



***ACCORD-Fluid***  
***The Academic Consortium for***  
***Research and Development on***  
***Fluid Dynamics***

<http://mh.mec.upt.ro/accord-fluid/home.aspx>

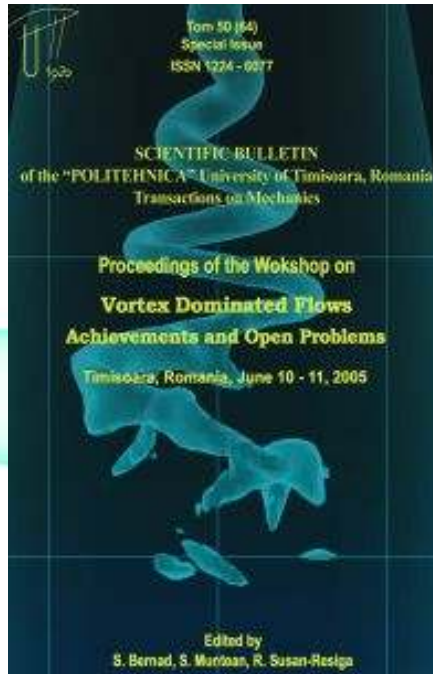
# *Partners*

- “Politehnica” University of Timisoara
- Romanian Academy – Timisoara Branch
- Politehnica University of Bucharest, Power Engineering & Aerospace Engineering
- Technical University of Civil Engineering, Bucharest
- “Dunarea de Jos” University, Galati
- Technical University “Gh. Asachi”, Iasi
- Technical University of Cluj-Napoca
- University “Eftimie Murgu”, Resita

# Goals

- The project main goal is to establish a **national research network on vortex hydro/aerodynamics and practical applications of vortex and swirling flows**.
- The **fundamental research** is focused on elucidating the physics of vortex flows, and on developing new mathematical models and numerical techniques for both inviscid as well as unsteady turbulent swirling flows. New mathematical formulations will be developed using the modern distributions theory. The turbulence modeling for RANS and LES will be improved to deal with large adverse pressure gradients encountered in swirling flows. For turbomachinery swirling flows, as well as for the tip vortex, new helical vortex models will be developed. This will further allow a better understanding, and quantitative description of the vortex breakdown phenomenon.
- The theoretical developments are used for **practical applications** in modeling, computing and analyzing vortex flows in hydraulic turbomachines (including draft tube vortex rope occurrence and evolution, tip vortex and the associated vortex cavitation), naval propellers hydrodynamics, lifting surfaces at high angle of attack, atmospheric boundary layer interactions with buildings and structures, fluidic vortex elements, swirl-stabilized combustors.
- By associating the research teams expertise, the investigations will include both numerical simulations and experiments, according to the current state of the art in research and development. The practical applications are aimed at improving and optimizing current technical solutions, as well as to design and test new machines and equipments.

# Workshops



# *Monography*

- **Modeling Fluid Motion**
- **Mathematical modeling and Numerical Analysis of Axisymmetric Swirling Flows**
- **Modeling of Vorticity Generation at the Interface of Bubbles or Drops Using Boundary Integral Methods**
- **Turbomachinery Swirling Flows**
- **Atmospheric Vortex Flows and Interaction with Buildings and Structures**
- **Vortical and Free Surface Flows for Ship Hydrodynamics**
- **Vortex Flows in Fluid Equipments**
- **Bio-Medical Vortex Flows**