Aeronautical on-board fire suppression systems, e.g. the one found in the APU compartment, are based on the interruption of the propagation of chain reactions typically found in aeronautical fuels. These fire suppression systems historically used hydrofluorocarbons (HFCs) as a fire protection fluid. These fluids with halogen gases, like Fluor are well known to be inhibitors of the aforementioned chain reactions. Even small concentrations of these fluids in the air are sufficient to stop the reaction. The most well-known and used one has been Halon (R13B1, CFBr3), however due to their high global working potentials (GWPs), the global regulatory phase-down under the Montreal Protocol and the availability of proven, more sustainable alternatives, industry has been pushed towards more environmentally friendly alternatives.

The main objective of the project is to develop a methodology to simulate the penetration of a two-phase
flow and to model the phase transitions. The developed procedure should be valid to perform a parametric study relevant for the aircraft fire suppression system. The project includes a combined theoretical and experimental comprehensive study in order to obtain further comprehension of the phenomena.

The candidate will be focused on the development of a multiphase flow solver based on both Eulerian and Lagrangian approaches in the context of RANS and LES. The work includes the development and application of advance Eulerian and Lagrangian approaches for dispersed multiphase flow at atmospheric conditions. The Lagrangian approach will be based on transporting group of particles with a specific vaporization model, while the Eulerian approach will be based on interface tracking methods as the conservative level set.

The research team that the applicant will be involved is the High-Performance Computational Mechanics Group at CASE Department of BSC. The team is a multidisciplinary group with more than 30 researchers from all disciplines and with strong background in Computational Fluid Dynamics (CFD). The team is involved in many EU and industrial projects related to this topic, where the successful activities and the publications on highly ranked scientific journals give the proved expertise. The applicant will based at BSC, but will also interact with the project partners: Universidad Politécnica de Madrid (UPM) and CMT-Motores Térmicos (UPV).

**Key Duties**

- The offered position is a Postdoctoral position for two years to contribute to the development and application of an Eulerian/Lagrangian multiphase approach to predict flow atomization and vaporization of a rapidly depressurised mist.

**Requirements**

- **Education**
  - PhD in Aerospace, Aeronautics or Mechanical Engineering degree with concentration on turbulence and multiphase flows.

- **Essential Knowledge and Professional Experience**
  - 0-3 years of PostDoc experience in a similar position.
  - The work conducted in the project will be performed with the parallel multiphysics code Alya, which is an inhouse finite-element solver developed at BSC.
  - The applicant is expected to get familiar with the code running benchmarking cases, and developing physical models that will be integrated in the multiphysics platform of Alya.

- **Additional Knowledge and Professional Experience**
  - General knowledge on fluid mechanics, LES, numerical methods, interface tracking (volume of fluid, level set, …) is expected.
  - Computational skills and parallel programming for HPC are not necessary, but will be considered an asset.

- **Competences**
  - Ability to rapidly become productive in new research fields.
  - High level of English, both oral and written.
Conditions

- The position will be located at BSC within the CASE Department
- We offer a full-time contract, a good working environment, a highly stimulating environment with state-of-the-art infrastructure, flexible hours, extensive training plan, tickets restaurant, private health insurance, fully support to the relocation procedures
- Salary: we offer a competitive salary commensurate with the qualifications and experience of the candidate and according to the cost of living in Barcelona
- Starting date: 01/12/2018 or 01/01/2019

Applications Procedure

All applications must include:

- A motivation letter with a statement of interest, including two contacts for further references - COMPULSORY - Applications without this document will not be considered
- A full CV including contact details

Deadline

The vacancy will remain open until suitable candidate has been hired. Applications will be regularly reviewed and potential candidates will be contacted.

Diversity and Equal Opportunity Employment

BSC-CNS is an equal opportunity employer committed to diversity and inclusion. We are pleased to consider all qualified applicants for employment without regard to race, color, religion, sex, sexual orientation, gender identity, national origin, age, disability or any other basis protected by applicable state or local law.
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