Report of the

EUFAR FP7

Polar Research Expert working group

23 November 2012 – Cambridge

Last update on 14/05/12 by TLC

1. Table of contents

2. List of attendees

- **Attendees:**

Phil Brown - UKMO
Guy Gratton - FAAM
Philip Goy - ARSF
David Davies - ARSF
James Johnson - ARSF
Dr Gary Llewellyn - ARSF
Jorg Hartmann - AWI
André Ehrilich - University of Leipzig
Daniel Steinhage - AWI
Tom Lachlan-Cope - BAS
Alex Weiss- BAS
Russ Ladkin- BAS
Rod Arnold- BAS
Mike Dinn- BAS
Hugh Corr- BAS
Carl Robinson- BAS
Amélie Kirchgaessner- BAS

UKMO – UK Met Office
FAAM – Facility for Airborne Atmospheric Measurements (NERC)
ARSF – Airborne Research and Survey Facilty (NERC)
AWI - Alfred Wegener Institute
BAS – British Antarctic Survey (NERC)

- **Excused:**

3. Introduction from each group

3.1. AWI

The Alfred Wegener Institute operates an instrumented Basler in both the Arctic and Antarctic. It has recently purchased a second Basler and this should give them more flexibility to work on both the Arctic and Antarctic. Both Baslers are ski equipped.

3.2. ARSF

The Airborne Research and Survey Facilty (part of NERC) operate a Dornier 228. This aircraft has not been modified to allow skis to be fitted but has been used from runways in Northern Norway and Svalbard. The aircraft is fitted with a full waveform lidar and hyperspectral cameras and has some atmospheric instrumentation.

3.3. FAAM

The Facility for Airborne Atmospheric Measurements is a joint facility shared between the UK Met Office and the Natural Environment Research Council. It operates a BAe 146 that has been heavily modified to take a wide range of atmospheric instruments. At the moment it cannot operate north of 80°N in the European sector (it has even worse restrictions over North America) although it hoped that upgrades in the navigation equipment will soon remove this restriction. The BAe 146 does not have skis and is restricted to reasonably large airfields.

3.4.BAS

The British Antarctic Survey (part of NERC) operates four ski equipped Twin Otters and a Dash 7. One of the Twin Otters has an atmospheric fit – including turbulence and cloud probes and a second is fitted with geophysics instruments including ice radar, gravimeter and magnetometer. The Dash 7 can also be fitted with gravimeter and magnetometer if needed. All the BAS aircraft have logistics role as well as an airborne science role and so the instruments are only fitted when needed.

4. Polar Operations

4.1. Arctic

A case study from the AWI

The BASLER of the Alfred Wegener Institute spends the Antarctic summer in the Southern Hemisphere and then normally comes North in March for maintenance in Canada. Survey in the Arctic in April – June and June – July with a period at the end of June and beginning of July reserved for more maintenance. During survey in the Arctic and during the ferry flight from Antarctica and between survey locations the aircraft can be fully equipped with instruments allowing all possible opportunities to collect data to be taken.

The BASLER flies around 800hrs per year (including both the Arctic and the Antarctic) and has the ability to land and pick up fuel from floating ice stations.

4.2. Antarctic

A BAS case study

A PowerPoint presentation of the 2010/11 BAS season in Antarctica is included as Annex 1. This season had two campaigns using the atmospheric fit on the Twin Otter one looking at sea ice and the other at large scale flow across the Antarctic Peninsula.

5. Special instrument fits

5.1. Geophysics

One of the BAS Twin Otters is fitted with hard points on the wings so a series of four folded dipoles can be fitted to each wing for use with an ice radar. This instrument is used, in conjunction with a gravimeter and magnetometer (fitted in a pod on the wing tip) to probe the inland ice cap of Antarctica. This is an instrument fit that has been developed for Antarctica but could have applications over the smaller Arctic ice caps. The BAS aircraft have also been fitted with hyperspectral imaging cameras for occasional campaigns (see 5.2 for more on hyperspectral imaging).

5.2. Hyperspectral imaging

ARSF have a modified Dornier 228 with a large camera hatch built into the floor of the cabin. This means that it is able to easily fitted with a wide range of optical instruments. The hatch has a roller shutter to prevent damage during takeoff and landing. ARSF normally operate the aircraft fitted with Eagle and Hawk hyperspectral Cameras and a Leica full waveform scanning lidar. The aircraft also has the capability to carry cloud and aerosol instruments. ARSF have conducted several campaigns in Northern Norway and Svalbard.

6. Other projects

6.1. SoRPIC 2010

André Ehrilich from Lipzig university gave a short presentation on SoRPIC 2010 see http://www.uni-leipzig.de/~sorpic/

7. General discussion -

7.1. EUFAR/funding

Phil Brown led a discussion on EUFAR and funding obtainable from EUFAR. Transnational Access has provided relatively small amounts of money to fund flying hours both in the Arctic and the Antarctic. These flying hours have tended to be attached to existing field campaigns – although the flying has to be for distinct project and is provided so that counties without instrumented aircraft can access the aircraft of countries that do. This is seen as an excellent method of getting more countries involved with polar atmospheric research.

The proposed Open Access scheme would extend the user base of the polar aircraft. However this scheme would not provide direct funding for flight hours but would encourage an exchange of resources in kind.

It was felt that both these schemes would provide a useful method to make the polar aircraft available to more countries within Europe.

7.2. Terms of reference

- To promote collaboration between polar scientist.
- To encourage new users to gain access to polar programmes.
- To document existing capability and identify gaps and future demands.

8. Conclusion

It was felt that the meeting was very useful. It was good forum for operators of polar aircraft to exchange information. It was felt that should be repeated. If possible, funding allowing, this next meeting should be hosted by the Alfred Wegener Institute.

It was recognized that the number of operators of instrumented polar aircraft was rather small. It was felt that although we had probably identified the major players (BAS and AWI) there were likely to be several other operators in Europe that did some polar work, for example DLR or DTU. Also it had not been possible to identify many of the user groups and they are at the moment under represented within the expert group. It was felt that a major use of this group should be to help users gain access to polar aircraft and that it was important in the future to identify potential users.

9. Annexes (if applicable)

All annexes are available either in this report or at www.eufar.net

ANNEXES SUMMARY:

ANNEX I: Presentation on BAS activity during 2010/11 season

ANNEX I:

Power point presentation from British Antarctic Survey.

ANNEX II: