



Open Greener Horizon Forum and Official EU-China GRAIN* Meeting

Monday, 12th – Wednesday, 14th November 2012

**CIMNE - Universitat Politècnica de Catalunya
UPC**

Barcelona, Spain

Welcome Address of Eugenio Oñate

Director of CIMNE
Professor of Computational Mechanics at
Technical University of Catalonia,
Barcelona, Spain



On behalf of CIMNE it is my great pleasure to welcome all the participants at the GRAIN Open Forum held in Barcelona on 12-14 November 2012 on the occasion of the follow up of the activities of the GRAIN Project of the FP7 Aeronautics Programme of the European Commission (EC).

The GRAIN project is a collaborative effort of a team of universities, research centers and companies in the aeronautics field in Europe and China. The aim of the project is to deepen in the mutual knowledge on the capacities and interests of the participant organizations for the solution of multidisciplinary problems in aeronautics needed for greener technologies reaching the Vision 2020 environmental goals

The continuing joint work materialized in the exchange of scientific and technical information and the organization of meetings and workshops, such as this one, has contributed to identify a number of priority RTD topics of common interest that will be jointly developed by selected partners of the Aerochina consortium in the coming years, in cooperation with other research groups and industries in Europe and China.

We therefore look forward to a continuing and sustainable RTD work between the GRAIN partners and hope that this collaborative effort will meet the interest and support of the EC and the corresponding funding organization in China.

On behalf of the GRAIN consortium I wish to express my gratitude to the EC and MIIT for their support to the project and for their confidence in the future of this Europe-China cooperation in the field of Aeronautics.

Good luck in your work and best wishes for the future of GRAIN activities.

*FP7 support action *Greener Aeronautics International Networking - GRAIN*



Committees

Advisory Committee

András Siegler, European Commission, Brussels, Belgium
Dietrich Knoerzer, European Commission, Brussels, Belgium
Dale King, Airbus, UK
Yann Barbaux, EADS-IW, France
LI Benjian, MIIT, China
GONG Haiping, MIIT, China
ZHANG Xinguo, AVIC/CAE, China
WU Guanghui, COMAC, China

Scientific/ Technical Committee

Adel Abbas, Airbus and UPM, Spain	HUA Jun, CAE, China
Anders Brødsjø, Airborne, Netherlands	WEI Jinzhong, AVIC/CAE, China
Gabriel Bugada, CIMNE, Spain	ZHANG Jian, AVIC, China
Nicola Ceresola, Alenia, Italy	LI Jibao, ACAE/CAE, China
Herman Deconinck, VKI, Belgium	CHEN Yingchun, COMAC, China
Magí Galindo, LEITAT, Spain	TANG Changhong, FAI/CAE, China
Charles Hirsch, NUMECA Int., Belgium	SUN Xiasheng, ASRI/CAE, China
Kostas Kontis, Univ. of Manchester, UK	NIU Wensheng, ACTRI/CAE, China
Norbert Kroll, DLR, Germany	ZHAO Bo, ARI/CAE, China
Daniel Loghin, Univ. of Birmingham, UK	XU Huasheng, GTE/CAE, China
Toan Nguyen, INRIA, France	DUAN Zhuoyi, FAI/CAE, China
Roberto Paoli, CERFACS, France	HUANG Wenchao, ASRI/CAE, China
Jacques Periaux, CIMNE, Spain	YI Xiaosu, BIAM, CAE, China
Ning Qin, Univ. of Sheffield, UK	ZHENG Yao, ZJU, China
Domenico Quagliarella, CIRA, Italy	REN Yuxin, TSHU, China
Jordi Saniger, EADS, France	WANG Jinjun, BUAA, China
Marco Scamuzzi, INGENIA, Spain	ZHAO Ning, NUAA, China
Xiang Zhang, Cranfield Univ., UK	GAO Zhenghong, NPU, China

Forum Organizing Committee

Gabriel Bugada, CIMNE, Spain
Jacques Periaux, CIMNE, Spain
Jordi Pons-Prats, CIMNE, Spain
HUA Jun, CAE, China
SUN Jian, CAE, China
HUANG Weijia, CAE, China



Partners of the GRAIN Project

Europe

Airborne
AIRBUS
ALENIA
Birmingham Univ.
CERFACS
CIMNE
CIRA
Cranfield Univ.
DLR
EADS-IW
INGENIA
INRIA
LEITAT
Manchester Univ.
NUMECA
Sheffield Univ.
VKI

China

ACTRI/CAE
ARI/CAE
ASRI/CAE
BIAM/CAE
BUAA
CAE
FAI/CAE
GTE/CAE
NPU
NUAA
PKU
SARI
TSHU
ZJU

Coordination & Management

Europe:

Gabriel Bugeda and Jacques Periaux, CIMNE/ UPC

GRAIN Coordinators

Dietrich Knoerzer, EC, DG Research & Innovation, Aeronautics

Scientific Officer

China:

HUA Jun and SUN Jian, CAE

GRAIN Coordinators

SHI Jingmin, MIIT

Director, Project Officer



Programme

Monday, 12th November 2012

Forum Day 1

- 08h30 - 09h00 **Welcome Address** (Pedro Diez, Vice-Rector, UPC, HUA Jun, CAE, Jacques Periaux, CIMNE)
- 09h00 – 09h30 **Opening Session** (Dietrich Knoerzer, RTD-Aeronautics, EC, Zheng Kai, Director, Gabriel Bugada, CIMNE; SUN Jian, Director Int., CAE)
- 09h30 – 10h30 **Invited Speakers Session 1**
Chairperson: Gabriel Bugada, CIMNE
- Norbert Kroll, Head of Department C²A²S²E, DLR, Germany
'Opportunities and challenges of high-order methods for future aircraft design'
- CHENG Haixin, Tsinghua University, China
'Wing/Nacelle Integrated Optimization based on Navier-Stokes Analysis'
- 10h30 - 11h00 **Coffee Break**
- 11h00 - 12h45 **Key Greening Technology (KGT1) Session:**
Emission Reduction Technologies
Chairpersons: Xiang Zhang, Cranfield Univ. / XU Huasheng, GTE
- Introduction by the Chairperson
- Ian Poll, University of Cranfield, UK
'The non-CO2 effects of aviation on the environment'
- ZHANG Chi, BUAA, China
'Next Generation Ultra Low Emissions Combustor Concept Development'
- Report on the KGT findings and discussion (Chairpersons)
- 12h45 - 14h00 **Lunch**



14h00 – 15h45 **KGT2 Session: Drag Reduction Technologies**

Chairpersons: Domenico Quagliarella, CIRA / DUAN Zhuoyi, FAI

- Introduction by the Chairperson

- BAI Junqiang, NPU, China

'Application of Gamma-Theta transition model in DES'

- Emiliano Iuliano, CIRA, Italy

'Optimization techniques for natural laminar flow design: experiences and future Perspectives'

- Report on the KGT findings and discussion (Chairpersons)

15h45 – 16h15 **Coffee Break**

16h15- 18h00 **KGT3 Session: Noise Emission Reduction**

Chairpersons: Herman Deconinck, VKI / HUANG Wenchao, ASRI

- Introduction by the Chairperson

- LU Hongqiang, NUAU, China

'Prediction of Flow-Induced Noise with High-Order Discontinuous Galerkin Method'

- Herman Deconinck, VKI, Belgium

'Flight Path 2050", current research in aircraft noise prediction'

- Report on the KGT findings and discussion (Chairpersons)

18h00 End of Day 1, Cocktail reception at UPC



Tuesday, 13th November 2012

Forum Day 2

- 9h00 - 10h00 **Invited Speakers Session 2**
Chairperson: Jacques Periaux, CIMNE/ SUN Xiasheng, ASRI
- WANG Jinjun, BUAA, China
'Experimental Investigation on the Turbulent Boundary layer Drag Reduction with Roughness Elements'
 - Michael Leschziner, Imperial College London, UK
'Gaining insight into turbulent drag-reduction mechanisms by means of numerical simulation'
- 10h00 - 10h50 **MARS Session: Flow Control Technologies**
Chairpersons: Ning Qin, Univ. Sheffield/ DONG Jun, ARI/ CAE
- MING Xiao, NUAU, China
'Investigation of Flow Control on Backward-Facing Step'
 - Konstantinos Kontis, Univ. Manchester, UK
'Drag-reduction technologies for aerodynamic applications'
- 10h50 – 11h20 **Coffee Break**
- 11h20 - 13h00 **KGT4 Session: Environmentally Friendly Materials and Structures**
Chairpersons: Marc Crescenti, LEITAT / YI Xiaosu, BIAM
- Introduction by the Chairperson
 - ZHU Jin, NIMTE, China
'Research on Bio-based Polymeric Materials'
 - Marco Scamuzzi, CIMNE, Spain
'Hybrid composite materials with adaptive properties'
 - Report on the KGT findings and discussion (Chairpersons)
- 13h00 - 14h15 **Lunch**
- 14h15 - 16h00 **KGT5 Session: High Performance Computing for Aeronautical Applications**
Chairpersons: Toan Nguyen, INRIA / ZHENG Yao, ZJU
- Introduction by the Chairperson
 - ZHOU Lei, LI Li, ACTRI, China
'An Investigation of a Parallel Grid Refine Strategy for Hybrid Grids'
 - Adel Abbas, AIRBUS, Spain,
'Advanced Numerical Simulation and HPC – Vision and Strategy'
 - ZHONG Chengwen, NPU, China,
'GPU-Accelerated Large-Eddy Simulation of Turbulent Cavity Flows'
 - Report on the KGT findings and discussion (Chairpersons)
- 16h00 - 16h30 **Coffee Break**
- 16h30 - 17h45 **Synthesis of the GRAIN Workshop** - Panel discussion on future green challenges –
The research and industry perspectives
Chairpersons: Dietrich Knoerzer, EC and HUA Jun, CAE
Panel participants:
Gabriel Bugada/ Jacques Periaux, CIMNE; Ms SUN Jian, CAE; Dale King, Airbus;
DUAN Zhuoyi, FAI; YI Xiaosu, BIAM; COMAC/ AVIC, others (including the audience)
- 17h45 End of Day 2



Wednesday, 14th November 2012

Forum Day 3

Official EU-China Meeting

9h00 - 9h20 **Opening Ceremony** (Rector of UPC (tbc.) / HUA Jun, Vice-President CAE)

9h20 - 10h40 **Keynote Lectures**

Chairperson: Ms. SUN Jian, CAE / Dietrich Knoerzer, European Commission

- LI Benjian, Deputy Director General, MIIT

- Andras Siegler, Director RTD-H Transport, European Commission

- Prof. HUA Jun, Vice president, CAE and Deputy Chief Engineer, AVIC
'Greener Aerodynamic Design with Numerical Tools'

- Christian Bulgubure, Vice-President Aerodynamics, Airbus SAS

'The Greening of Civil Aviation: 40 years of innovation at Airbus and new technologies development for future green aircraft and operations'

10h40 - 11h10 **Coffee Break and Group Photo**

11h10 - 12h30 **Industry and Research Lectures**

Chairperson: Jacques Periaux, CIMNE and SUN Xiasheng, ASRI

-Yi Xiaosu, BIAM, China

'How to make Structural Composites Multifunctional and Environment-friendly?'

- Vincent Garnier, Vice-President Research & Technology, SNECMA, France
< Title tbd.>

- LI Xiaodong, BUAA, China

'Direct Numerical Simulation and Physics Modelling of Impedance from Acoustic Liners'

- Piergiorgio Renzoni, Head of Fluid Mechanics Department, CIRA, Italy

'Present and Future R&D Activities at CIRA Contributing to the New Flightpath 2050 Europe's Vision for Aviation to Protect the Environment'

12h30 - 13h30 **Lunch**



13h30- 14h15 Research Lectures

Chairperson: Jacques Periaux, CIMNE and Yi Xiaosu, BIAM

- SUN Xiasheng, President, ASRI

'Aircraft Structural Testing/Analysis and SHM'

- Ms. Marja Eijkman, Division Manager Air Transport, NLR, The Netherlands

'Air Transport of tomorrow – a need for new technologies, innovation and greener operations'

14h15 – 15h00 Progress in EU-China Collaboration in Aeronautics

Chairperson: Gabriel Bugea, CIMNE and MING Xiao, NUAU

- Ning Qin, U. Sheffield/ DONG Jun, ARI, Technical Co-coordinators MARS

'Progress and Achievements of the MARS Project on Flow Control'

- Dietrich Knoerzer, RTD-Aeronautics

'Assessment of GRAIN Achievements and Future Perspectives'

- HUA Jun, Vice-President CAE, China

'Forum Summary and Recommendations'

15h00 - 15h30 Coffee Break

15h30 - 18h00 Key Green Technology Group Meetings (in parallel)

Chairperson: A. Abbas, Airbus, DUAN Zhuoyi, FAI

15h00 - 18h00 Meeting EC – MIIT/ CAE (Restricted Meeting)

18h00 End of day 3

20h30 Official GRAIN dinner



Thursday, 15th November 2012

GRAIN Final Review Meeting

(Participants: GRAIN partners, EC, MIIT and Reviewers)

Co-Chairmen: Jacques Periaux and Gabriel Bugeda, CIMNE, HUA Jun, Ms. SUN Jian, CAE

9h00 - 9h10 **Introductory address, (EC, MIIT, CIMNE, CAE)**

9h10 - 9h30 **Overview of the AEROCHINA project, (CIMNE)**

9h30 - 11h00 **Activity Reports of the Work Packages and KGTs including lessons learned from the workshop and the identification of future potential RTD activities (WPs):**

WP1 - Management, Project Specifications, Communication Platform (CIMNE, CAE)

WP2 - Reduction of Emissions Technologies (KGT1) (Cranfield Univ., GTE)

WP3 - Reduction of Drag Technologies (KGT2) (CIRA, ARI, FAI)

WP4 - Reduction of Noise Perception (KGT3) (VKI, ASRI)

WP5 - Environment-friendly Materials (KGT4) (LEITAT, BIAM)

WP6 - High Performance Computer Facilities for Aeronautical Applications (KGT5) (INRIA, ZHEJIANG Univ.)

WP7 - GRAIN Dissemination activities: Web-site, project repository, KGT dissemination events (CIMNE, CAE, VKI)

11h00 - 11h20 ***Coffee Break***

11h20 - 11h40 **Summary of main achievements of GRAIN project (CIMNE, CAE, AIRBUS)**

11h40 - 12h00 **Administrative and financial aspects (deliverables, cost statements) (CIMNE, CAE)**

12h00 - 12h20 **Future actions (Exploitation, GRAIN2) (CIMNE, CAE)**

12h20 - 13h00 **Assessment by the Reviewers and conclusion by EC Scientific Officer and MIIT**

Project Officer

13h00 **End of GRAIN Review meeting**