

Report of the EUFAR FP7 Gas-Phase Expert Working Group

25th October 2010 – MeteoFrance, Toulouse



Last update on 07/01/2011 by Jim McQuaid

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2. List of attendees

- Attendees:

Name	Institute	Email
Jim McQuaid	University of Leeds	j.b.mcquaid@leeds.ac.uk
Hans Schlager	DLR	hans.schlager@dlr.de
Corinne Jambert	CNRS Laboratoire d'Aerologie	corinne.jambert@aero.obs-mip.fr
Ruth Purvis	NCAS/University of York	rp16@york.ac.uk
Piero Di Carlo	University of L'Aquila	piero.dicarlo@aquila.infn.it
Carl Percival	University of Manchester	carl.percival@manchester.ac.uk
Celine Mari	CNRS Laboratoire d'Aerologie	celine.mari@aero.obs-mip.fr
Frank Holland	Juelich	f.holland@fz-juelich.de
Mark Bart	University of Leeds	m.bart@leeds.ac.uk
Manvendra Dubey	Los Alamos National Laboratory	dubey@lanl.gov

3. Presentations and Visit to the IAGOS Laboratory

3.1. Meeting presentations

The agenda is quite informal, to provide us with a nice opportunity to exchange ideas and thoughts. In the past few years there have been some significant developments in instrumentation and new techniques transferring to airborne platforms. In addition the exciting development of the new German HALO aircraft becoming available quite soon. A number of the group gave short presentations on some new instruments and results.

- Piero Di Carlo (University of L'Aquila): Laser Induce Fluorescence Observation of NO₂, Peroxy Nitrates (PNs), Alkyl Nitrates (ANs) and HNO₃ on the BAE146
- Carl Percival (University of Manchester): Measurements using the new Manchester QCL and CIMS instruments
- Ruth Purvis (NCAS/University of York): Extending the use of FAAM aircraft to provide long term observation project and Aircraft GCMS for terpene measurement
- Hans Schlager (DLR) & Frank Holland (Juelich): New chemical instrumentation under preparation for HALO.

All presentations developed into discussions with ideas being exchanged between the participants.

The presentations are available on the EUFAR website

Celine Mari kindly arranged for a tour of the MOZAIC-IAGOS instruments at the Laboratoire Aerologie after lunch.

3.2. MOZAIC-IGOS Instrumentation Laboratory

Phillipe Nedelec demonstrates the standard IAGOS installation package, this consists of modified commercial Ultraviolet (O_3) and Infrared (CO_2) instruments.



Commercial instrumentation is modified and rebuilt into aircraft certified cases in preparation for installation onto commercial aircraft.



4. Measurements and Traceability.

4.1. UK Chemistry Users Group.

Ruth Purvis is the co-chair of the UK FAAM chemistry working group and suggested that some members of the EUFAR gas-phase EWG might be interested to attend the next FAAM chemistry WG meeting which is expected to be held in early 2011. Jim suggested that it may be possible to gain access to some EWG funds for people to attend. It was also suggested that the meeting could be coupled to a visit to the 146 facility in Cranfield. This would provide members of the group an opportunity to meet and discuss a range of key issues in gas-phase chemistry. Participants were enthusiastic about this opportunity and it further strengthens the gas phase community across Europe. Ruth will forward details of this meeting when time/date/venue is confirmed.

4.2. Potential Proposal for a Joint Research Activity

At the Munich EWG meeting (Summer 2006), a major outcome was the strong desire to have more efforts to traceability of airborne observations. Discussions during the meeting rounded upon the need to address the topic of traceability in our observations. The robustness of observational data which is being used to constrain modern high resolution numerical models is becoming very high on research agency agendas. This proposal will directly address this issue. The pressure to achieve the proposed scientific objectives as defined within the context of funded research programmes can lead to a tendency that intercalibration and measurement comparisons are overlooked as they are viewed as supporting the mission goals. It is relatively rare that published output results from measurement tests in their own right. Whilst instrument operators are generally very keen, there can be some reliance upon historical work to underpin the reliability of the measurements, however, more often than not instruments are installed onto research aircraft for short periods of time. This leads to the potential for changes in signal resolution and sensitivity between installations. Instrument improvements which often result between airborne missions can lead to changes in these parameters also. In recent times, with more parallel observations becoming available between aircraft more emphasis has been placed upon measurement comparison as demonstrated in a number of recent projects including EUCAARI. It was suggested that this might be a proposal to EUFAR as a Joint Research Activity (JRA). Jean-Louis provided some information to assist this idea. In the first instance a short proposal outline is required to be submitted to EUFAR HQ before the end of the year. This would not commit anyone to anything, but is the first step in the process to apply for EUFAR support. http://www.eufar.net/management/JRA/general_JRA.html

The proposal is that a mobile unit be assembled, and that this be capable of performing a number of functions by which airborne observations can be supported. Transporting primary gas standards (eg, carbon dioxide, carbon monoxide, methane, nitric oxide/nitrogen dioxide) and primary calibration sources (e.g. ozone photometer). It is envisaged that a high flow reduced pressure be constructed to permit inlet testing. Of course side by side flights will still be a major part of the whole

testing procedure, but these need to be underpinned by more basic “baseline” measurements on the ground as detailed here.

Currently there is a new activity to replace EUSAAR – (European Supersites for Atmospheric Aerosol Research - <http://www.eusaar.net/>) which was more focussed to aerosols. **ACTRIS (FP7 - Aerosols, Clouds, and Trace gases Research Infrastructure Network)** will be a combination of Collaborative Projects and Coordination and Support Actions for Integrating Activities. We propose to use this network as a model to assist our development of the structure of our activity. There is also considerable scope to work together with this network, many airborne research activities include overflights of ground sites so there is a very clear benefit from this collaboration. Zero gas and dilution systems will allow the ultimate detection limits to be ascertained, details of instrument operational constraints (e.g. step functions, time constants, sample integration time) will also be determined. Another funding avenue that could be exploited is the **EMRP European Metrology Research Programme**. (<http://www.emrponline.eu/>)

Initial test gases

This focus in the initial stages will be the stable gas phase species and then proceed to more challenging compounds.

Stage 1: Ozone, carbon monoxide, carbon dioxide, methane, nitric oxide and nitrogen dioxide, selected volatile organic compounds (VOC), sulphur dioxide and water.

Stage 2: Ammonia, formaldehyde, glyoxyl, peroxyacetyl nitrate, oxygenated volatile organic compounds (OVOC), nitric acid and HOx radicals

Action 1: Preparation of JRA proposal – “Traceability in Gas Phase Observations in the EUFAR fleet”

Responsible: Jim McQuaid and others

Deadline: End of 2010

Deliverable number: as indicated in the contract

5. Conclusion

The meeting provided an ideal platform for European scientists to exchange ideas and update one another upon recent developments such as a new LIF system, in-flight GC-MS for biogenic VOCs, ground based/laboratory techniques being transferred to airborne platforms (CIMS & QCL) as well as exploitation of long term datasets collected by the UK ARA aircraft and also the new platform, HALO, and associated new instrumentation. Unfortunately the number of participants was quite low but those in attendance all took part enthusiastically in discussions and were very supportive of the formulation of a JRA proposal.