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PROJECTE DE DOCTORAT INDUSTRIAL EXPEDIENT 2015 DI 067

DADES DE L'EMPRESA I DE L'ENTORN ACADÈMIC

Títol del projecte

DEVELOPMENT OF FLUID DYNAMIC ISSUES IN A GENERAL PURPOSE PARALLEL COMPUTAT CODE. APPLICATION TO MULTIPHASE FLOWS.

Empresa

TERMO FLUIDS S.L.

Responsable de l'empresa

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BREU DESCRIPCIÓ DEL PROJECTE DE RECERCA

First year:

* Study of the general structure and main functions/objects of the TermoFluids general purpose code. TermoFluids is a parallel unstructured CFD&HT code for the simulation of multiphysic and multiscale technological problems. The code has been developed by Termo Fluids S.L. with the collaboration of the CTTC (UPC).

* Application to the aerodynamic flow complex geometries (flow in ducts, compact plate-and-tubes surfaces, etc.). Application to the aerodynamic flow in fans and heat exchangers.

* Collaboration of optimum blade design and engine cooling solutions in order to suppress stall and surge problems at low flow conditions in ram-air fan applications. This work is directly related to European projects with the participation of Termo Fluids S.L.

Second-year:

* Developing domain optimization techniques in order to reduce the computational domain in rising bubbles problems. Comparative studies of the different methods (namely, fringe zone, moving mesh and non-inertial reference frame methods). Development of new methods and boundary conditions in order to improve the performance of the existing ones.

* Applicability to the challenging 3D Taylor bubble problem.



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Third year:

* Development of an energy equation solver that complement the momentum multiphase solver. The solver should work in unstructured meshes and should be parallelizable. Study the mass transfer process in multiphase problems.

* Applicability to rising bubbles and jet problems.