Abstract Submitted
for the GEC18 Meeting of
The American Physical Society

A $z-\theta$ fluid simulation of a Hall Effect Thruster[1] VALENTIN JONCQUIERES, OLIVIER VERMOREL, BENEDICTE CUENOT, CERFACS — With the renewed interest for Hall effect thrusters to supply light satellites, the industrial need for accurate numerical solvers has become crucial. To answer this demand, CERFACS is developing the AVIP-Fluid code which solves plasma physics in real industrial geometries using an unstructured parallel-efficient 3D fluid methodology. An AVIP-PIC version also exists which is presented in a separate contribution. Fluid models can provide in a reasonable computational time information about the plasma behavior inside the discharge channel. The present approach includes a detailed plasma model where each species is ruled by a system of Euler equations with source terms representing the electric field, ionization and other chemical processes. A Poisson equation is solved for the electric field. A particular attention is paid on specific numerical schemes implemented to deal with such equations in an unstructured and parallel formalism. The modeling of collision source terms is also investigated. After the presentation of models and numerics, a 2D $z-\theta$ simulation of a Hall thruster discharge channel is performed and compared to PIC simulations in order to observe the formation of the electron cyclotron drift instability.

[1]This work is financially supported by Safran Aircraft Engines as a part of a CIFRE convention and supervised by Stephan Zurbach. It was performed using HPC resources from GENCI (Grant A0032B10157).

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Date submitted: 14 Jun 2018 Electronic form version 1.4