

New computation tools enable much faster and cheaper product development

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Faster, more accurate and agile computation tools and methods have been developed through the SEMTEC project, led by VTT Technical Research Centre of Finland. This will enable the elimination of the expensive and time-consuming prototype phase in the electromechanical industry. Finnish industry will gain a competitive advantage due to the faster product development of electrical motors, generators and transformers, which will enter the markets at lower cost. The project will also result in quieter and more energy-efficient machines.

The key result of the SEMTEC [project](#) is new computation methods, which can now be exploited by [industry](#) for the first time, using companies' own tools.. The project produced innovative and accurate methods to control vibrations, dampen noise and improve the energy efficiency of devices.

Beneficiaries of the results include the electromechanical industry in particular, which manufactures electric motors, generators and transformers. In addition, cooperation between research and industry will increase when all results are available to everyone via the [open-source Elmer software](#).

"Finnish industry will gain a competitive advantage from leaner design processes. Electromechanical devices are seldom mass-produced - each product unit tends to be separately designed. Accelerating product development will therefore markedly shorten delivery times and create a major competitive edge," says project manager Janne Keränen of VTT.

For example, the noise generated by lifts and transformers will be reduced. This will enable the reducing of disturbing and tiresome noise in homes and workplaces.

"SEMTEC has led to close and symbiotic cooperation between industrial enterprises, research institutes and universities. Open source code means that new models developed by researchers can be tested immediately in the industry's own design systems. The project has enabled the productisation of new, world-class modelling toolset, which we have already been using to win major deals," says Eelis Takala, Lead Research Specialist at Trafotek.

Scientific computing in transition: the Elmer tool

As computing power grows and the use of open source software increases, electromagnetic computation is reaching a turning point. Old software is seldom suitable for the world of parallel computing.

The Elmer tool, an open-source finite element method (FEM) software developed by CSC, was used in the project. Elmer features numerically efficient parallel computing and advanced coupling of multiple phenomena.

"Only genuine cooperation enabled the development of software for a new application area so quickly. The importance of parallel computing will continue to grow as number of computational cores in CPUs increases. This leads us to believe that long and fruitful cooperation lies ahead," says Peter Råback of CSC, Product Manager of the Elmer software.

Provided by VTT Technical Research Centre of Finland

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