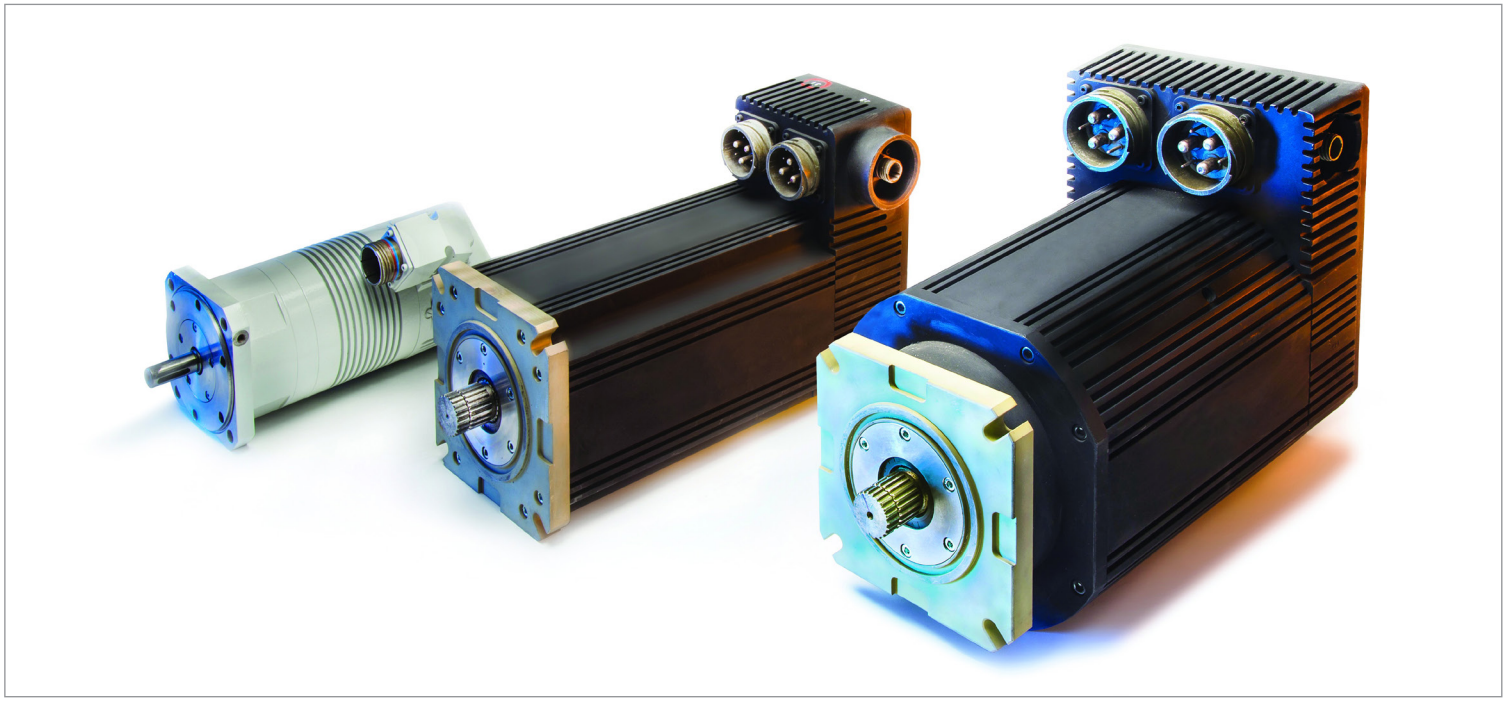
Bental Motion Systems
a member of the Gevasol Group

ALTAIR

Simulation Fosters Stronger Customer Collaboration and Develops New Business



Since 1983, Bental Motion Systems, a member of the Gevasol Group, has designed and manufactured advanced power and motion systems for demanding industries like defense, aerospace, and semiconductors. It produces a variety of end applications including motors, alternators, and electrical brakes. To meet increasing demands, Bental continues to advance its in-house capabilities in development, analysis and design, testing, and quality assurance. These expert capabilities, led by the three post-graduate PhD designers of the R&D group, enable quick response and turnaround.

Their challenge

Over the years, the R&D team progressively extended its usage of the Altair software suite, benefiting from the flexible licensing system. This allowed them to cover more physics and gain flexibility in their approach dependent on the project phase. For example, Altair FluxMotor™ is dedicated to motor pre-design which enables quick concept exploration and accurate feasibility checks depending on the specifications and final application.

"FluxMotor gives our development and marketing teams a great tool for quick and very accurate decision making regarding new development requests. Designing an electrical machine in less than one day sounds incredible, doesn't it?" said R&D electrical engineer Kobi Ingram. "Of course, at this stage it is not a full design, but Altair tools gives us very valuable predictions on machine performance, parameters, and productivity feasibility check."

Along with this, the team has learned how to gain quick insights by referencing previous designs. Shared on their company server, the team can select the most appropriate starting point for a new design, when pure innovation is not requested.

At this stage of the project, once feasibility have been approved and validated with the customer, the complete FluxMotor project can be exported to Flux2D.

bental motion systems

gevasol fluid and motion control

Industry

Electrical power and motion systems for aerospace & defense, semiconductors, and other industries

Challenge

Accelerate the design of electric machines while reacting fast to customer specific requirements

Altair Solution

Enabling quick concept exploration including valuable predictions on machine performance, parameters, and productivity feasibility check.

Benefits

- Accurate decision making
- Complete analysis in less than 20 minutes
- Design an electric machine in one day

The finite element complete solution is used for detailed electromagnetics design and thermal simulations. Since the imported model contains all geometric materials and physical parameters, a simple scenario is ready to be solved. Using a built-in macro designers can create the torque verses current chart showing the saturation knee. Producing this analysis with a significant level of accuracy in total takes less than 20 minutes.

For more specific analysis, Flux 3D was used to check the machine's magnetic field surrounding, to predict the winding head temperature and to perform axial direction analysis. Coupling both electromagnetics and thermal analysis, the same model was used in a single environment which provided another opportunity to accelerate the design.

When a more global approach was required coupling with a complex mechanical system, Altair Inspire™ supported the team and is now used on a regular basis. Altair AcuSolve™ is a complementary solution when it comes to advanced thermal analysis. Its computational fluid dynamics (CFD) solver helps evaluate forced air-cooling options.

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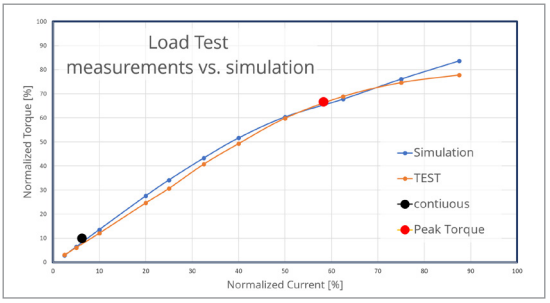
Kobi Ingram
R&D electrical engineer

Today, the increasing use of Altair HyperStudy™ for data exploration and multiphysics optimization shows interesting possibilities to innovate on new concepts and optimize global performance.

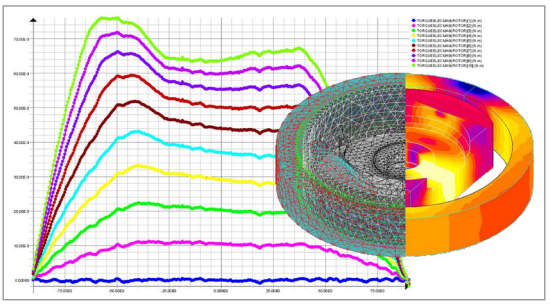
Results

"I can hardly remember the days when every design iteration took hours, not to mention some design parameters which could only be approved by long fastidious and expensive prototypes," said Kobi Ingram.

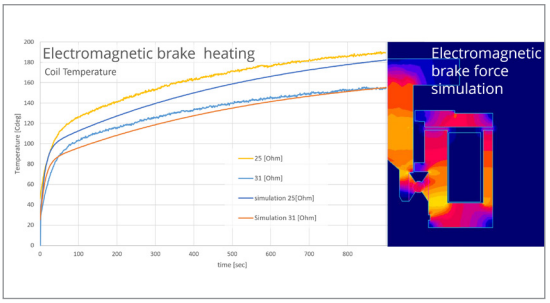
While some designers still sporadically use their spread sheets with analytical formulas, the increasing use of Altair software supported them to completely rationalize their design approach, and complete a customized workflow for their needs. They are now able consider more configurations with multidisciplinary constraints, make decisions faster, working closely with their customers at the different design stages to stick to their needs, and produce efficient sustainable equipment.



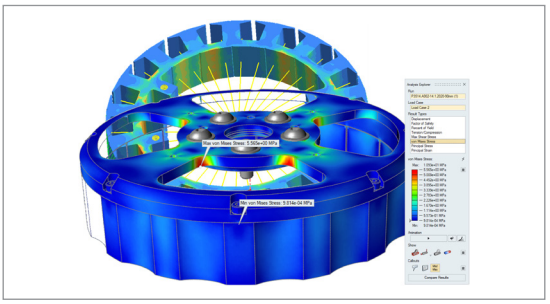
FluxMotor's accuracy enables dramatic cost reduction in prototypes



Flux multiparametric capabilities intuitively allow an accelerated design exploration



Easy electromagnetics and thermal Flux coupled analysis enrich the relevance of the studies, while remaining accurate



Mechanical stress analysis on the motor casing and rotor computed in Inspire

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