

ADVANCES IN HYPERSONIC FLOW SIMULATION TRACK NUMBER : 200 AND 600

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ABSTRACT

There is currently a renew of the scientific interest on the simulation of hypersonic flows, for several reasons ranging from geopolitical constraints, the various project of sending men to Mars to classical economical ones.

This mini-symposium intends to propose an overview of the current state of the art and the different challenges in that field: the various flow regimes, from rarefied flows to dense regimes, which boundary conditions, the various thermodynamical models, as well as the turbulence modelling, The numerical discretisation: block structured versus unstructured meshes. Why, how and what are the challenges, which flow solver ? The issues of robustness of the solvers: positivity issues due to strong shock waves, strong fans and flow/boundary layers interactions, The issues coming from moving geometries because of ablation, The mismatch between nozzle flow experiments and true flight, because of missing similarity parameters, Steady flow versus unsteady flows: is there a potential for high order methods, and if so, which type of high order methods, Uncertainty quantification, etc

The speakers will come from European institutions (ESA, VKI, ONERA, DLR, etc), defence related institutions such as CEA in France, and possibly NASA. A tentative list is: Pierre-Henri Maire (CEA-CESTA), "Challenges in hypersonic flow simulation", Thierry Magin (VKI, Belgium) "Rarefied gas dynamics modellisation", V. Lago (CNRS ICARE Orlans) "Rarefied flows, an experimental view point", ONERA, Pietro Congedo (Inria) "Uncertainty quantification in hypersonics", P. Gnoffo (NASA Langley), Jean-Luc Vérant (ONERA Toulouse) "Modelisation of thermal effects", C. Marmignon (ONERA Chatillon) "Numerical simulation of hypersonic flows", F. Chalot (Dassault).