Project-, Master thesis or Scientific assistant

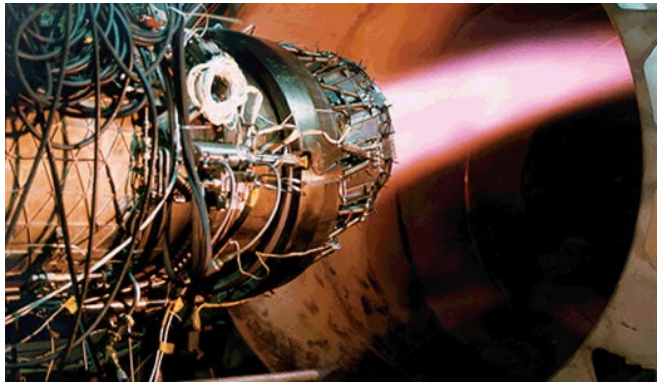
Universität der Bundeswehr München
Institut für Strahlantriebe

☑ Simulation (CFD/FEM) ☐ Experiment ☐ Construction ☐ Theory

Numerical investigation of a fluidic thrust vector nozzle for UAVs

Overview:

At the Institute of Jet Propulsion (ISA) of the University of the German Armed Forces Munich (UniBwM), novel concepts for thrust-vector manipulation of subsonic aircraft and their integration into the overall system are being investigated. Concepts for thust-vector sweeping can lead to an increase in agility and/or a reduction in the required control surfaces and as a result to a reduction in the so-called radar cross-section. Within the scope of this work, a fluidic thrust vectoring nozzle concept with a rectangular nozzle exit cross-section will therefore be investigated numerically (CFD) with respect to its aerodynamic performance and reliability. In addition, a possible influence on the design of the control surfaces (especially elevator and rudder) will be investigated.



Thrust-vectoring EJ200, Source: ITP

Objectives:

- Design (analytical), construction (CAD) and detailed numerical investigation (CFD) of a three-dimensional fluidic thrust vectoring nozzle with rectangular outlet cross-section to generate thrust jet deflections and resulting pitch and yaw moments.
- Use of the ANSYS FLUENT or TRACE flow solver, taking into account various turbulence models and numerical methods, to investigate the steady-state/stationary operating behavior of the thrust vectoring nozzle. Variation of geometric designs/parameters and operating points/ambient boundary conditions.
- Development of different parameterized geometries and determination of the influence of different geometric parameters on the nozzle performance.

Requirements:

- Interest in numerical flow simulation and CAD (ideally, basic theoretical knowledge and first practical experience with flow solvers exist)
- Interest in fluid mechanics and the application of learned theory
- Independent and target-oriented way of working

Begin: Immediately

Contact: Nils Schwagerus
Telephone: 089 6004 2216
E-Mail: nils.schwagerus@unibw.de
Office: Buil. 37/200, Room 1209a

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