

AERONET

The European Thematic Network on Aircraft Emissions and Reduction Technologies

Global commerce and the mobility of private persons are based on a well functioning air transportation system. Beside this increasing demand air transportation has to limit its impact on the atmosphere and its contribution to the predicted global warming. Information exchange and permanent dialogue among the stakeholders in aviation and with the atmospheric scientists supports the necessary strategic decisions to guarantee its sustainable development. AERONET has been established to serve this purpose in Europe and has demonstrated its successful working.

AERONET is a Thematic Network of the European Commission under DG XII Science, Research and Development in the 4th Framework Industrial and Materials Technologies, Aeronautics Programme. The project was started on August 1, 1997, and will continue until the end of the year 2000. Based on the experiences and success of the first AERONET project, AERONET II has begun as a follow-on project under RFP 5 Aeronautics Programme for another three years from January 2001. Working area of AERONET is the contribution of air traffic emissions to anthropogenic climate and atmospheric changes.

Background

Civil aviation plays a central role in the global economy, in commerce and in private travel. As such, it has developed particularly over the last 30 years – since the broad introduction of jet engines to an integral part of the infrastructure of today's society. And the demand for air travel is predicted to grow continuously by about 4 % to 5 % per year over the next 10 to 15 years with emissions of CO₂ from aviation predicted to grow annually by 3%. The civil aircraft industry, including aircraft and engine manufacturers, operators, fuel suppliers, airports, and air navigation providers, has a keen interest to ensure that its products are environmentally acceptable. In view of the long development times and high investments for new technologies, industry needs early information on possible changes in regulations and demand for technology acquisition. Moreover, it needs to understand the environmental and technical background in order to indicate as early as possible suitable technical regulation strategies to various regulatory and certification organisations. These developments make it necessary for all involved to communicate and co-ordinate their activities in the best possible way.

Objectives and Benefits

For this reason, the AERONET Thematic Network has been created as a platform where all the stakeholder communities can meet, exchange information, views and experiences gathered in different EC projects and national programmes. The intention is to

- raise the level of confidence among the communities,
- bring together experts from aircraft and engine technology, atmospheric research and operations as well as programme responsables to exchange knowledge and opinions, and to discuss necessary future actions on the basis of jointly defined goals and time scales,
- produce competitive advantage for Europe through enhanced information exchange in the field of atmospheric effects of air traffic emissions,
- identify gaps of knowledge and help prepare a co-ordinated submission of proposals
- support the Commission in identifying topics for the Framework Research Programmes and
- strengthen the body of European expertise supporting a co-ordinated approach to global policy and regulations activities in the political arena.

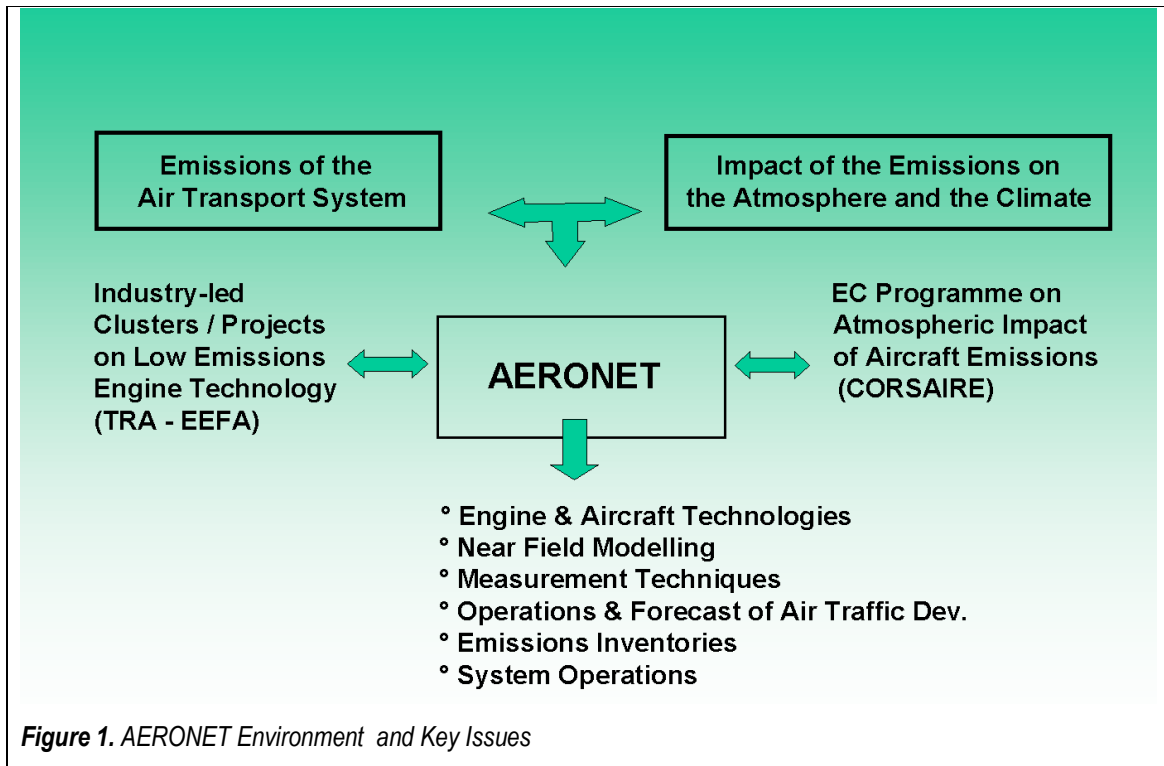
Joint actions, such as

- Thematic Meetings for information exchange and discussion with broad inter-disciplinary participation
- Dedicated Workshops with internal and external experts
- Studies and Working Papers
- Plenary Meetings and Open Scientific Seminars as well as
- Printed and electronic information

help to achieve these objectives.

Organisation

The AERONET project was introduced alongside an existing framework of environmental research and aeronautical RTD programmes and projects and has established an effective link between both.



Internally, the project is co-ordinated through the AERONET Management Team (AMT) consisting of experts from five Aeronautical Research Centres in Europe, DLR, in Germany, as Scientific Co-ordinator and Project Manager, DERA, UK, ONERA, France (AERONET I), NLR, The Netherlands, and FFA, Sweden. Particular members of the AMT are, at the same time, responsible for each of the three Work Packages, namely, Aircraft and Engine Technology Aspects of Emission Reduction, Fleet Emissions and Operational Technology Aspects of Emission Reduction, and Environmental Balance in the Air Transport System.

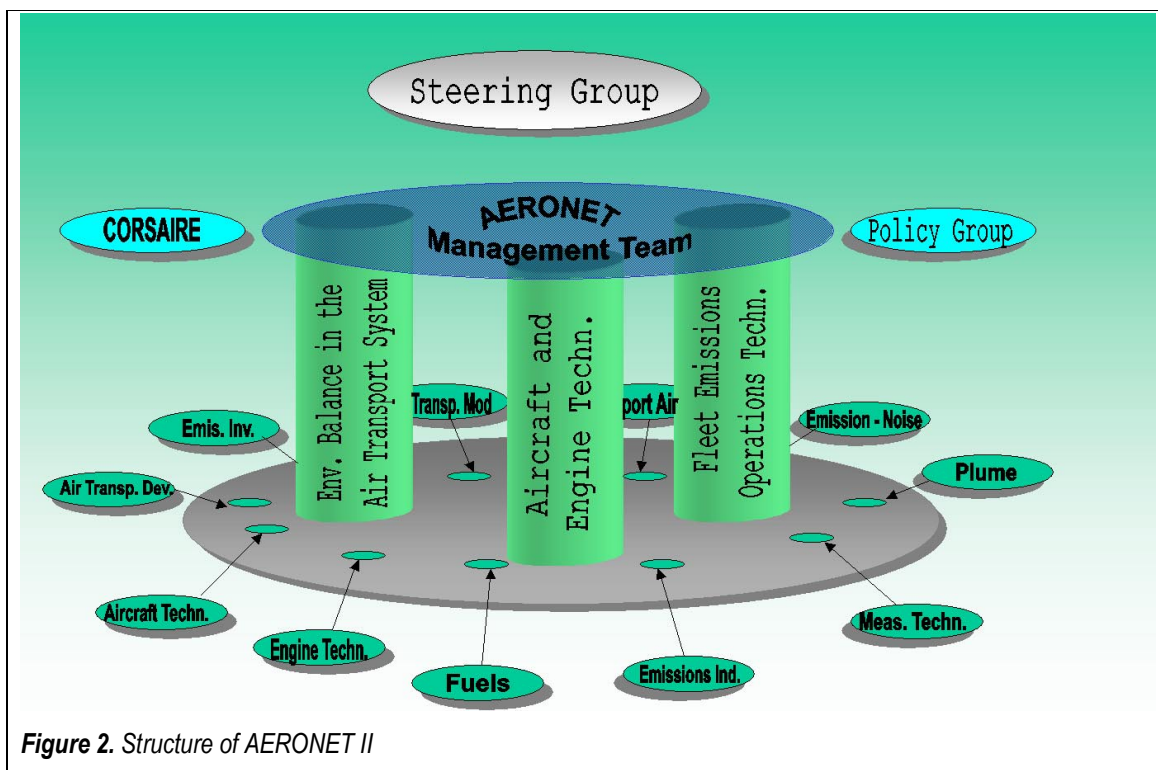


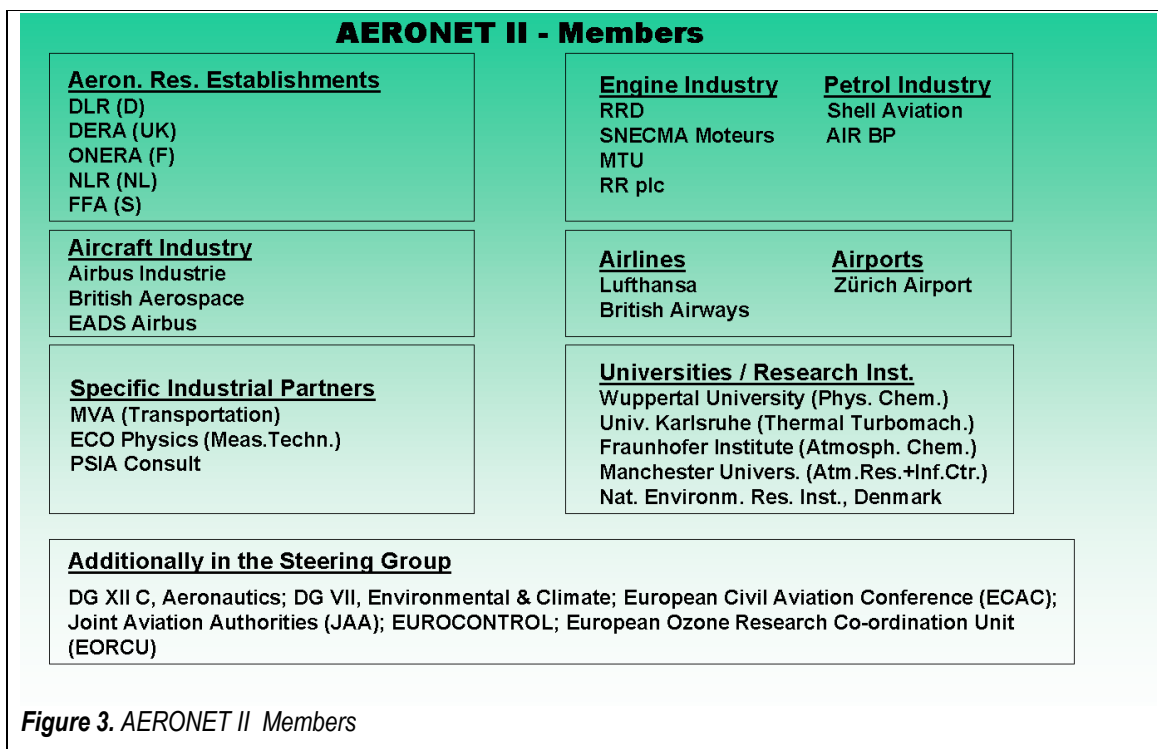
Figure 2. Structure of AERONET II

A formalised and permanent link has been established to the Atmospheric Science programme CORSAIRE, through the representation and participation of the European Ozone Research Co-ordination Unit (EORCU) in the AMT. A similar link will be established into the political arena (as ICAO/CAEP and ECAC) through governmental representatives in the so called Policy Group.

The full and latest scientific/technical knowledge in all aspects of the air transport system can be made available through nominated Points of Contact in the 12 established Thematic Areas (TA 1: Aircraft Technology / TA 2 Engine Technology / TA 3 Fuels / TA 4 Emissions Indices / TA 5 Measurement Technology / TA 6 Aircraft Plumes / TA 7 Emissions - Noise Interactions / TA 8 Air Traffic Management / TA 9 Air Transport Development / TA 10 Emissions Inventories / TA 11 Air Transport System Interaction Models / TA 12 Local Airport Air Quality). They will be involved in the planning and execution of all activities thus guaranteeing a high level of competence and maximum benefit for all members.

The AMT reports to the Steering Group in which the EC is represented through the scientific officer of the project and his counterpart for the related atmospheric research. Further major stakeholders are represented through high-level experts from engine and aircraft industry and airlines, the aeronautical and atmospheric research, air traffic control and regulatory bodies of involved nations.

22 partners from 8 European countries are members in AERONET and 25 in AERONET II, some further organisations have been involved additionally as members of the Steering Group as can be seen in the subsequent table.



Results

Experiences thus far have confirmed that economical, ecological and community benefits can be achieved through the work in AERONET:

- Close links among the partners helped to strengthen the European aviation sector in its common understanding of the wide range of issues and encouraged their co-operation and collaboration thus leading to targeted R&D for faster reduction of emissions.
- The project supported European actions towards a well-balanced and sustainable air transportation system as a critical and integral part in a global market and world wide mobility of individuals.
- AERONET has been welcomed and actively used by the partners, providing as it does, the only platform in Europe for the different stakeholders to meet, communicate and co-operate in an organised and systematic way on subjects needing a comprehensive view and the consideration of a broad variety of technical, economical, environmental and social aspects.

The following list of working papers gives an impression on the kind of activities performed in AERONET so far:

- Engine Cycle Study on CO₂ / NO_x Balance
- Aircraft Weight and Drag
- Fuel Quality and Composition
- Air Transport System Development and ATM developments
- Development of a self-consistent Measurement Strategy

- In-flight Studies of Aircraft Exhaust Products
- Harmonisation of European Emissions Inventories
- Green Flight-Environmentally Friendly Flight Operations and Route Networking (Draft)
- Engine Exhaust Modelling in the Near Field (Draft)

The EC FP5 projects CYPRESS (Cycle Prediction and Emissions Study), PARTEMIS (Measurements and Predictions of the Aerosols and Particles from Aircraft Engines) and AERO2K (Global Aircraft Emissions Data Project for Climate Impact Evaluation) arose from AERONET discussions and studies.

This work will be continued and even intensified during the three years to come in the AERONET II project.

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