

IFAR – International Forum for Aviation Research

Joachim Szodruch¹,
Richard Degenhardt²

German Aerospace Center (DLR)
¹10117 Berlin and ²38108 Brunswick
E-mail: joachim.szodruch@dlr.de

ABSTRACT

The future challenges of air transport motivated in 2010 the leading worldwide aviation research institutions to found IFAR - the International Forum for Aviation Research - which is working on a voluntary, non-binding basis. The primary purpose of IFAR is to connect research organisations worldwide, to enable the information exchange on aviation research activities between members, to facilitate opportunities for networking and creating partnerships and to coordinate views and make recommendations for use by its members. Climate change is currently one of the most relevant topic and was the initial motivation to set up IFAR. However, the focus of IFAR is on all non-competitive research and development topics related to global technical challenges such as those pertaining to emission, noise, security, safety and efficient operations, and steps to reduce the impact of aviation on climate and the environment. Against this background, IFAR aims at developing a regularly updated IFAR Framework Document outlining global research objectives and technological opportunities for use by its members. The results will be updated regularly at the website www.ifar.aero.

From the beginning, the IFAR activities were supported by the IFAR secretariat which was established and financed by DLR. From mid 2011 the IFAR administration and the IFAR activities are also supported by the 3-year Support-Action-Project IFARs funded by the European

Commission. After mid 2014 IFAR is expected and will be self organised without any further external support.

STATE OF THE ART / BACKGROUND

The increasing need for international mobility in a globalised, work-sharing based economy leads to a worldwide growth in air traffic by about 5% per year. This is the basis for economical growth but has an influence also on the climate change which is currently discussed worldwide by scientists, decision-makers and the public. The 4th Assessment Report of the Intergovernmental Panel on Climate Change (IPCC) has stirred an intensive public debate also on future aeronautical research challenges and policies. This report identifies aviation to contribute 2–3% of today's total global anthropogenic CO₂ emissions. This prompted the International Air Transport Association (IATA) to set the long-term challenge of Zero Emission Aviation by 2050 and emphasised the importance of addressing these challenges on a global level. The answers and solutions to these demands are expected to be given by research, eventually industry and operators. Except Member States or regional networks (e.g. ACARE local or EREA in Europe), specifically non-profit aviation research organisations were up to 2010 not organised on a worldwide level and did not have a representation which can react to global questions and demands. The new International Forum for Aviation Research (IFAR) fills this gap.

OBJECTIVES AND RESULTS

IFAR aims to realise the following activities (cf. Figure 1):

- connecting the global aviation research community worldwide;
- Serving as a venue for information exchange and communication, e.g.

by its Summits, by conducting specialist meetings, holding workshops, supporting actively conferences, hosting internet forums, etc.;

- Developing among its members a shared understanding on a common set of key challenges faced by the global aviation research community;
- Developing views and recommendations, e.g. the IFAR Framework Document, to inform on future research strategies and – where appropriate – to develop a combined research strategy for the future;
- Publishing and disseminating information (e.g. via webpage, flyers, publications, participation to conferences);
- Issuing IFAR views and recommendations and give advice on aviation topics; the purpose of issuing such views and recommendations is to define trends in aeronautics research and/or inform legislators concerning emerging regulations; however, views and recommendations are not meant as binding guidance to individual IFAR members and their home country.

Within IFAR, the members aim also to identify and evaluate options for new opportunities for cooperation and applying the results of aviation research.

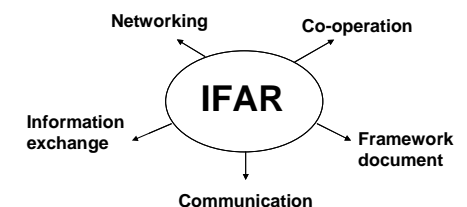


Figure 1 IFAR objectives

IFAR ORGANISATION / MEMBERS

IFAR operates on the basis of consensus among its members. Annually, principals from IFAR members convene at an IFAR Summit meeting. This event sets the

IFAR goals and activities for the coming year and may establish special temporary committees or technical expert groups for IFAR activities of high interest.

Membership in IFAR is open to national aviation research organisations, including universities active in aviation research, which are non-profit and which are owned or mainly publicly funded by governments and which are charged by the country or countries in which they are located to conduct such research activities on their behalf. One organisation per country is accepted for membership.

Current IFAR members are listed in Table 1 and are visualised in Figure 2. These members represent more than 34,000 researchers working in mostly civil aviation. Not counted yet are researchers of IFAR member countries belonging to different research organisations or universities. However, the ultimate aim is that IFAR members represent their countries entire research workforce.



Figure 2 IFAR Member countries

IFAR HISTORY

The Forth Assessment Report of the International Panel on Climate Change (IPCC) has stirred an intensive public debate on future aeronautical research challenges and policies. As a response, in 2008 key leaders of 12 international aeronautical research organisations met in Berlin to address challenges to future Air Transport in the context of climate change. The second time, in 2010, 16 international aeronautical research organisations met and

founded the International Forum for Aviation Research (IFAR) in order to take up work on possible research contributions to the climate and environmental challenges faced by the air transport community and with a view to also address further global aeronautical challenges such as noise, security, safety and efficient operations. In 2011, the 2nd IFAR Summit was held in Paris. The number of IFAR members increased to 21. The participants agreed to a common IFAR Charter. They exchanged their views on the global challenges and agreed to develop the Framework document on the technological solutions related to climate impact and noise. Furthermore they started activities on education by promoting and the exchange of graduate students, young scientists and engineers. The next IFAR Summit 2012 will take place in Japan. The IFAR Summits are planned to be regularly every year.

IFAR FRAMEWORK

IFAR aims at developing and maintaining a regularly updated IFAR Framework Document outlining global research objectives and technological opportunities for use by its members. The Framework follows a 3-Step-Approach illustrated in Figure 3. *Step 1* builds the vision and goals which are for instance influenced by political demands. *Step 2* considers new and visionary break - through technologies which are expected to fulfil the IFAR vision in *Step 1* and which eventually improve the entire Air Transport System (ATS) in *Step 3*. Technologies in this regard are not only software or hardware but can also be improved operations or measures. IFAR - as research representation - concentrates on the development of the technologies until Technology Readiness Level (TRL) 6. Further qualification and development is expected to be performed by industry. The new technologies do not need necessarily

to be developed only within the aviation sector. They can also be transferred from other industrial sectors as automotive, space, energy, etc.. Alternative fuels, which might be needed for the future ATS to fulfil the long-term vision can be complementary developed in the energy research sector. Co-operation and research activities across branches and disciplines seem beneficial and mandatory.

The Framework Document may be based on:

- a comparison of existing goals/objectives (cf. [2] to [7]);
- an inventory of possible concepts or technologies which could be developed to accomplish certain objectives.

IFAR can also develop other views and recommendations, findings and reports as may be appropriate. Such documents may include the findings of IFAR Ad Hoc Committees or IFAR Technical Expert Groups.

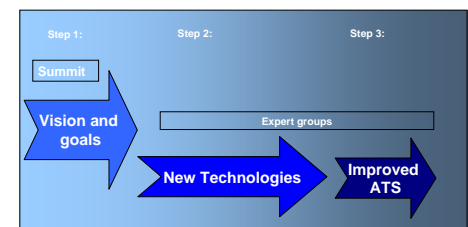


Figure 3 IFAR 3-Step Approach

SUMMARY

IFAR is a new International Forum for Aviation Research and was founded in 2010. It connects leading aerospace research organisations worldwide, enables information exchange between them, facilitates opportunities for networking and creating partnerships, coordinates views, makes recommendations and supports students and young scientist/engineers. IFAR focuses on non-competitive topics related to global technical challenges such as those pertaining to emission, noise, security, safety and efficient operations, and steps to reduce the impact of aviation on climate and

the environment. IFAR develops a regularly updated Framework Document outlining global research objectives and technological opportunities. The IFAR activities are supported by the IFAR secretariat which was established and financed by DLR. From mid 2011 the IFAR secretariat is also supported by the 3-year EU-project IFARs. After mid 2014 IFAR is expected to be self organised without any external support.

Table 1 IFAR Members

	Organisation name	Country
1	Commonwealth Scientific and Industrial Research Organisation	Australia
2	Budapest University of Technology and Economics	Hungary
3	Central Aerohydrodynamics Institute of Russia (TsAGI)	Russia
4	Centro Italiano Ricerche Aerospaziali (CIRA)	Italy
5	Chinese Aeronautical Establishment (CAE)	China
6	Czech VZLU-Aeronautical Research and Test Institute	Czech Republic
7	French Aerospace Lab (ONERA)	France
8	German Aerospace Center (DLR)	Germany
9	CSIR-National Aerospace Laboratories (CSIR-NAL)	India
10	Institute for Aerospace Research (NRC)	Canada
11	Japan Aerospace Exploration Agency (JAXA)	Japan
12	Korea Aerospace Research Institute (KARI)	Korea
13	Middle East Technical University (METU) Ankara	Turkey
14	National Aerospace Laboratory of the Netherlands (NLR)	Netherlands
15	National Institute of Aerospace Research “Elie Carafoli” of Romania (INCAS)	Romania
16	National Institute of Aerospace Technology of Spain (INTA)	Spain
17	Polish Institute of Aviation (ILOT)	Poland
18	Technical Research Centre of Finland (VTT)	Finland
19	The Swedish Defence Research Agency (FOI)	Sweden
20	U.S. National Aeronautics and Space Administration (NASA)	USA
21	von Karman Institute for Fluid Dynamics (VKI)	Belgium

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