

APPROACHES TO TRANSNATIONAL ACCESS FOR AIRBORNE PLATFORMS: EUFAR AND THE UNITED STATES

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ABSTRACT:

About 30-instrumented aircraft are operated in Europe for research in the geosciences (EUFAR). In the United States the federal agencies operate less than 40 aircraft dedicated to airborne science (ICCAGRA). While there are certain commonalities for access to research aircraft between European and US scientists, there are major differences. In Europe, access to national facilities is easier than that to aircraft operated in another European country. In the United States the primary federal agencies that operate research aircraft, NASA, NOAA, NSF and DOE, have specific mandates that constrain access between agencies by scientists. This paper will discuss constraints to transnational access in each organization and also suggest procedures that could improve access within each organization and eventually between the two organizations.

1. EUFAR

The European Facility for Airborne Research (EUFAR) is an integrating activity of the European Commission DG Research. The primary objectives of EUFAR are:

- To develop trans-national access to national infrastructures
- To reduce redundancy and fill the gaps
- To improve the service by strengthening expertise through exchange of knowledge, development of standards and protocols, constitution of data bases, and joint instrumental research activities
- To promote the use of airborne research infrastructures, especially for young scientists from countries where such facilities are lacking.

With the support of the European Commission, EUFAR allocates access to 19-instrumented aircraft. These research platforms range from a small low and slow flying single engine airplane (an ENDURO operated by Univ. Kerrie in Germany) to a 4-engine turbo jet (BAe 146 operated by a UK consortium). Aircraft platforms are provided by six of the EUFAR country members: Germany, France, United Kingdom, Spain, Netherlands and Italy.

EUFAR supported Trans-national access, however, represents less than 10 % of the overall activities of all European operators.

In addition to Transnational Access allocation, EUFAR has 20 working groups, 7 support technical issues specific to airborne instrumentation (e.g., certification/operation) and 13

measurement fields (e.g., cloud microphysics). EUFAR also includes a major education and training program to assist new researchers.

For Transnational Access activities, proposals are reviewed and approximately 540 flight hours will be awarded. The funding includes the flight hours as well as scientific and engineering support required for planning of the field campaign, data analysis as well as travel and subsistence allowance.

EUFAR is planning for the acquisition, modification and instrumentation of a heavy lift platform, tentatively planned as a C-130 class aircraft.

2. ICCAGRA

In the late 1990s several US agencies that operate research aircraft formed the *Interagency Coordinating Committee for Airborne Geoscience Research and Applications* (ICCAGRA).

A charter was drafted and approved by four major agencies that operate research aircraft. The original members were NASA, NOAA, NSF and Office of Naval Research (ONR). Additional agencies were invited to join the original four as the committee evolved.

ICCAGRA was established to improve cooperation, foster awareness, facilitate communication among the partner agencies and serve as a resource to management on airborne science issues. The committee addresses collaboration and cooperation on the use of airborne platforms and instruments in interagency and international field campaigns.

The primary purpose of ICCAGRA is to increase the effective utilization of the federal airborne science research fleet.

To do so the committee will, in part:

- Identify interagency needs and exchange research program schedules
- Improve coordination of airborne programs between agencies
- Enhance opportunities for the interagency sharing of aircraft resources, instrumentation and data to minimize duplication and to expand science investigators' access to interagency assets
- Evaluate coordination processes and develop interagency agreements to facilitate the transfer of airborne platforms or the purchase of reimbursable or cooperative flight time between cooperating agencies
- Convene a program review where all participating agency representatives present a review of airborne programs and plans to agency personnel.

ICCAGRA typically meets twice a year, but can meet more often if necessary. It has taken a number of years before the specific elements of the charter began to be successfully implemented. There was, and there remains, considerable institutional resistance to sharing of resources and instruments between agencies. This state of affairs is largely due to the specific missions of the different agencies and how they can respond to another agencies need.

3. EUFAR and ICCAGRA

As the above brief descriptions of EUFAR and ICCAGRA suggest the two organizations have many similar objectives and that greater communication or coordination between the two is warranted. Consequently several years ago an ICCAGRA representative attended EUFAR meetings and the EUFAR coordinator began participating in ICCAGRA meetings. The logical outgrowth of this enhanced coordination led to the establishment of our new working group in ISPRS, *Standardization of Airborne Platform Interface*, a working group that consists of 11 subgroups, including transnational access (subgroup 7).

4. AIRCRAFT RESEARCH INFRASTRUCTURE in EUROPE

Unlike very large research infrastructures (RIs) such as ESA for satellites and CERN for particle physics, European medium size RIs, like instrumented aircraft, have been developed and are operated at the national level. In each country, their operation rely on a triangle constituted of national research funding institutions (NRFIs), scientific programs (SP) and the RI operators. In the most common scheme, NRFIs directly support the fixed costs of the RIs and provision funding in the scientific programs for the variables costs. The fraction of direct versus indirect support may vary among countries but the basic principles remain the same. Scientists from national research organizations contributing to the fixed costs of the RIs are entitled to submit research proposals to the scientific programs in order to get the complement necessary for the performance of their field project, also referred to as the additional or variable cost.

Scientists from other research organizations or other countries may apply for access to the RIs but they have to raise a much larger amount of funding corresponding to the total cost of the RI operation (sum of the direct and indirect national funding contributions). Their scientific programs, commonly supporting additional costs only, are not provisioned to support such high funding request.

In summary, RIs are formally open to all researchers at the international level, but it is much easier to raise funding for access to a national facility (additional costs only) than to a facility operated in another country (full cost). That also implies that researchers from countries where there are no research aircraft available can hardly develop airborne field programs.

A unified management of European RIs will likely be developed in the medium term, but in the meantime researchers and RIs operators shall act for facilitating open access in the current framework. Associations of RIs, research vessels for instance, have implemented schemes to barter access between vessels. The scheme is now operational but it does not solve the issue for researcher from countries with no RIs to barter.

A more general scheme could be implemented in which countries with no RI, hence no operation costs, might contribute in kind to the existing ones by detaching scientific personnel, hence gaining access for their researchers. This scheme has two merits. It will allow new researchers to access top level infrastructures, and it will facilitate the transfer of knowledge by training scientific personnel in the operation of such RIs.

5. AIRCRAFT RESEARCH INFRASTRUCTURE IN THE UNITED STATES OF AMERICA

Within the United States almost all of the civilian executive agencies operate aircraft, approximately 1,400 in all. Of these, however, only a small number is engaged in airborne or environmental research. Agencies such as NASA, NOAA, the Department of Energy, Department of the Interior, and the NSF operate highly modified aircraft. The agencies operate a broad range of aircraft types, from King Airs to high altitude ER-2s to heavy load aircraft such as a DC-8, P-3 and C-130 (Figure 1).



Figure 1. NSF C-130Q operated and maintained for NSF by the National Center for Atmospheric Research (NCAR)

The primary constraint to providing access for researchers within the United States is that each agency has specific mandates that often preclude access. For example, NOAA has the responsibility for hurricane surveillance and consequently its two P-3 aircraft and its Gulfstream IV SP are allocated for hurricane reconnaissance from June – November. NASA's aircraft are mission oriented with their two primary responsibilities to provide calibration and validation measurements for satellite missions and to engage in specific process studies. NSF's aircraft serve the university community and the allocation of research aircraft is based upon a merit review of science proposals that cover the full spectrum of atmospheric and environmental inquiries. DOE and DOI likewise must respond to their agency needs and this limits the broad based access to airborne facilities by investigators.

Under the terms of the ICCAGRA charter the institutional barriers to access across agency boundaries are beginning to be minimized. Standardization of instrument interface and procedures are helping to improve access across agency boundaries. For example, researchers can now have an easier time having instruments integrated on different agency aircraft. Agencies are also more interested in collaborating on the use of their airborne assets across agency boundaries. Over the last several years Congress and the Office of Management and Budget have encouraged this approach.

While progress has been made and is being made daily there remains much to be done. Several suggestions have been made to use the US research fleet more effectively. One of these suggestions is to have a centralized scheduling office consisting of representatives of the different agencies. While this approach has some merit there would be many complications to work out, such as priorities and funding. Another suggestion has been made to consolidate the research fleet, a suggestion that may have merit on the surface but would be extremely difficult to implement. Nevertheless, it is clear that the agencies must continue to collaborate and make their airborne assets more available to the broader research community; much like EUFAR attempts to do.

6. CONCLUSION

Collaboration and transnational access between EUFAR and ICCAGRA members is more problematic than what exists for each organization. There is a suite of political and fiscal issues that would have to be resolved. However, the two organizations are making some progress, as indicated by the eleven subgroups in this Working Group. The future is encouraging.