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	The position is opened within an RTRA project. Since the post-doc is recruited to build surrogate models of the efforts which are imposed on an aeronautical structure (flexible wing) by a flow, using the results of detailed aerodynamical computation. The ideal profile would be composed of an expertise computational fluid dynamics and flow control including background in recent POD computations. An additional interest for statistical learning would be appreciated. Autonomy, ability to work in a research team and ability to report the research results by writing scientific communication are absolutely necessary. Good English practice.
Missions	The main task is to build surrogate models which would be embedded into a multidisciplinary optimization process. Detailed computation of spatial fields which are obtained from the boundary conditions (wing geometry and flow parameter) will be provided. The POD dimensionality reduction of the data will be processed by sampling the input->aerodynamic field application and then instead of computing the Galerkin-POD approximation of the model, reduced order model will be obtained from the POD projections of the data. Several techniques of surrogate modelling, learning algorithms and design of computer experiments will be compared. 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&D.
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

Contact : Manuel Samuelides, (manuel.samuelides@wanadoo.fr)