ALFA-BIRD

Alternative Fuels and Biofuels for Aircraft Development

**Funding:** European (7th RTD Framework Programme)

**Duration:** Jul 2008 - Jun 2012

**Status:** Complete with results

**Total project cost:** €9,762,582

**EU contribution:** €6,822,685

**Call for proposal:** FP7-AAT-2007-RTD-1

**CORDIS RCN:** 88864

**Background & policy context:**

ALFA-BIRD (Alternative Fuels and Biofuels for Aircraft Development) is a project co-funded by the EU in the 7th Framework Programme for Research and Technological Development, started in July 2008. ALFA-BIRD is an R&D project aiming at viable technical solutions. Its objective is to investigate and develop a variety of alternative fuels for the use in aeronautics, motivated by the need to ensure a sustainable growth of the civil aviation, regarding the impact of fossil fuels on climate change, and in the context of oil prices that are highly volatile and increasing in the long term.

The main challenge in the project work is developing fuels that meet the very strict operational constrains in aviation (e.g. flight in very cold conditions), and are compatible with current civil aircraft, which is a must due to their long lifetime of almost 50 years. To address this challenge, ALFA-BIRD gathers a multi-disciplinary consortium with key industrial partners from aeronautics (engine manufacturers, aircraft manufacturers) and fuel industry, and research organizations covering a large spectrum of expertise in fields of biochemistry, combustion as well as industrial safety. Bringing together their knowledge, the consortium will develop the whole chain for clean alternative fuels for aviation. The most promising solutions will be examined during the project, from classical ones (plant oils, synthetic fuels) to the most innovative, such as new organic molecules. Based on a first selection of the most relevant alternative fuels, a detailed analysis of 4 new fuels is performed with tests in realistic conditions.

**Objectives:**

ALFA-BIRD aims at developing the use of alternative fuels in aeronautics. In a context where the price of oil is increasing and with impact of fossil fuels on climate change, the sustainable growth of the civil aviation is conditioned by the respect of the environment. In this context, using biofuels and alternative fuels in aeronautics is a great challenge, since the operational constraints (e.g. flight in very cold conditions) are very strict, and due to the long lifetime of current civil aircraft (almost 50 years).

To address this challenge, ALFA-BIRD gathers a multi-disciplinary consortium with key industrial partners from aeronautics (engine manufacturers, aircraft manufacturers) and fuel industry, and research organisation covering a large spectrum of expertise in the fields of aeronautics, biochemistry, combustion as well as industrial safety. Bringing together their knowledge, the consortium will develop the whole chain for clean alternative fuels for aviation.

**Methodology:**

The consortium will develop the whole chain for clean alternative fuels for aviation. The most promising solutions will be examined during the project, from classical ones (plant oils, synthetic fuels) to the most innovative, such as new organic molecules. Based on a first selection of the most relevant alternative fuels, a detailed analysis of 4 new fuels is performed with tests in realistic conditions. It covers a number of areas, including:

- study of possible alternative fuels for use in aviation;
• chemical analysis of the "best" fuel;
• improved formulation of bio-fuels;
• new injection systems;
• modelling of injection and combustion;
• compatibility with aircraft fuel systems;
• production of new fuels.

The first fuel selection matrix has been designed around three main axes, covering a wide range of possible alternative fuels from short term to long term:

• paraffinic fuels, with hydrotreated vegetable oils and synthetic fuels (XtL), in a short / middle term vision;
• naphthenic fuels, representative of new production processes such as coal or biomass liquefaction in a middle term vision;
• oxygenated fuels, such as higher alcohols or furanic compounds, in a long term vision.

Parent Programmes:
FP7-TRANSPORT - Transport (Including Aeronautics) - Horizontal activities for implementation of the transport programme (TPT)

Institute type: Public institution
Institute name: The European Commission
Funding type: Public (EU)
Other funding sources: DG RTD

Lead Organisation:

European Virtual Institute For Integrated Risk Management Eu Vri Ewiv

Address:
Haus Der Wirtschaftwilli-Bleicher-Strasse 19
70174 Stuttgart
Germany

Organisation Website:
http://www.fehrl.org
EU Contribution: €888,300

Partner Organisations:

Airbus

Address:
2 ROND POINT EMILE DEWOITINE
31700 BLAGNAC
France

Organisation Website:
http://www.airbus.com
EU Contribution: €93,950

Mtu Aero Engines

Address:
Dachauer Strasse 665
80995 MUENCHEN
Germany
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<td>Technische Universitaet Graz</td>
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<td>The University Of Sheffield</td>
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<td>Fundacion Instituto Tecnologico Para El Desarrollo De Las Industrias Maritimas</td>
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<td>Institut National Des Sciences Appliquées</td>
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<td>Office National D'etudes Et De Recherches Aerospatiales</td>
<td>CHEMIN DE LA HUNIERE, 91120 PALAISEAU, France</td>
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<td>Deutsches Zentrum Fr Luft Und Raumfahrt E.v</td>
<td>Linder Hhe, 12489 KLN, Germany</td>
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<td>Airbus Operations Limited</td>
<td>New Filton House, Filton, BRISTOL BS99 7AR, United Kingdom</td>
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<td>Avio S.p.a.</td>
<td>Via 1 Maggio 99, 00187 RIVALTA DI TORINO</td>
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Organisation Website links:
- Deutsches Zentrum Fr Luft Und Raumfahrt E.v: [http://www.dlr.de](http://www.dlr.de)
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Ifp Energies Nouvelles

Address:
1et 4 avenue de Bois-Préau
92500 RUEIL MALMAISON
France

Organisation Website:
http://www.ifp.fr

EU Contribution: €688,212

Institut National De La Recherche Agronomique

Address:
Rue De L'Universite 147
75338 PARIS CEDEX 07
France

Organisation Website:
http://www.inra.fr

EU Contribution: €54,124

Rolls Royce Plc

Address:
65 Buckingham gate
LONDON
SW1E 6AT
United Kingdom

Organisation Website:
http://www.rolls-royce.com

EU Contribution: €44,194

Centre National De La Recherche Scientifique

Address:
3 rue Michel-Ange
75794 PARIS
France

Organisation Website:
http://www.cnrs.fr

EU Contribution: €467,574

Technologies:

Alternative fuels
Alternative aviation fuels

Development phase: Research/Invention

Key Results:
The most promising solutions will be examined during the project, from classical ones (plant oils,
synthetic fuels) to the most innovative, such as new organic molecules. Based on a first selection of the most relevant alternative fuels, a detailed analysis of up to 5 new fuels will be performed with tests in realistic conditions. Then, at the end of the project, the review of the performance of these new alternative fuels will be made regarding the economical, environmental and technical efficiency. Based on this result the most relevant strategy for future alternative fuels for aircraft will be defined, as well as an implementation plan and industrial applications. The impact of such a project will be of first importance for the evolution of aviation within the next 5 decades.

**Innovation aspects**

ALFA-BIRD will investigate new approaches and new alternative fuels to power aircrafts with the possibility to revisit the fuel specifications and reconsider the whole aircraft system composed by the triplet: fuel, engine and ambience.

**Strategy targets**

Innovating for the future: technology and behaviour

Documents:
- Projection of the Fuel Market to the midterm (2025) D09 (Other project deliverable)

STRIA Roadmaps: Low-emission alternative energy for transport

Transport mode: Air transport

Transport sectors: Passenger transport

Transport policies: Environmental/Emissions aspects

Geo-spatial type: Other