



VORTECH

scientific
software
engineers

What is VORtech?

We help our customers to solve mathematical problems and to develop software for large-scale computation, simulation, prediction, monitoring and optimization.

We work mainly for major corporate, academic and governmental organizations as a specialized R&D partner.

Started in 1996 as a spin-off from Delft university of Technology, our firm has steadily grown to more than 20 professionals. Most employees hold a PhD in mathematics or computer science.

$$\frac{\partial u_z}{\partial z} = 0$$

$$\frac{u_\theta^2}{r} = -\frac{1}{\rho} \frac{\partial p}{\partial r} + v_c \left(\right.$$

$$\frac{u_\theta}{r} = -\frac{1}{\rho r} \frac{\partial p}{\partial \theta} + v$$

$$\frac{\partial}{\partial t} + (\mathbf{u} \cdot \nabla) u_z = -\frac{1}{\rho} \frac{\partial p}{\partial z} + v_c$$

What do we do?

Mathematical modeling

Before any problem can be solved with mathematics, it must be described in mathematical terms. This is called mathematical modeling.

For example: we helped a large asset management company to make the best selection out of hundreds of proposed asset investments. Our contribution was the development of a mathematical description of the problem so that analytical tools could be used to find an optimal solution.

Mathematical problem solving

Once the mathematical formulation of a problem is there, we can assist in solving it.

For example: for a leading producer of artificial fibers, we found a method to solve the mathematical equations describing one of their production processes. This finally gave the insight that the company needed to solve a nagging problem that was pestering the production process.

Building computational/simulation software

In many cases, the mathematical model needs to be translated into software. This is because the equations cannot be solved by hand or because the users want to work with the mathematical model in a user-friendly way.

For example: for an engineering firm we implemented a model to describe the sky glow that is caused by city lights. This software is used to predict whether new construction plans will exceed the limits on sky glow set by environmental law.

Maintenance, extension and optimization of computational/simulation software

Once the computational software is there, it needs to be maintained, extended, adapted and optimized. This is the bulk of what we do.

- **Extending and adapting software:** we are more qualified for this than normal IT-companies, because we are able to understand the mathematics behind the software. We are also used to the complex

algorithms and data-structures that are typical of this kind of software.

- **Maintenance:** In many cases, our clients outsource the maintenance of their complex computational code to VORtech. We have standard procedures for making sure that the software is always up to date and well-tested.
- **Optimization:** Our experience in high performance computing helps us to create software that will run efficiently on today's most powerful computers.

For example: we've played a major role in the development of Rijkswaterstaat's software to predict flooding. Another example: We have made significant contributions to a model for global changes that is used by an environmental government agency to support policy decisions.

Consultancy on computational/simulation software

We help our clients to answer questions that they have regarding the use and management of computational software. Working in the field for more than 15 years and for dozens of customers, we've come across most of the issues that our clients face.

For example: we have counseled several customers on how to organize maintenance for their complex software. We give courses on the specific challenges in developing computational software.





We combine in-depth knowledge of mathematical modeling, simulation and computational techniques with state-of-the-art methods for software development.

Our mission

We want to bring our clients the latest and best in scientific software development and mathematical consulting, with a highly qualified team in a project form that matches the needs of our clients.

At the frontline of technology

We are dedicated to bringing our clients the latest in technology and the best in skills. We maintain our high level of knowledge and experience by:

- learning from the wide variety of customers that we serve,
- maintaining close ties with various Dutch universities,
- participating in international research projects, which not only makes us grow professionally, but also allows us to contribute to the advancement of our profession.

By hiring us, our clients connect to the best and latest insights in the field. We maintain a leading role in High Performance Computing and the use of observational data in combination with computational models (data-assimilation).

Dedicated to quality

When VORtech is involved in a project, we provide more than just a few highly qualified people. In fact, the whole of VORtech is dedicated to the success of the project. We constantly monitor the progress of projects that we work on. And we will readily step in if our experience tells us that something could be done better or more effectively.

Flexible to match your needs

For us, each customer is unique. Therefore, we have organized ourselves to deliver our services in any form that our client wants. Whether our client needs someone working (part-time?) in their office or wants to outsource an entire project, we can deliver. The only thing that is important to us is that our employees also spend some time in our offices to be in contact with the knowledge and experience of his or her colleagues.

Frequently asked questions

When we engage new customers, some of the following questions often arise.

You are mathematicians and software engineers. How can you help us if you don't know anything about our field?

Indeed, you probably know more about your specific application than we do. On the other hand we know a lot about mathematics and software engineering. So the challenge is to bring your knowledge and ours together.

Therefore, we select our colleagues for their ability to work with experts in other fields and jointly develop things that neither the client or us could have developed only by ourselves. And because our colleagues have seen quite a bit of applications, they tend to get up to speed in any application domain pretty fast.

How do you deal with confidentiality?

Compare us to a doctor. You know that he is not going to share your medical history with others. If he did, he would soon be out of work. It's the same with us: if we would ever breach confidentiality, it would mean the end of our business. This is probably an even better



guarantee than an NDA (that we usually sign, nevertheless).

How do you ensure that I can work with the software after you leave?

All software that we make or modify becomes yours; everything we do is delivered to you at the end of the assignment. Usually, we work together with your own experts so that they learn about what we do. We don't want to retain customers because they cannot leave us. We want to retain our customers because they are impressed by our work and want to work with us again.

Interested?

If you think that VORtech could bring value to your company, feel free to contact us. We'd be happy to come and discuss with you how we can help you. In most cases, we start with a short project of just a few days that gives us the chance to show what we are worth. We're proud to say that we never disappointed a new customer.

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