

# Integrated Tools for Electrical Engineering

Based in Meylan, outside Grenoble, France, the **CEDRAT Group** specialises in software and hardware solutions which cover a wide range of electrical and mechatronic engineering applications, most notably the flagship software suite Flux, a finite element application used for electromagnetic and thermal simulations, both in 2D and 3D. A strongly research and development-driven venture, the company plans to widely commercialise the Flux technology.



The CEDRAT Group headquarters in Meylan, France



turnover of nearly seven million Euros, with average annual growth rates of 10%.

Half of CEDRAT's turnover is generated with the Flux software and associated, compatible software applications developed by third parties. Flux is a finite element application designed to perform two and three-dimensional elec-

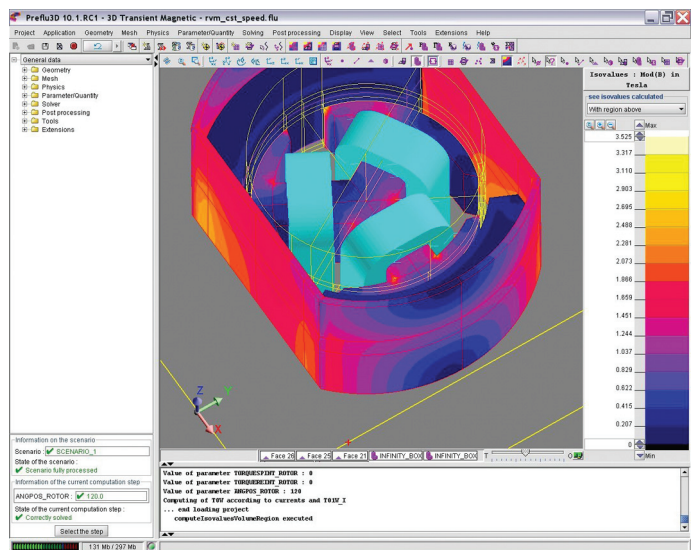
tromagnetic and thermal simulations and is capable of handling the design and analysis of electromagnetic products. The software features a wide range of functions such as extended multiparametric analysis, advanced electric circuit coupling and kinematic coupling; it is suited for static, harmonic and transient analysis. Flux is used in the design, optimisation and analysis of all manner of electromagnetic devices, including electrical motors and generators, linear actuators, transformers, induction heating devices, sensors, HV devices, cables, non-destructive test equipment and many other applications. The Flux customer base includes Siemens, Schneider, General Electric, Renault and Peugeot.

According to our interview partner, Thomas Maillard, Sales Engineer, there is a great deal of de-

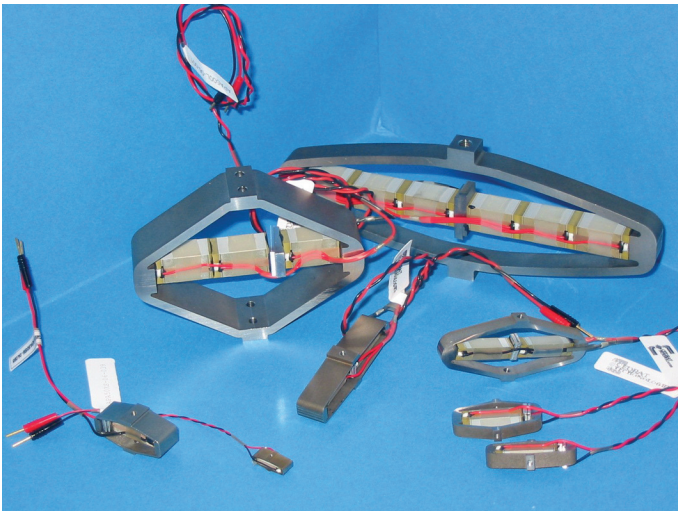
CEDRAT was founded by Pierre Ribard, Jean-Claude Sabonnadiere and their families in 1971 with the aim of generating technology transfer from a software application for magnet R&D developed by Jean-Claude Sabonnadiere. In 1977, the first CEDRAT subsidiary, CEDRAT Technologies, was formed to concentrate on software development. The first commercial version of Flux 2D was launched in 1981, followed by Flux 3D in 1990. 1986 was marked by the company's opening of its US sales and support subsidiary, Magsoft. Since

that period, the portfolio has been further enhanced by the incorporation of advanced software solutions dedicated to simulating mechatronics, power systems, electrical motors, non-destructive testing and electrical connections.

The CEDRAT Group is made up of four companies: CEDRAT, CEDRAT Technologies, Magsoft and Adapted Solutions, and is led by Managing Director Bruno Ribard, the son of one of the founders. Altogether, the group employs approximately ninety members of staff and exhibits a



Flux is a finite element application designed to perform 2D and 3D electromagnetic and thermal simulations



**Mechatronic hardware products like amplified piezo electric actuators are one of the company's strengths**

velopment potential with Flux: *“Up to now, Flux has been a very academic application and therefore very research oriented. We are now going to make it a lot more user friendly so that it can be integrated into larger software platforms. Furthermore, we want to derive dedicated versions from the original*

*Flux software, for example, aimed specifically at electrical motor design applications.”*

Twenty percent of the turnover is generated through the development and sale of off-the-shelf mechatronic hardware products, namely piezo actuators and electronics, piezo motors, mag-

netic actuators and ultrasonic transducers with the associated drivers and controllers. These products are utilised in a wide range of scientific and industrial applications, including micro and nano-positioning, vibration generation, micro-scanning, fast and precise motion control, active vibration control and energy harvesting. Customers in this segment include plasma television manufacturers, NASA and DLR. The remaining 30% of CEDRAT's turnover is generated by contract research and development, for instance for Michelin or Rossignol. *“It is our mission to become*

*the leaders in the field of mechatronic components and software by bringing innovation to our customers' solutions,”* stresses Thomas Maillard.

CEDRAT sells its products and services worldwide, either direct or through distributors. Export accounts for around 80% of the company's business. The most important trade shows are the SPS in Nuremberg and the Hannover Messe.



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