

Engineering Consulting

Electromagnetics



Powersys owns a staff of engineers expert in simulation software and a network of partners with more than 15 years experience in the field of power system, electromagnetic design and power electronics. By the combination of engineering knowledge and our experience, Powersys is a partner of choice for your advanced studies.

DOMAIN OF EXPERTISE

- Design Optimization
- Sensitivity and parametric analysis
- Electromagnetic analysis 2D/3D
 - > Torque
 - > Losses
 - > Flux Distribution
- Thermal 2D/3D
 - > Temperature distribution
 - > Heat transfers
- Structural
 - > Noise
 - > Stress
 - > Deformation
- Ekectrical analysis
- Efficiency map generation
- RT table generation

“

In my opinion, one of the biggest strengths is the accuracy of the achieved simulation results and obtained real results. Indeed, this helps us to enhance the design process of the products and test control algorithms.

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Software expertise

Our simulation software know-how and expert network is a real value added



Agile methodology

A proactive and faithful team completely dedicated to your success with a positive attitude



Turn-key solutions

Complete custom solutions meeting your project requirements and expectations.

J erome CORNAU

Engineering Service Manager

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STUDY EXAMPLES

Electromagnetics



Improving Brushless DC motor (BLDC)

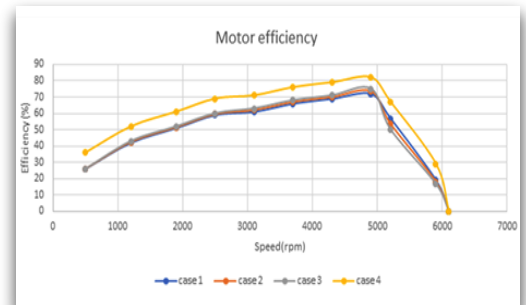
💰 11k€ 📅 3 weeks

Studies

- **Modelling** of the BLDC motor in JMAG (geometry, materials, meshing)
- Validation on **several configurations**
- Analysis of the **influence on performance** of following parameters: Metal sheet thickness, temperature, air gap and magnet material

Results

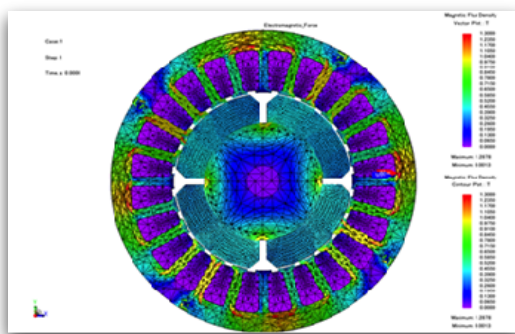
- Several **characterizing curves** are established: Speed vs Torque, Speed vs Current, Speed vs Efficiency and Transient efficiency.
- **The optimal values** of design parameters are found



The client can increase its motor performance, particularly torque and efficiency.

💰 20k€ 📅 5 weeks

Analyzing the impact of an external field on motors torque



The client has a better knowledge of the torque of the machines

Studies

- **Modelling** of several induction machine:
 - Representation of **geometry, materials and notches**
 - **Validation** and tuning in several configurations
- Motor simulation in both **2D and 3D**:
 - Different motor **power and poles number**
 - Simulation **w/o external fields and w/o housing**

Results

- The influence of external magnetic field:
 - is **small and get smaller** as the machine power and the poles number rises
 - is almost **cancelled** by the **housing**
 - rises **motor torque**

Getting the buses heating due to eddy currents

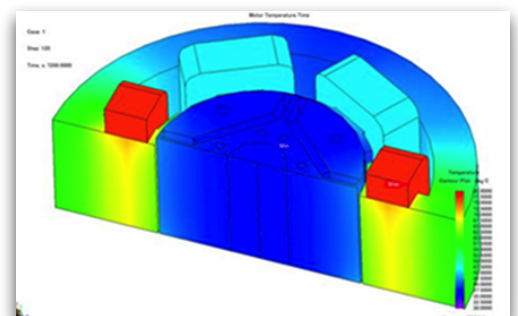
💰 10k€ 📅 3 weeks

Studies

- Magnetic modeling: Bus bar modelling from **CAD design** and **Current circulation** modeling
- Determination of **magnetic field** in bus bar and resulting **eddy currents**
- Analysis of losses due to eddy currents
- Evaluation of **temperature raising**

Results

- Temperature repartition:
 - o **Hot spots** identification & Maximal **temperature determination**



The client will know the thermal impact of the current on the busbars