



## MINUTES INDUSTRIAL PROGRAMME COMMITTEE MEETING

12<sup>th</sup> October 2010,  
Instituto Superior Tecnico, Lisbon, Portugal

### Attendance

Dr. Philippe Geuzaine	CENAERO
Prof. Charles Hirsch	Numeca International
Prof. Anthony Hutton	Airbus UK
Prof. René Oliemans	Multiphase Flow B.V.
Prof. Wolfgang Rodi	K.I.T
Prof. Stefan Wallin	FOI, Stockholm
Dr. Richard Seoud	ERCOFTAC
Prof. Ananias Tomboulides (parttime)	Univ of Western Macedonia

**Absent:** Prof. Piotr Doerffer and Dr. David Standingford

**Approval of the agenda:** the agenda was approved as listed.

The meeting was opened by the deputy chairman, Prof. Oliemans, at 09.30, after arrival of participants.

### 1. Minutes of IPC meeting held in Delft on 18 May 2010

*Status of Actions May 2010 meeting:*

**Item 4 ERCOFTAC Industrial Strategy, 4.ii:** events for 2010 and 2011 in hand.

**Item 5 QNET-CFD Wiki:** Action by Prof. W. Rodi and Dr. R. Seoud on advertising the Knowledge Base in "Flow, Turbulence and Combustion" still outstanding due to delay in upgrading (see section 2, below).

**Item 6 (i) Best Practice Guidelines:** new members will receive one free copy; price for additional copies still to be reconsidered. **(ii)** Prof. A. Hutton still has to collect information from Dr. Lea for the 2<sup>nd</sup> edition of the BPG for Industrial CFD.

The minutes were approved.

### 2. QNET-CFD Knowledge Base (Prof. W. Rodi)

**Present Status:** Slow progress since May 2010 meeting. Postponement of advertising campaign with 12 months, since Prof. Rodi first would like to add between 5 and 10 new cases. Incorporation of data is an issue; support to introduce these is needed. Prof. Rodi will coordinate this. R. Oliemans will contact Martin Sommerfeld to assess how multiphase flow data promised can be delivered.

**Experience by users:** a way of finding out the experience by users has to be established. Action by Prof. Rodi. Moreover, we need to improve the database, as some cases are no longer up-to-date. The following possible additions have been identified:

- Three UFR cases on dispersed multiphase flows promised by Prof. M Sommerfeld.
- UFR NACA airfoil from Prof. M Strelets (he just started working on this).
- UFR car mirror: Dr. C. Mockett promised delivery by end of 2010.
- UFR 3-D diffuser: Prof. S. Jakirlic/Dr. D. von Terzi. LES and RANS from SIG 15 workshops.
- NEW AC on 4 stage compressor by TU Dresden, preliminary draft exist.



UFR by Prof. S. Drobniak, Czestochowa University of Technology, Poland, in 2011.

- Dr. C. Angelberger, IFP, Institute of French Petroleum, is interested in doing a case on flow in engines.

- Prof A. Dreizler, Technische Universität Darmstadt, Germany, will add a case by end of 2010.

Regarding the old cases, Prof. Hirsch stressed that some action needs to be taken for upgrading and assign a budget for incorporating the new data. It is very important that the quality of the data base is of a high level. The current status is partly out of date, and not appropriate for use by engineers from industry. It was agreed that the Application Challenges will be reviewed for upgrading as follows:

- 1) External Aerodynamic – Prof. Hutton
- 2) Combustion – Prof. Hirsch
- 3) Process Industry – Prof. Rodi
- 4) Civil construction and HVAC – Prof. Rodi
- 5) Environment – Prof. Rodi
- 6) Turbomachinery – Prof. Hirsch

*Action by Hutton, Hirsch and Rodi:* to conduct the assessment and report by the Spring Festival meeting in May 2010 in Gdansk, Poland. On the basis of the workscope defined a budget has to be allocated and a person should be identified to support Prof. Rodi in upgrading the Knowledge Base.

### **3. Industrial Strategy for ERCOFTAC ( Dr. R Seoud) Programme of Event, 2010.**

Two of the 6 events for 2010 (Hybrid RANS-LES in May and Best Practice in Engineering CFD in September 2010) have been held. The net income for 2009-2010 has been 34k Euros. Due to a scope change the event on CFD for Dispersed Multi-Phase Flows, organized with SIAMUF, planned for October 2010, had to be postponed to June 2011. The scope change has been agreed with SIAMUF by the course coordinator, Prof. Sommerfeld.

The Uncertainty Quantification (UQ) course, coordinated by Prof. Hirsch, will be postponed to March 2011. This event did not attract enough delegates (on 2<sup>nd</sup> Nov 2010 the total delegate number would have reached 15). There is an opportunity for the UQ course to be delivered in the USA. As of the writing of these minutes, the necessary channels are being employed by Prof. Hirsch, with a tentative view to deliver this event, in the USA in Nov 2011, at NASA Langley, Hampton, Virginia. This will add to the list of events identified in the Programme of Events, 2011.

The course on Microfluidics at IMFT, Toulouse, France, planned for 6-7 Dec 2010 has up to now attracted only 7 delegates. Dr. Seoud's email database on this topic is extensive, some 23 pages in MS Word. Dr. Seoud and the course coordinator are in discussion on how best to improve the overall approach to this topic, and hence future events. One possibility would be to go back and conduct a one day technology awareness event, which may attract more delegates, but with a lower profit margin.

A survey was conducted by Dr. Seoud to identify the reasons behind the low delegate number in particular for the UQ course. Main answer, pooled from delegates that have been to most of our events, has been that there is no budget, and as industry allow one delegate per event per year, then most have done so. According to Prof. Chabard of EDF late autumn, in the EU, is a busy time, due to budget consolidation and preparation, and people perhaps have no time to attend. Also, in France the date of the course, 11-12 Nov 2010 is a holiday. Last but not least even a drop in course fees did not motivate a crowd.



**Programme of Events, 2011:**

A) Course: CFD for Dispersed Multi-Phase Flows

Location: Stockholm, Sweden. Date: June 2011.

Course Coord; Prof. M Sommerfeld (Prog Ready)

B) Course: Uncertainty Management and Quantification in Industrial Design and Analysis

Venue: GE Global Research, Munich, Germany. Date: 3-4 March 2011

Course Coord: Prof. C Hirsch (Prog Ready)

C) Course: Transition Modelling

Venue: GE Global Research, Munich, Germany. Date: 25-26 May 2011

Course Coord: Prof. E. Dick (Prog Ready)

D) Seminar: Flow Control for Aerodynamics: State of the Art in the EU

Venue: Royal Belgium Academy of Science, Date: June 2011

Seminar Coordinator: Prof. A. Hutton

E) Course: Flame stabilization for Industrial Burners.

Venue: GE Global Research, Munich, Germany, Date: 26-27 Sep 2011

Course Coord: Prof. A. Tomboulides (Prog Ready)

F) Course: Design Optimisation

Venue: EADS, Manching, Date: October/Nov 2011

Course Coord: Prof. K Giannkoglou/Dr. W Haase (Prog Ready)

G) Course: BP for Eng CFD, and Hybrid RANS-LES for Industrial CFD

Venue: GE, Cleveland, USA. Date: 24-28 Oct / Nov 2011

H) Course: Uncertainty Management and Quantification in Industrial Design and Analysis

Venue: NASA, Langley, Virginia, USA. Date: Nov 2011

Course Coord: Prof. C Hirsch (Prog Part Ready/Consolidation with US speakers)

*Action Dr. Seoud:* is to mention the course coordinator on each flyer. Text format appear to change, therefore, consistency required and never use ditto, ‘ ‘ ‘.

**Prospects for new members**

Ford Turkey attempting to initiate a PC. The company has discussed the outline of a PC with two universities.

**Status Potential new Pilot-Centres outside EU**

PC Brazil: action by Prof. Rodriguez in Sao Carlos.

**4 Best Practice Guidelines (BPG)**

**BPG on CFD of Dispersed Multi-Phase Flows (Prof. R. Oliemans)**

Prof. Oliemans will give an introductory lecture on November 8, 2010 at the 10<sup>th</sup> course on CFD of Multiphase Flows by the Dutch Process Engineering Society, held at Eindhoven University of Technology. The BPG for CFD of Dispersed Multiphase Flows will be distributed as part of the course hand-out. It has been made available for that purpose at a fee of €30 per book.

**BPG 2<sup>ND</sup> Edition (Prof. A. Hutton)**



No progress here at all. We need to nominate someone.

**Action: Prof. Hutton**

**Status BPG on Combustion (Prof. A. Tomboulides)**

After discussions with colleagues and a conference call on September 27, 2010 with the following participants: Luc Vervisch, Michael Pfitzner, Rob Bastiaans, Dirk Roekaerts, Dominique Thevenin, Ananias Tomboulides a decision on the following about the Combustion BPG:

**Structure:**

- Combustion BPG should be more like a *how-to guide* and not like a *turbulent combustion modeling book* as there are several such books.
- should not duplicate what is in the original BPG but only additional topics relevant to combustion modeling: turbulent combustion models and radiative heat transfer.
- designed for people that have some background on CFD and possibly combustion (*PhD students or industry CFD people that use this mostly and would like to know how to do it correctly*).
- Since industry is now using LES we should include substantial part on LES also RANS but not much on DNS
- ToC should be revised and structured based on *problem type*, i.e. ICE engines, Gas Turbines, Furnaces, *fuel type*, as well as *high or low pressure* and not based so much on premixed vs non-premixed etc.
- Since a lot has been learned from sandia-type laboratory flames they should also be summarized so that one can use these for validation before a real application; also laminar (e.g. for small burner manufacturers etc)
- Boundary condition issues, which are more important for laboratory flames (Sandia flames) than for complex systems. Section on inflow generators and how it affects predictions in model flames, which are sensitive.

**Contributions:**

Prof. Luc Vervisch will have the coordination of the Combustion BPG

- 1) Dr. Christian Angelberger from IFP agreed to prepare with his colleagues a chapter on BPG for Internal Engine
- 2) Prof. Janicka in collaboration with Dr. Amsini Sadiki from Darmstadt and Prof. Michael Pfitzner from Munich will contribute their experience with RANS and LES in Validation-type flames as well as in Internal Combustion Engines
- 3) Dr. Laurent Gicquel from CERFACS (Poinsot's group) will contribute a chapter on BPG on Gas turbines.
- 4) Prof. Dirk Roekaerts from Delft in collaboration with Prof. Mancini (Germany) and Prof. Coelho (IST, Lisbon) will contribute to the part of the BPG about radiative heat transfer modeling; description of the available models and general recommendations on how to judge accuracy.

**5 Chair and membership of IPC**

The main issue is how to invigorate further the meetings that we currently have. It is believed that one of the best ways forward is to invite industrial speakers to inform us on their activities and wishes on the role ECOFTAC could play in providing proper knowledge on flow, turbulence and combustion.

**Chair and Deputy Chair Person**

During the MB meeting, taking place in the afternoon of the 12<sup>th</sup> of Oct 2010, it was declared that Dr. P. Geuzaine would be the new chairman, and Prof. R. Oliemans, would be the deputy chairman.

**6. Any Other Business**

None



*European Research Community on Flow,  
Turbulence and Combustion*



**7. Date and location of next IPC**

**Gdansk, Poland, 13<sup>th</sup> of May 2011 (following the Spring festival on May 12).**

Richard Seoud  
London, 3 Nov 2010