



# Fondation de Coopération Scientifique Sciences et Technologies pour l'Aéronautique et l'Espace

## THE RTRA SCIENCES AND TECHNOLOGIES FOR AERONAUTICS AND SPACE RECRUITS

### POST-DOC POSITION

#### PROJECT OSYCAF

OPTIMISATION D'UN SYSTÈME COUPLÉ FLUIDE-STRUCTURE REPRÉSENTANT UNE AILE FLEXIBLE

Profile	<p>The position is opened within an RTRA project. Since the post-doc is recruited to build surrogate models of structural behaviour of composite aeronautical structures, the ideal profile would be composed of a joint expertise in surrogate model building (regression, approximation,...) and in composite structure computation.</p> <p>Actually, a strong expertise in one of these fields and an interest for the other field is supposed to be sufficient to be recruited. An engineering formation would be appreciated.</p> <p>Autonomy, ability to work in a research team and ability to report the research results by writing scientific communication are absolutely necessary.</p> <p>Good English practice</p>
Missions	<p>The main task is to build an appropriate algorithm which is able to approximate the constraints on a structure element from the load case, the geometric dimensions of the structure and the material parameters. Detailed computation will be provided and used as a learning base of examples. The challenge is to learn functions which are not smooth with a good compromise between precision and computation charge. Adaptive and multilevel surrogate models will be used and mixture of experts using weighted least square approach and EM arguments will be considered.</p> <p>Further the surrogate models will be used in connection with other partners in multidisciplinary optimization. This mission is connected both with academic research and industrial R&amp;D.</p>
Duration	18 months
Scientific Officer	Manuel Samuelides, Tel 0607857789, manuel.samuelides@wanadoo.fr
Host laboratory	ONERA/DTIM, 2 avenue Edouard Belin, 31055 Toulouse

#### Description of the project :

This project aims at designing a collaborative and distributed multidisciplinary optimisation methodology in the context of aeronautics. It involves four major players from Toulouse that work on and share many disciplinary scientific objectives such as computational fluid dynamics, mathematical algorithms, optimisation and structural mechanics. The present research activity will focus on the optimisation of a coupled system describing the fluid-structure behaviour and interaction of an aircraft wing. The unified or integrated approach for coupling the two disciplines in a fully industrial automatic process applied to a full aircraft is a long term objective. The present project should be seen as a key step towards the achievement of this objective.

Besides all compulsory technical aspects investigated in each discipline during this project such as metamodels, algorithms handling noisy gradients etc, all the partners expect an improved comprehension of the way to manage multidisciplinary optimisations in a framework of a segmented working environment.

**Partners: CERFACS, ONERA, ISAE, UPS**

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