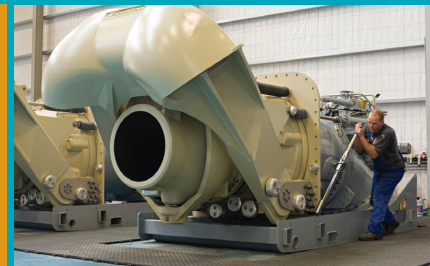


# Hamilton Jet Spirit of innovation

TechNZ supports the manufacturing sector to develop new products, processes and services and improve technical knowledge and R&D ability. Up to \$50 million is invested each year in New Zealand businesses to grow world-class companies through innovative technology.



## The Company

CWF Hamilton, known as Hamilton Jet, is New Zealand's largest marine exporter and ranks among only 50 New Zealand companies achieving annual export earnings of more than NZ\$50 million.

The company was founded by Sir William Hamilton, pioneer of the modern water jet system. Sir William's grandson Mike chairs the current board of directors. The water jet range sells to owners of high-speed marine vessels such as passenger ferries, patrol boats and rescue craft. It is the world's largest manufacturer of water jet propulsion equipment in the sizes it produces, with over 50 per cent market share globally for its product range.

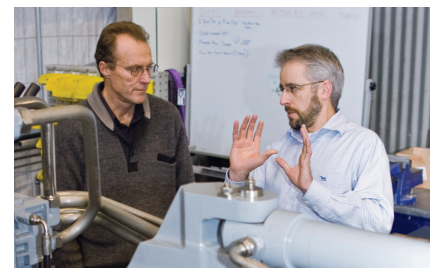
## The Research and Development

Water jets have been the cornerstone of CWF Hamilton's business for 20 years. The early range used conventional, two-dimensional turbo-machinery design methods but, by the mid-1990s, improved performance and new designs were needed.

TechNZ – the Foundation for Research, Science and Technology's business investment programme – provided funding for the company to secure technical expertise to help develop a unique design and analysis package.

TechNZ supports the manufacturing sector with technology and skills funding to develop new products, processes and services and improve technical knowledge and R&D ability. Up to \$50 million is invested each year in New Zealand businesses to grow world-class companies through innovative technology.

“ Like many New Zealand companies, CWF Hamilton does 'a lot on a little', using its culture of innovation and excellence and investing strongly in R&D to remain a world leader in water propulsion equipment. It successfully competes against major international companies like Rolls Royce. ”



## Fact File

**Location:** Christchurch

**Staff:** 340 staff in New Zealand and 60 offshore

**Exporting:** Over 98% of product exported

**First major TechNZ investment:** 1996

**Value of TechNZ investment:** More than \$1 million to date

**Projected revenue from latest R&D:** \$40 million in five years

Above: CWF Hamilton Technical Director Mike Hamilton (left) and Technical Services Manager Phil Rae (right).

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New Zealand Government

“ CWF Hamilton globally dominates its market and successfully competes against international companies such as Rolls Royce. It has strived to understand its product and customers’ needs and, with support from TechNZ, used research and development to deliver innovative improvements. ”

Sue Pauwels, Business Manager, TechNZ

Computational fluid dynamics (CFD), which uses numerical methods and algorithms to solve and analyse problems involving fluid flows, was favoured, but Technical Services Manager Phil Rae says there were few people in the world with the right CFD expertise.

“It really is rocket science, and most of the people with capability in using it for designing water jets were buried inside places like NASA.”

However, a fortunate connection was made between the company and Dr Ian Huntsman, a turbo-machinery designer with world-leading CFD knowledge who was teaching at the University of Canterbury.

TechNZ funding was used to secure Dr Huntsman’s expertise to develop a unique software package.

The software has been in continuous development since the late 1990s, and Dr Huntsman has since become CWF Hamilton’s Research Manager.

The R&D also resulted in a sophisticated test rig for water jets and produced a number of new pump designs. A second project, supported by TechNZ, which began in 2001, continued development of the software and introduced a tool to design the unique geometry of water jet intakes.

“You start R&D with an idea of where you are going and the challenges ahead but it inevitably takes longer and the destination often differs from your expectations. That was very much the case with the first project – it was excellent learning but we needed the second project to turn that into tangible outcomes.”

Mr Rae says going through the TechNZ approval process added rigour to the R&D planning, and the resulting investment was significant in dollar terms.

R&D in recent years has focused on hydrodynamic research, design and testing of new water jet components and developing electronic control systems, but Mr Rae says the company is now embarking on a major project to develop the mechanical technology needed for new water jet designs.

## The Achievements

CWF Hamilton is on a solid growth curve, and Mr Rae says the spirit of innovation that kick-started the company remains strong today.

Recent R&D has delivered the CFD analysis technology, rapid prototyping capability and new products, including the largest water jet the company has ever designed, with an inlet diameter of one metre and a maximum power input of over 5 megawatts.

The company has also developed a unique test rig to measure water jet performance on the water, using a sophisticated data acquisition system.

“We have the whole development route covered, from concept to validation, giving us an edge on competitors and allowing us to generate and test more designs,” says Mr Rae.

While this year’s research and product development budget is NZ\$4.3 million, Mr Rae says the company’s position as the world’s largest water jet manufacturer puts a constraint on resources available for completely new R&D. “We have to keep working on existing products and carrying out incremental developments – our customers demand that.”

[www.hamiltonjet.com](http://www.hamiltonjet.com)



CWF Hamilton has used research and development to grow the business into New Zealand’s largest marine exporter.

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