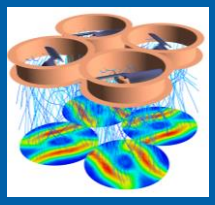

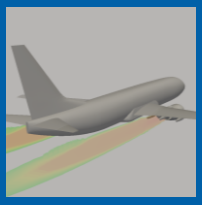

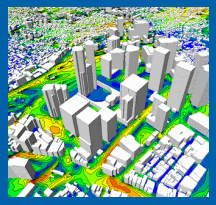

CFD FREELANCING

Simulation engineering services

Attila Felföldi, MSc. in Fluid Dynamics and Aerospace

ENGINEERING SERVICES

Attila Felföldi, CEO of the company of CFD Freelancing helps businesses and private customers to solve their fluid dynamics, thermal or acoustics related problems by doing Computational Fluid Dynamics simulations.

CFD Freelancing

AEROSPACE

AUTOMOTIVE

TURBOMACHINERY

BUILDING ENGINEERING

INDUSTRIAL FLOW PROBLEMS

CFD FREELANCING

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ABOUT

Work experience

2016- Freelancer CFD Engineer

2012–2016 Senior Aeroacoustics Engineer

EXA GmbH, Munich, Germany

Aerodynamic and aeroacoustic analysis for the automotive industry (HVAC, cabin, aerodynamics, fans, blowers, optimization)

2010–2011 Research and Development Engineer

Knorr-Bremse Brake Systems Ltd., Research and Development Center, Budapest (Hungary)

Analysis of turbocharger compressor flows, boiling, cooling jackets

Education

2011–2012 Research Master MSc. in Fluid Dynamics

von Karman Institute for Fluid Dynamics (NATO), Rhode-Saint-Genese (Brussels) (Belgium)

Fluid dynamics, measurement techniques and CFD simulations

2005–2011 Aerospace Engineer MSc.

Budapest University of Technology and Economics, Budapest (Hungary)

Principles of mechanical engineering, fluid dynamics, and design

Thermodynamics of jet and internal combustion engines, flight mechanics, stability, aircraft design

AEROSPACE

EXTERNAL AERODYNAMICS

INTERIOR FLOWS

SLOSHING AND LIQUIDS

CFD FREELANCING

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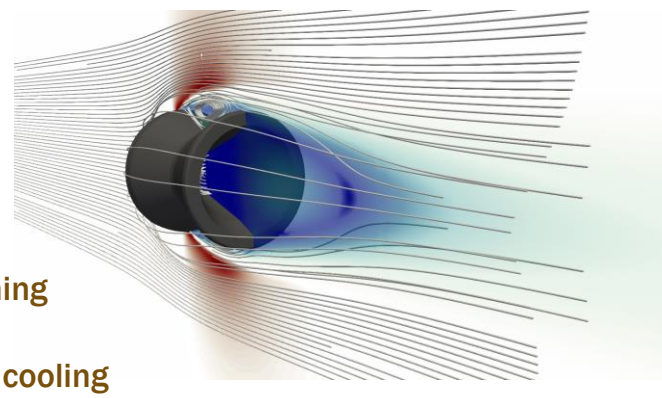
WHAT IS CFD?

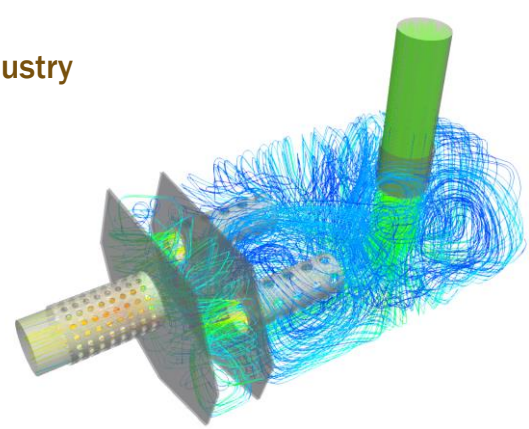
CFD stands for **Computational Fluid Dynamics**. It is a branch of fluid mechanics that uses numerical (digital) analysis to **analyze problems that involve fluid flows**. High speed computers and validated software are used to calculate the main parameters of any flow field, including **pressure loss**, **flow speed**, **temperature**, **turbulence** and **acoustics**.

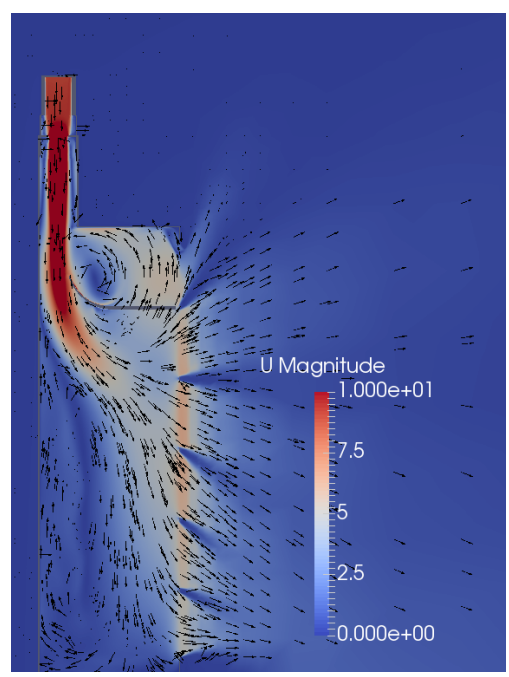
The CFD simulation needs to be built up and launched by and expert in fluid dynamics. At CFD Freelancing I have this expertise, starting from model CAD geometry preparation, simulation and post-processing. The results of the numerical flow analysis need to be analyzed in-depth, and communicated to the customer with clarity – all I am delivering to my customers.

I offer CFD simulation engineering services in the following **industries** (among others):

- **Automotive, transportation, aerospace**
- **Multiphase water-air flows**
- **Heavy equipment and machinery**
- **HVAC – Heating, Ventilation and Air Conditioning**
- **Server room, building, garage ventilation and cooling**
- **Construction and architecture**
- **Healthcare, consumer goods, household devices**
- **Valves, pumps, fans and other turbomachinery**
- **Energy industry**







PRODUCT DEVELOPMENT

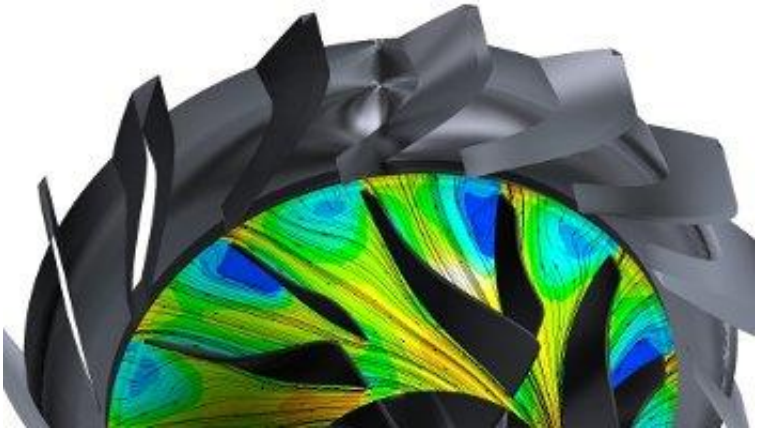
Product development with Computational Fluid Dynamics Simulations (CFD) is the most efficient way if your product is affected by thermal phenomena, aerodynamics or acoustics. There is always room for improvement! CFD-Freelancing has enough engineering skills and industrial expertise to help you further in any topics:

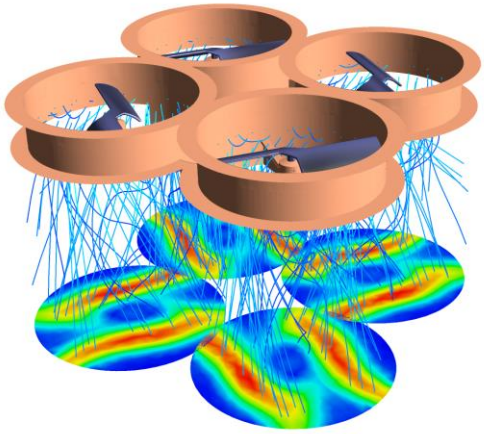
- **thermal issues: overheating, cooling, heat transfer issues**
- **fluid flow related problems: mixing, separation, pressure loss, drag, air distribution**
- **acoustics related issues: flow induced noise problems, silencer, loud devices**

Every product design problem needs careful approach and thorough planning before executing the simulations. Therefore, an in-depth communication of the goals, definition and identification of the exact problem as well as setting improvement directions are key to a successful design loop. CFD Simulations can help you shorten the way to a better performing, more competitive products.

Several phenomena cannot be measured in wind tunnels or in the lab. It would be either too time consuming, expensive (prototypes, labor costs, equipment), or limited to a certain set of experiments.

In case of numerical simulations **there is no design scenario limit**. Costs are very controllable, there is no need for laboratory or expensive equipment. But the main strength of a digital simulation is that it allows the engineer to have an **in-depth look into the flow field**. Therefore, identification of problems can be done on the computer screen, faster and in a more efficient way than anything else.





WORKFLOW OF A CFD SIMULATION

The workflow of a successful CFD simulation project starts at understanding all the aspects and requirements of the customer. In order to deliver the highest quality results in the shortest time possible, the projects start with scheduled meeting either on-site or off-site.

CAD Preparation

If all the requirements are clarified, the virtual prototype of the parts needs to be set up. This usually starts with receiving the geometry from the customer, but based on design sketches I can also create the CAD model. At the end of this step, all unnecessary parts will be removed and prepared for the next step.

Meshing / Discretization

In order to execute the mathematical solver on the flow field, the flow domain has to get discretized or meshed, that is, divided into small volumes. My expertise in this process reaches back to 2009 making the meshing step high quality and fast.

CFD Simulation

After all the geometry is prepared, the computer takes over the work and calculates the necessary fluid flow parameters everywhere in the volume. This CFD simulation usually takes from some hours up to several days, depending on the complexity and size of the problem

Analysis and presentation

When the simulation is ready the cfd engineer needs to analyse the results. In the first step an automatic analysis is executed, giving the engineer a quick look into the flow field and an opportunity to identify the possible issues and improvements possibilities. Then the cfd expert looks for causes of the problem and works out solutions and development recommendations. Finally, I will present the results in a qualitative and quantitative form to you, and we will define further steps together.