

*ECOLOG (Extinguishing CONcept Lowering Ozone depletion and Green house effect),
An Airbus Project addressing the Halon Replacement concern for Engine/APU fire
extinguishing application*

Christian Fabre & Remi Deletain, Airbus, Toulouse, France

The project presented in this document relates to a new engine fire & APU extinguishing system on-board aircraft. This system was preliminary studied, developed and prototypes were achieved in the frame of a research project called ECOLOG (Extinguishing CONcept Lowering Ozone depletion and Green house effect), launched and financed by Airbus.

Problematic

The extinguishers for engine fire & APU installed currently aboard the aircraft of all types, use as fire extinguishing agent the Halon 1301, whose effectiveness is recognised, but which has a negative effect on the environment. In spite of the existing concession which authorises its use for the applications known as “critical”, concession from which profits the aeronautical field, the ambition of Airbus with this project was to demonstrate that it was possible to be free from this product in the application considered (engine & APU fire extinguishing) and this, with the will to work effectively for the safeguarding of the environment. Coherent will with the environmental objectives of AIRBUS, which has obtained, in Jan 07, the ISO 14001 certification for both the product and sites scopes of its activities.

The aimed objective was not to achieve a simple theoretical study of feasibility, but to bring a concrete response to the problem of the replacement of Halon as fire extinguishing agent, while studying and by developing a durable solution for an engine & APU fire extinguishing system friendly for men and environment.

Phase A - Research Project ECOLOG

- Partners

The choice of industrial partners associated with the research project (Siemens SBT and SNPE-Pyroalliance) made with the concern of being able to propose at the end of the study a system mature, industrially realisable, and answering the criteria of aeronautical certification.

The extinguishing agent retained is the NOVEC 1230 marketed by 3 M, which is completely inoffensive for men and the environment. It is not concerned by the protocols of Montreal or Kyoto, because it does not destroy the ozone layer and does not contribute to the climatic reheating. Its life span in the atmosphere does not exceed a few days (to be compared with the 65 years of Halon 1301).

The identification of an agent having the adequate medical and environmental characteristics constitutes however, only one first step in the solution of the problem. It is also necessary to demonstrate that this agent is the good candidate to replace Halon in the considered application (namely here for the engine/APU fire extinguishing application aboard aircraft), and to develop a complete system making it possible to store this agent, then to effectively spray it in the concerned areas with a sufficient concentration to allow the fast and definitive fire extinction.

Moreover this system must be able to support the aeronautical constraints and to answer the regulations in force applicable to this type of system. As far as possible it should not add maintenance actions and it must be able to be easily integrated in the A/C environment.

It is exactly what was made with the project ECOLOG, where once the concept elaborate by taking into account the stresses of design specified above, and identified the fire extinguishing agent, several validation stages were done with the manufacturing of various demonstrators tested on installations specifically built for the occasion, in order to demonstrate feasibility and system effectiveness.

Regarding the agent itself, the NOVEC 1230 has been successfully tested at the FAA TC in Atlantic City, using for that the test bench especially built for evaluating potential candidates to the replacement of the Halon for engine & APU fire extinguishing application. A minimal NOVEC 1230 concentration value was officially determined.

The research project ECOLOG thus allowed the validation of a new friendly fire extinguishing agent and the development of an innovative system ensuring the effective distribution of this agent when necessary in the engine and APU fire areas. The demonstration was made that it is possible to be free from Halon 1301 in the fire extinguishing application considered, and the extinguishing system thus made up, brings a concrete response to the problem arising.

Phase B – ECOLOG – Feasibility study (implementation and test of demonstrators on board real Aircrafts)

The future deployment of this type of extinguisher using NOVEC is currently in the course of study.

End of 2006, Airbus has approached the main potential extinguisher suppliers, with the goal to be able to compare several extinguisher designs directly on Aircraft by testing different demonstrators. A test campaign is scheduled in June 2007 on the A340-600 and later on the A380.

Prior to these, other tests will be performed on a dedicated test bench to improve the agent distributing piping, in order to limit to the maximum the amount of agent to use for reaching the requested concentration value..

Once the tests on aircraft are completed, Airbus will be in the position of choosing the best technology (and the supplier) for final products susceptible to be deployed over the whole fleet. Obviously, the new Airbus aircrafts or in production aircrafts will be equipped by such a new system. Nevertheless, a study is also conducted for assessing the possibility of installing it on the “flying” aircrafts by retrofit application. Other installations of this type of extinguisher with NOVEC 1230 and using an innovative mode of pressurisation can also be envisaged for other applications, even far from the aeronautic area.