MANYCORE GPU SUPERCOMPUTING FOR ENGINEERING COMPUTATIONAL FLUID DYNAMICS

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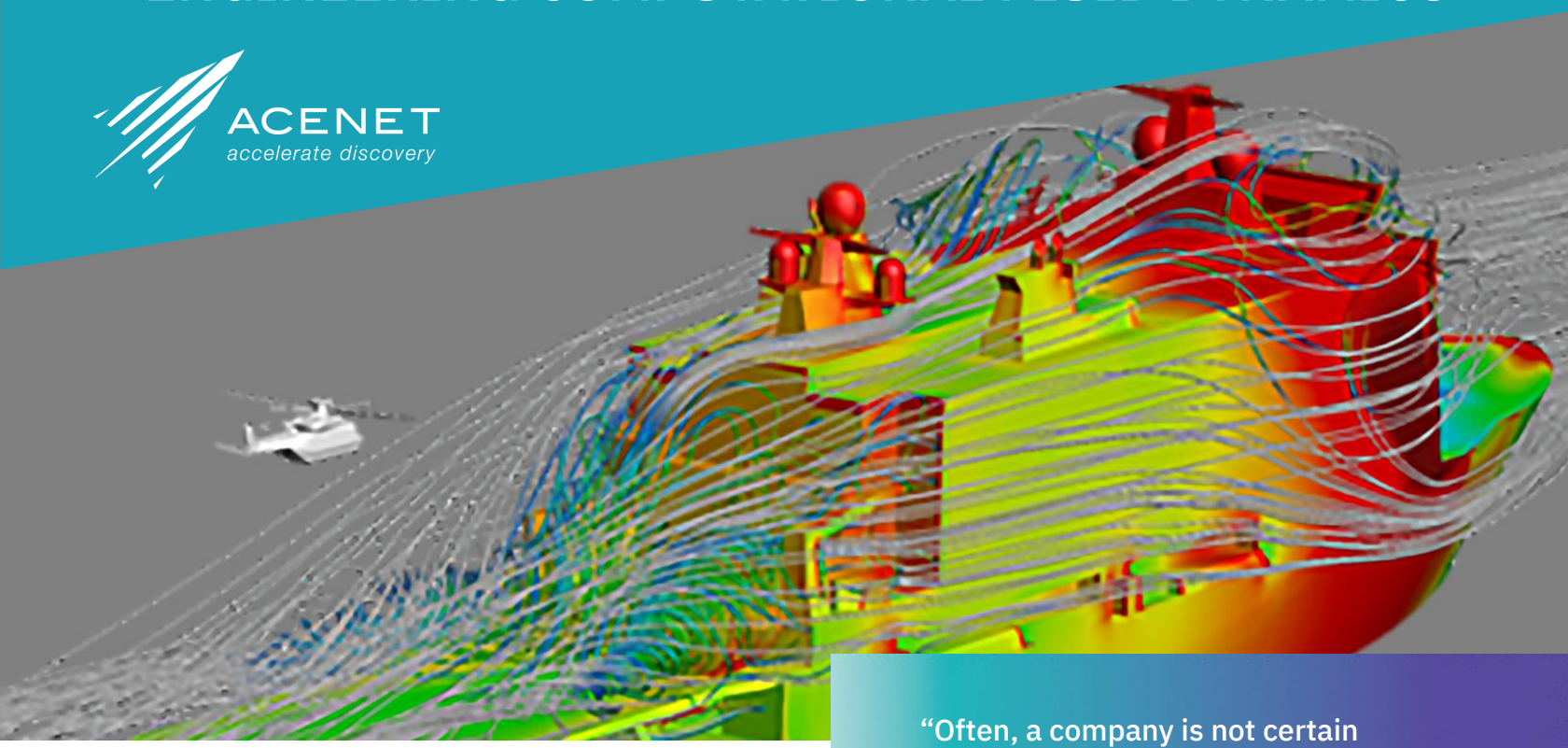

ENVENIO ENGINEERING SIMULATIONS

Timely access to high power computing and technical expertise in this start-up's testing and refinement process expanded their customer base and accelerated the development of a powerful, patented software platform.

> "Often, a company is not certain about a new technology it wants to adopt and needs more information before committing valuable resources. ACENET Solutions can play a vital role in providing unique worker skill sets that cannot easily be assembled in a short time to undertake such projects."
>
> IAN MCLEOD, CEO, ENVENIO INC.

Envenio specialized in Computational Fluid Dynamics (CFD), developing and selling an innovative GPU manycore solver that enables computers to simulate the flow of liquids or gas. Initially pursuing next-generation CFD solutions for vehicles and systems operating in ocean environments, Evenio later branched into construction industry applications and product design, with focus on the aerospace and defence, HVAC, environmental, and agricultural sectors.

Based in Fredericton, with over 15 employees, Envenio was born out of IP developed at the University of New Brunswick (UNB). Its flagship product was the patented EXN/Aero, a fluid simulation software system designed to run on manycore computers.

Note that Envenio Inc. was acquired in 2018. It still operates from Fredericton, NB, though its activities are now focused entirely on its parent company.

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What were the computing challenges?

The EXN/Aero software developers required access to high performance computing resources and the expertise and training needed to utilize them effectively.
Designing CFD software, from scratch, for use with GPUs was a key innovation for Envenio. Most commercial CFD software at the time did not use GPUs.

Evenio's work began in a UNB research lab on small desktop GPU systems. Simulations using CFD can be very large, requiring a significant number of dedicated GPUs, well beyond what laptops or desktop systems provide.

The tight timelines set by the primary R&D sponsor, Defence Research & Development Canada, necessitated dedicated GPU infrastructure.
The dedicated server gave the development team the greater control it needed over the software environment, provided a more open and innovative software environment, and enhanced interaction between university researchers and software developers. As the capability of the software expanded, so did Envenio's client base.

How did ACENET contribute to this start-up's success?

ACENET was a key partner in securing equipment funding, developing system specifications, managing the procurement process, overseeing installation, and undertaking its ongoing operation and management.

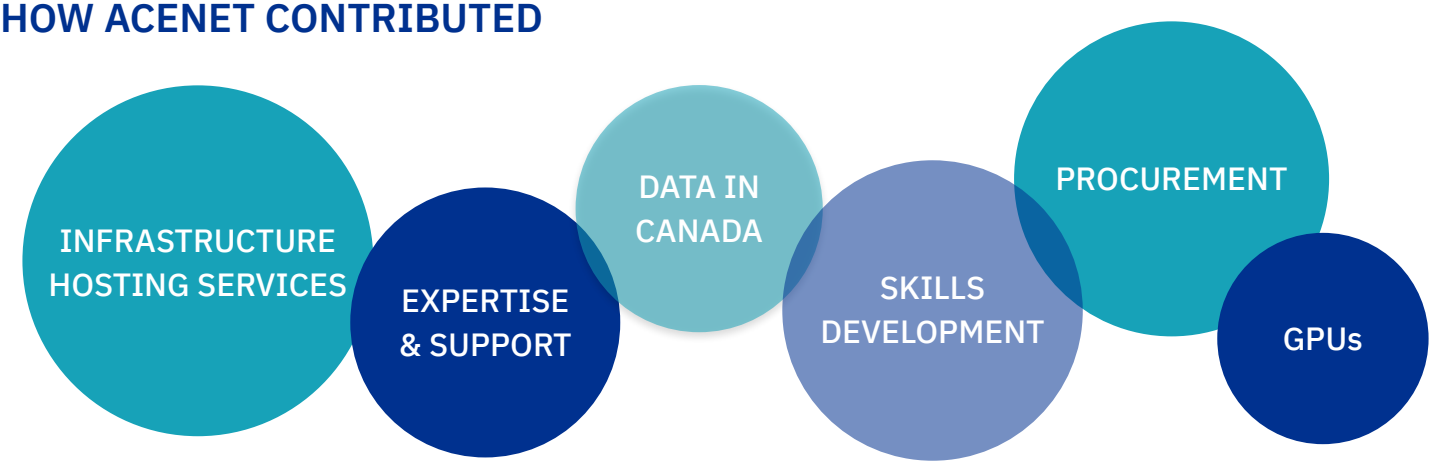
Through UNB sponsorship and government grants, Envenio gained access to a dedicated, state-of-the-art NVIDIA GPU system, housed at the university. The 2015-installed system had 60 CPU cores, 20 GPU cards, and 96 TBs of storage. This accelerated the testing and refining phases, utilizing approximately 25,000 GPU days over two and a half years.

ACENET technical consultants provided both face-to-face and virtual onboarding, ongoing support to the project team, and continual training of new users.
Many of the new people on the development team were graduate-level engineers, but undergraduate programmes rarely include any systematic training in advanced computing. Key proficiencies for new team members included effective use of parallel programming methods (MPI, OpenMP and CUDA), software scripting tools such Python, and software revision and control systems such as GitHub. ACENET's experts helped ensure that all team members were equipped for advanced computing at this level, and so contributed to the development and maintenance of a highly-skilled workforce in the Atlantic region.

What was the outcome?

The EXN/Aero software was successfully patented and licensed, serving customers in Canada, the US and abroad. Based on EXN/Aero, Envenio developed a range of software platforms for CFD, and the principals negotiated the sale of Envenio for an unspecified dollar amount.

HOW ACENET CONTRIBUTED



LET US SHOW YOU HOW YOU CAN ACCELERATE YOUR PROJECT