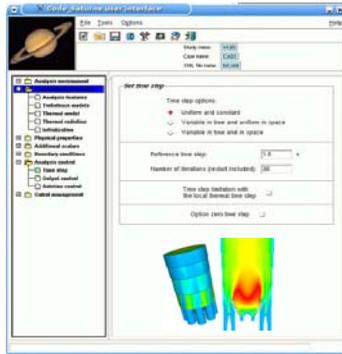# *Code_Saturne*
EDF's Open Source CFD Solution

EDF's general purpose computational fluid dynamics software

Open source industrial software

EDF makes *Code_Saturne* available as an open source software under the GPL licence, starting with a first beta release since march 2007.

Quality Assurance

Code_Saturne® has been developed since 1997,
under Quality Assurance,
with regular and extensive validation and qualification phases.

Portability and parallelism

Portable on Linux PCs and all Unix platforms tested so far (500,000 lines in Fortran 77, C 99 and Python), *Code_Saturne* runs in parallel on distributed memory machines.

Capabilities

With its co-located Finite Volume approach, it deals with any type of mesh cell and grid structure.

Its basic capabilities enable computation of incompressible or expandable flows with or without heat transfer and turbulence.

Dedicated modules are available (radiative heat transfer, combustion, magneto-hydro dynamics, compressible flows, Euler-Lagrange approach for two-phase flows, capabilities for parallel code coupling).

EDF's objectives

Collaborations: keeping the course

Since the early times of *Code_Saturne*'s development, EDF has encouraged collaborations with universities and industry. Today, with more than 20 partners, EDF is keen to expand the community.

The open source approach is fully coherent with the route taken since 2001 with EDF's structural analysis software *Code_Aster* and, more recently, with the Salomé platform.

More applications for a higher quality

With a larger community of users and a wider range of applications, the code will be subjected to different challenges and new benchmarks.

This wider use in industry, research, and education will contribute to a better and faster qualification of the models and algorithms.

New contributions

Operated as an industrial software, *Code_Saturne* is also a way to capitalize on the knowledge of EDF Group and of its partners, in France and abroad.

Opening the source code is an opportunity for every user to benefit from contributions from others, contributions that will be integrated and maintained in the reference version, widening the range of applications of the software.

For the benefit of all partners, in industry, research and education

Industry: software control

Code_Saturne open source provides an answer to specific needs that can not easily be made available in commercial "black boxes".

It makes it possible for industrial users and for their subcontractors to develop and maintain their own independent expertise and to fully control the software they use.

Research: a framework

Code_Saturne open source provides an answer for research teams who are eager to devote themselves to a specific area and who need a framework to assess their developments on complex flows or geometries.

The software has been designed to facilitate further developments (documentation, standard languages – F77, C99 and Python interface).

Education

Training of users, starting at Universities/Engineering Schools, is crucial to ensure the quality of CFD predictions.

Code_Saturne is available as a support tool for such training: the documentation manuals are available, fully complemented by access to the actual documented source code and, on demand, to validation cases.

Contact: saturne-support@edf.fr - Download : http://rd.edf.com/code_saturne

Code_Saturne
EDF's Open Source CFD Solution

Access to the code

Gnu General Public Licence (GPL)

Code_Saturne open source is provided under the Gnu General Public Licence.

EDF's associated libraries BFT ("Base Functions and Types") and FVM ("Finite Volume Mesh") are provided under the Gnu Library General Public Licence (LGPL).

The aim is to allow anyone to use, share, change and redistribute the software, and to guarantee that others will have the freedom to do likewise

Where to get the software from

The first open source release, posted in march 2007, is a beta-release of *Code_Saturne* 1.3 (stable and validated version due at the beginning of 2008).

A web site is set up by EDF to download the software and its documentation. Its address is: http://rd.edf.com/code_saturne

Information may be obtained from: saturne-support@edf.fr

Distribution

The GPL licence includes a "no warranty" clause.

Anybody distributing the code may provide additional guarantee, under his own responsibility.

EDF R&D is the only distributor for EDF.

The trade mark "*Code_Saturne* " is the property of EDF.

Services, dedicated applications and contributions

Services

Anyone may offer, freely or for a fee and without EDF's guarantee being required, any service associated to *Code_Saturne,* such as, for example: support to installation, training, development or studies.

Dedicated applications

On the basis of *Code_Saturne,* anyone may develop and distribute dedicated software under any licence, provided the terms of *Code_Saturne* licence are not violated.

Contributions

Anyone developing in *Code_Saturne* may offer the source produced for integration into the reference version maintained by EDF. In this case, and if the development is accepted by EDF's development team:

- The author-file keeps track of the developer's name (except if the developer explicitly declines).

- The developer accepts that the copyright put on the source code be EDF's copyright. This does not increase EDF's rights to use, develop or distribute the code. Ensuring that EDF is the unique copyright holder is necessary for EDF to be able to efficiently protect the terms of the licence and manage the source-code day to day.

Practical data

User club

An annual users' club meeting is organized by EDF, usually in November or December.

Support

User support is provided at no cost but without any warranty, that is, under the same terms as those indicated in the GPL licence:

saturne-support@edf.fr

Initial training

EDF offers, twice a year and for a fee, a beginners' training session.

During this two-day training course,
- Talks are given by developers to provide the theoretical and practical insight necessary to understand the basic algorithms of *Code_Saturne.*
- Practical test cases are run to enable users to get acquainted with the software (basic options and more advanced usage with user defined programmes).

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