
Hillman, Robert[1]; Swift, Gary[2]; Layton, Phil[1]; Conrad, Mark[1]; Thibodeau, Chad[1]; Irom, F[2]
[1]Maxwell Technologies, [2]JPL

E5 Analyses of CCD Images of Nucleon-Silicon Interaction Events
Chugg, Andrew[1]; Jones, Rodri[1]; Moutrie, Michael[1]; Dyer, Clive[2]; Ryden, Keith[2]; Truscott, Peter[2]; Armstrong, James[3]; King, Douglas[3]
[1]MBDA UK Ltd,[2]QinetiQ,[3]BAE SYSTEMS

F3 Temperature Effects and Long Term Fading of Implanted and Un-Implanted Gate Oxide RADFETs
Haran, Avner[1]; Jaksic, Aleksandar[2]; Refaeli, Nati[1]; Eliyahu, Avrahan[1]; David, David[1]; Barak, Joseph[1]
[1]Soreq NRC,[2]National Microelectronics Research Institute (NMRC)

F4 Hot Pixel Generation in Active Pixel Sensors: Dosimetric and Micro-dosimetric Response
Scheick, Leif[1]; Novak, Frank[2]
[1]JPL Caltech, [2] LARC NASA

G1 High Energy Proton Irradiation Effects in GaAs Devices
Warner, Jeff[1,3]; Walters, Rob[1]; Messenger, Scott[2]; Summers, Geoff[1,3]; Khanna, Shyam[4]; Estan, Diego[4]; Erhardt, Lorne[4]; Houdayer, Alain[5]
[1]US Naval Research Laboratory, [2]SFA, Inc., [3]University of Maryland , [4]DRDC Ottawa, [5]University of Montreal

G2 Assessing Space Radiation Environment Effects on an Erbium-Doped Fiber Amplifier
Caussanel, Matthieu[1]; Signoret, Philippe[1]; Gilard, Olivier[2]; Sotom, Michel[3]; Touboul, A.[1]; Gasiot, Jean[1]
[1]Montpellier II University,[2]CNES,[3]Alcatel Space

H2 Spacecraft Activation and South Atlantic Profiles Mapping Measured with RHESSI Satellite
Hajdas, Wojtek[1]; Eggel, Christina[1]; Wigger, Claudia[1]; Sanctuary, H.[1]; Zehnder, Alex[1]; Smith, David[2]
[1]Paul Scherrer Institut, [2] UCL Berkeley

Nominated Poster Papers

AP2 Radiation Damage of InGaAs Photodiodes by High-Temperature Electron and Neutron Irradiation
Ohyama, Hidenori[1]; Takakura, Kenichiro[1]; Hayama, Kiyoteru[1]; Simoen, Eddy[2]; Claeys, Cor[2]; Hirao, Toshio[3]
[1]Kumamoto National College of Technology,[2]IMEC,[3]Takasaki JAERI

FP2 A Comparative Study Between Two Neutron Facilities Regarding SEU
Granlund, Thomas[1]; Olsson, Nils[2]
[1]Saab Avionics AB,[2]Swedish Defence Research Agency

LN1 14 MeV Neutron-Induced SEU in SRAM Devices
Flament, Olivier[1]; Baggio, J[1]; D'Hose C[1]; Gasiot, G[1,2]; Leray, J.L[1]
[1]CEA DIF, [2]ST Microelectronics

The RADECS 2003 Best Oral Paper Award goes to:

G1 High Energy Proton Irradiation Effects in GaAs Devices
Warner, Jeff[1,3]; Walters, Rob[1]; Messenger, Scott[2]; Summers, Geoff[1,3]; Khanna, Shyam[4]; Estan, Diego[4]; Erhardt, Lorne[4]; Houdayer, Alain[5]
[1]US Naval Research Laboratory, [2]SFA, Inc., [3]University of Maryland , [4]DRDC Ottawa, [5]University of Montreal

The RADECS 2003 Best Poster Award goes to:

LN1 14 MeV Neutron-Induced SEU in SRAM Devices
Flament, Olivier[1]; Baggio, J[1]; D'Hose C[1]; Gasiot, G[1,2]; Leray, J.L[1]
[1]CEA DIF, [2]ST Microelectronics

RADECS 2003

Schedule

Association RADECS

TIME	Monday September 15	Tuesday September 16	Wednesday September 17	Thursday September 18	Friday September 19
08:00	<<<<<<<<<<<<<<<<<<<<<<<<<<< Registration Desk Open ** >>>>>>>>>>>>>>>>>>>>>>>>>>				
09:00	08:30 – 08:40 Short Course Introduction *Ali Mohammadzadeh* 08:40 Environment (Mission) Analysis & Specification *Renaud Mangeret*	08:30 – 09:00 Conference Opening 09:00 – 10:20 Session A	08:30 – 09:25 Invited Talk: The Birth of Radiation Physics J.C. Boudenot, *THALES* 09:25 – 10:30 Session C	08:30 – 09:25 Invited Talk: Tulips from Amsterdam J. Eijking, *FBC* 09:25 – 10:30 Session E	08:30 Invited Talk: The Odissea Mission to the International Space Station F. De Winne, *ESA astronaut* 09:25 – 10:30 Session G
10:00	10:00 – 10:30 Break	10:20 – 10:50 Break	10:30 – 11:00 Break	10:30 – 11:00 Break	10:30 – 11:00 Break
11:00	10:30 – 12:00 Radiation Effect Analysis *Juan Carlos Rodriguez* *Gordon Hopkinson* *Sophie Duzellier*	10:50 – 12:30 Session A	11:00 – 12:30 Session C	11:00 – 12:30 Session E	11:00 – 12:25 Session H
12:00	12:00 – 14:00 Lunch	12:30 – 14:00 Lunch	12:30 Poster Session Intro *Wojtek Hajdas* 12:35 – 14:00 Lunch	12:30 – 14:00 Lunch	12:25 – 12:30 Conference Close 12:30 – 14:15 Lunch
13:00					
14:00	14:00 – 15:30 Component Characterisation & Testing *Juan Carlos Rodriguez* *Gordon Hopkinson* *Sophie Duzellier*	14:00 – 15:25 Session B	14:00 – 15:00 Poster Session 1	14:00 – 15:00 Poster Session 2	[illegible]
15:00	15:30 – 16:00 Break	15:25 – 15:55 Break	15:00 – 15:30 Break 15:30 – 17:20 Session D	15:00 – 15:30 Break 15:30 – 17:15 Session F	
16:00	16:00 – 17:30 Radiation Hardness Assurance For Space Systems *Christian Poivey* *Stanley Mattsson* 17:30 Wrap-Up	15:55 – 17:05 Session B			
17:00	17:30 RADECS Association Meeting	17:05 – 17:30 Late News 17:30 – 19:00 Conference Reception		17:15 – 17:20 Author Briefing	
18:00			18:00 Exhibitor's Reception		
19:00				19:00 Conference Dinner	

Announcement: RADECS 2005

8th European Conference
Radiation and Its Effects on Components and Systems
19-23 September 2005
Palais des Congrès du Cap d'Agde
France

The 8th European Conference on Radiation and Its Effects on Components and Systems, RADECS 2005, will take place in the Palais des Congrès, Cap d'Agde, France, from 19 to 23 September 2005. The Conference technical programme will feature oral and poster presentations describing recent observations, results and developments concerning radiation effects on materials, electronic components and systems.

A short course will be held on 19 September 2005. A technical exhibition is also part of the programme.

Cap d'Agde

After 26 centuries of history, Agde has become a modern city that is expanding due to tourism. It is well known for its recreation, and its location on the Mediterranean coast of France ensures a temperate climate during September.

Theme

As is the case each year, the RADECS Conference is the major European rendezvous for the Radiation Effects community. A variety of papers describing radiation effects on devices, integrated circuits, sensors and systems, as well as hardening, test and environmental modelling methods, will be presented in oral and poster sessions. Target applications are space, the nuclear power industry, atmospheric & ground radiation effects, military, high energy physics, and related areas.

Call for Papers

The working language of the Conference will be English.

We invite submission of papers describing significant new findings in the following areas:

- Radiation Environments
  - Space and Avionics, High Energy Physics, Nuclear Medicine, Military
  - Characterisation and Modelling
  - Radiation Environment Monitors
- Radiation Effects on Materials, Components and Systems
  - Basic Mechanisms
  - Characterisation, Computer Simulations
  - Ground and In-orbit testing
- Radiation Hardening and Mitigation Techniques on Process, Circuit Design and System Level
- Radiation Test Facilities and Dosimetry
- Radiation Hardness Assurance, Test Methods and Standards
- New Developments of Interest to the Radiation Effects Community

Deadline for submission: April 5th, 2005

Submissions will also be assessed with respect to their suitability for publication in a special Conference issue of the IEEE Transactions on Nuclear Science, based on separate submission of a complete paper, and subject to an independent review after the Conference. Further information will be sent to prospective authors upon acceptance of their RADECS summary.

Industrial Exhibition

An industrial exhibition will be located adjacent to the conference areas from Tuesday afternoon until Thursday evening, 20-22 September. Companies and organisations wishing to promote their products, facilities and services in the radiation effects domain are invited to obtain detailed information from the RADECS website (www.radecs.org)

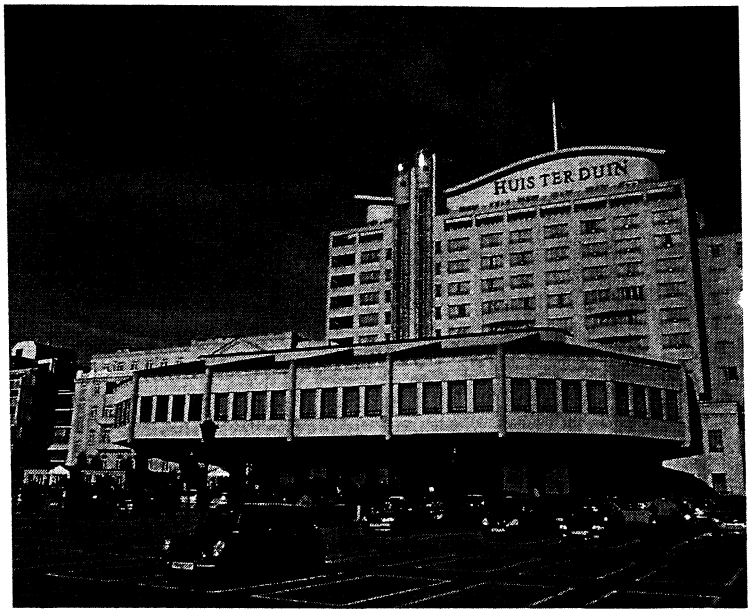
General Chairman:	L. Dusseau
Technical Chairman:	F. Saigné
Local Arrangement:	B. Sagnes
Secretary:	P. Bargoin

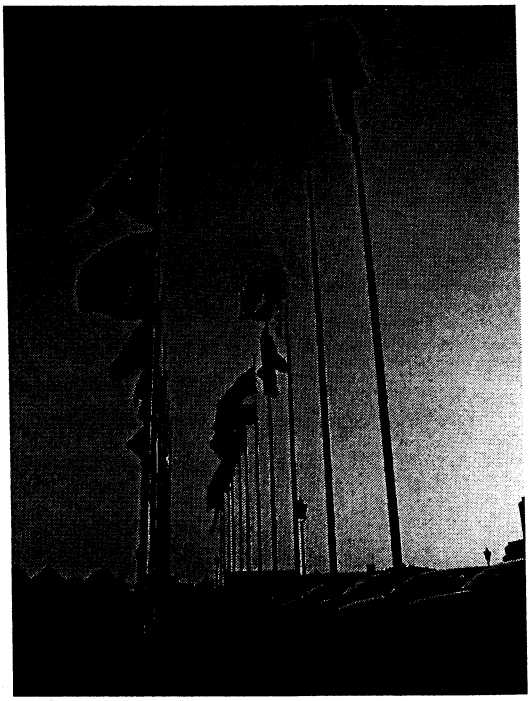
RADECS 2005 is organised by:

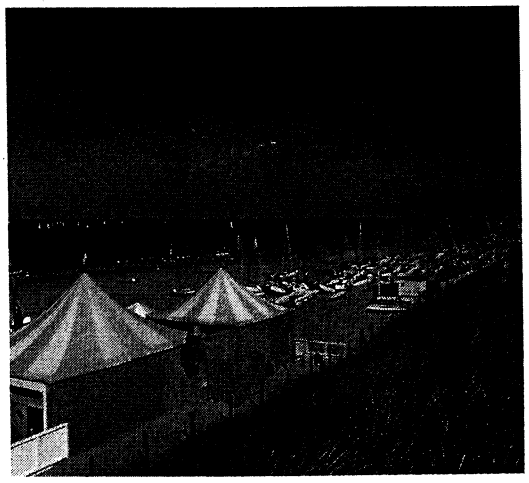
Centre d'Electronique et de Micro-optoélectronique de Montpellier

Contact: radecs2005@radecs.org

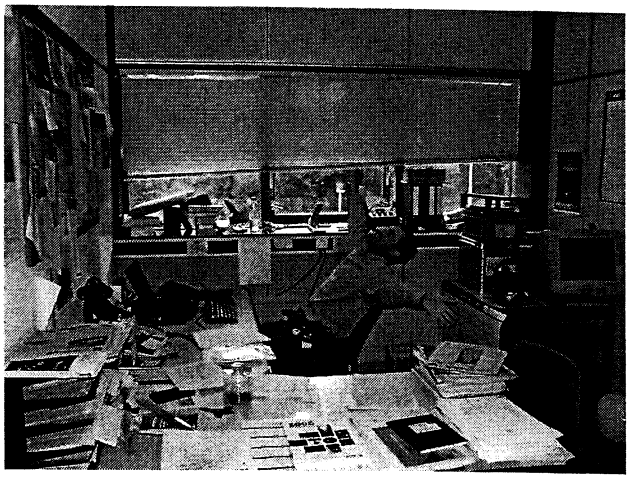
Photos from RADECS 2003

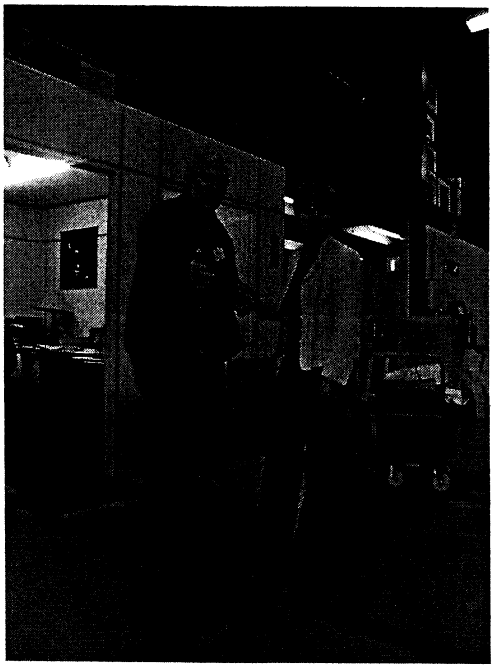


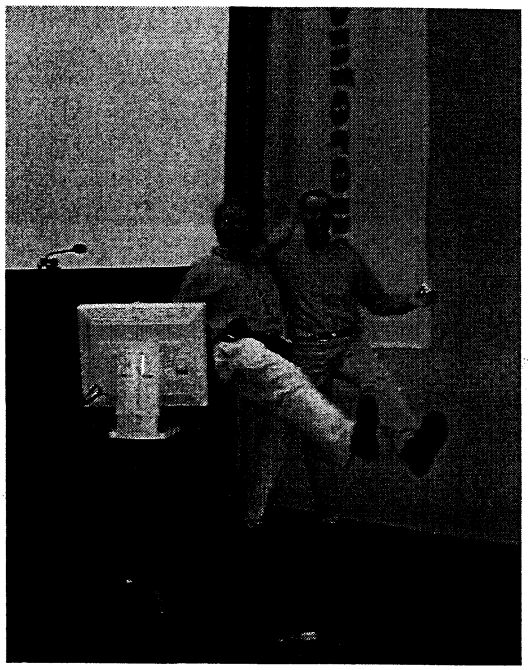


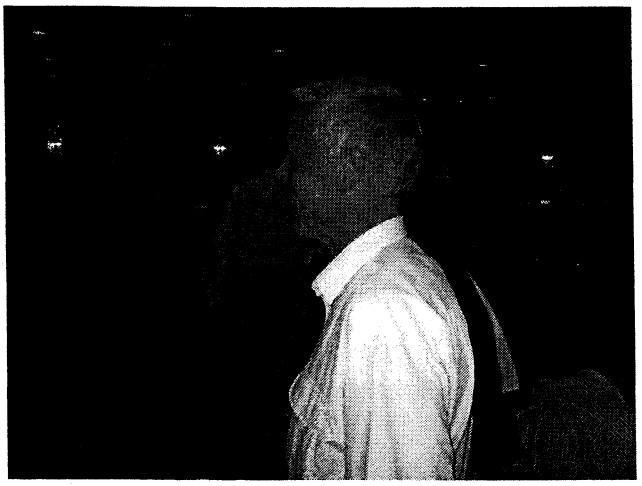


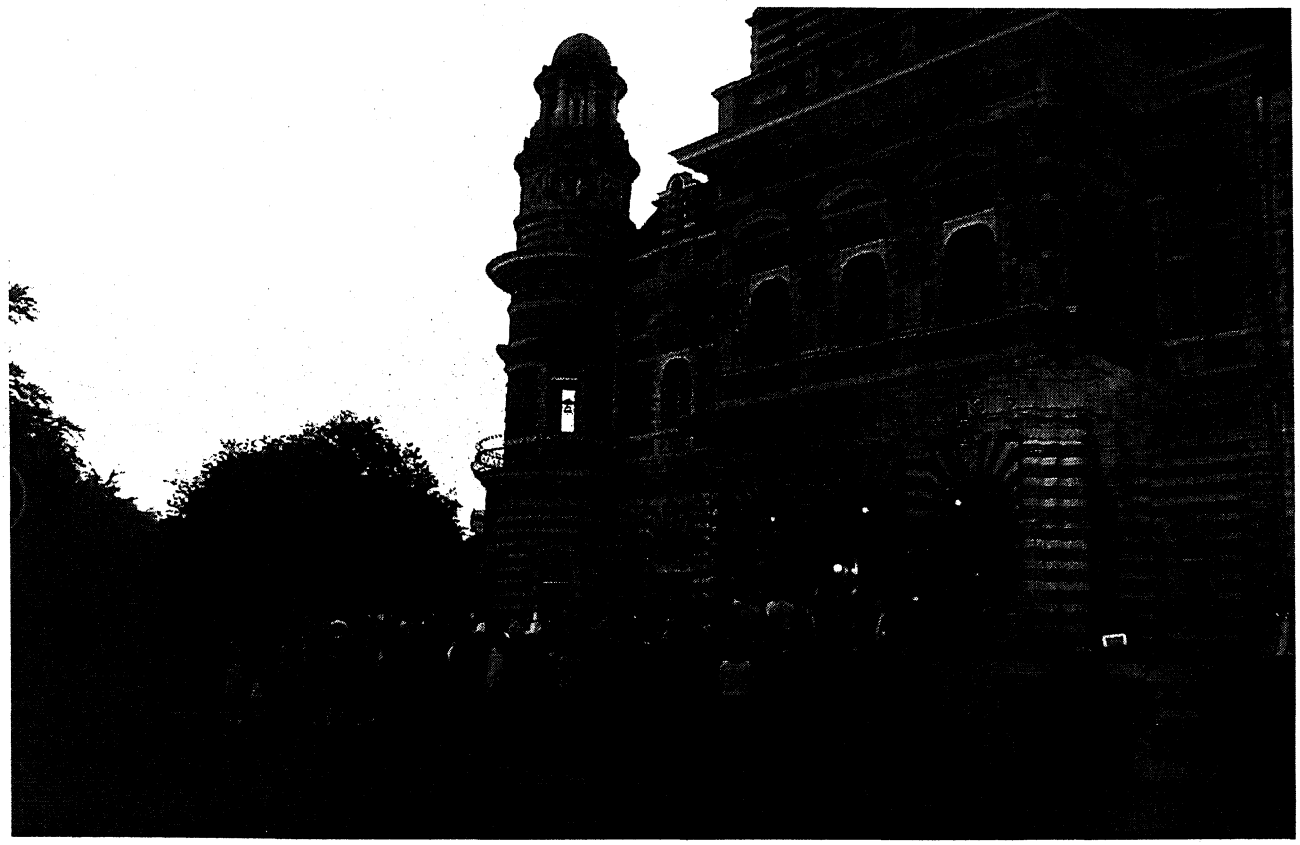
II

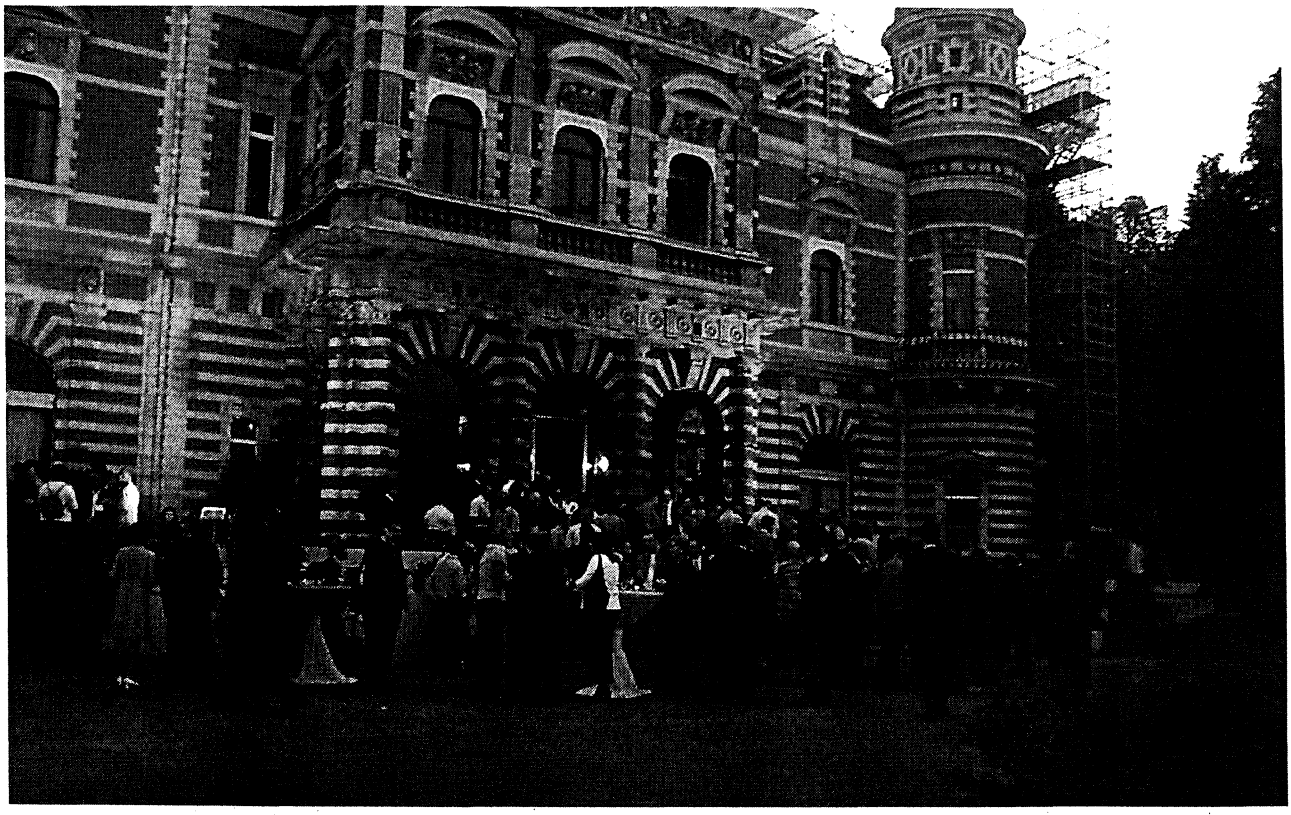


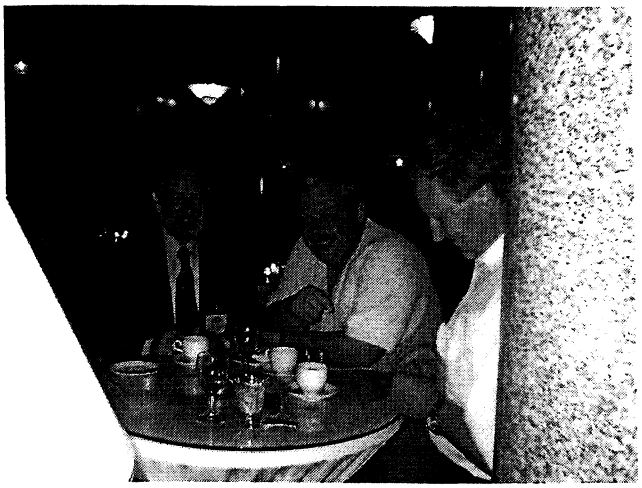




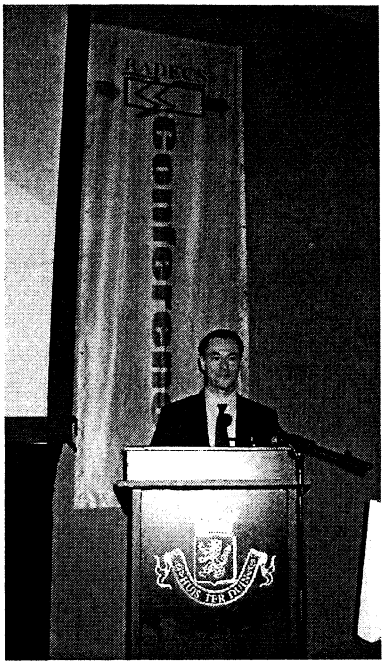


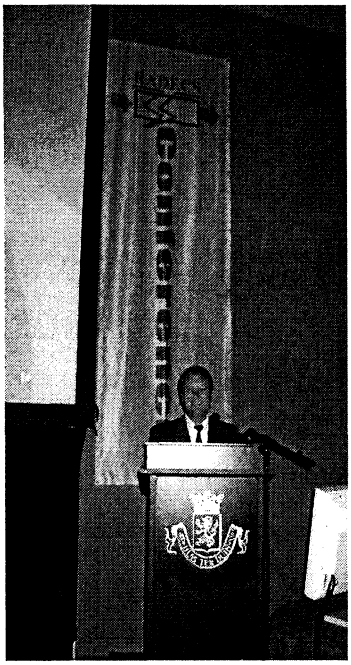







Tot ziens
Goodbye
Au revoir






Thanks for coming !
Tot ziens
Goodbye