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DownUnder GeoSolutions goes from Subiaco backyard to \$330m super gas, oil solutions

Peter Milne | The West Australian

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📷 DownUnder GeoSolutions co-founders Matt Lamont and Troy Thompson with their supercomputer in West Perth. Picture: Nic Ellis

Two Perth geophysicists built a backyard shed in Subiaco to house their fledgling business 14 years ago.

Now they have 350 employees across four continents and are looking to spend more than \$330 million on supercomputers.

DownUnder GeoSolutions, founded by Matt Lamont and Troy Thompson, helps oil and gas companies locate their expensive drilling campaigns. There is a lot at stake. Oil and gas consultancy Wood Mackenzie expects \$US37 billion (\$49 billion) to be spent on conventional exploration this year.

Exploration starts with seismic surveys that shoot sound waves into the earth and measure the signals reflected back.

Geophysicists use algorithms and computing power to interpret the signals. There is a trade-off between computer power, time to deliver the results, and the resolution of the results measured in hertz.

Final results can take up to 12 months for one common technique, full waveform inversion, when produced at industry standard resolutions of 12Hz or less.

The difficulty in producing faster, higher resolution results is that doubling the resolution needs 16 times the computing power.

DownUnder wants to push their analysis to 100Hz this year, requiring more than 4000 times the computing power of a 12Hz analysis. The measure of computing power is petaflops: the ability to perform one thousand million million operations a second.

The Magnus computer at the Pawsey Supercomputing Centre in Kensington has a computing power of 1.1 petaflops. It is dwarfed by the 10 petaflops of computing power DownUnder built in its West Perth office and nearby data centre. Mr Lamont, DownUnder's managing director, said it was the only company, apart from computer manufacturers, to which Intel supplied its Xion Phi co-processors.

“You can save a great deal of money if you get creative with how you go about it and you build it all yourself,” he said.

The processors, which act as mathematical accelerators, sit in oil-filled tanks with a heat exchanger to dissipate the energy given off by the electronics. DownUnder designed and patented the cooling system and is considering spinning off a start-up company.

Across offices in Perth, Kuala Lumpur, London and Houston, DownUnder has about 50 petaflops of computing power but plans to boost that eventually to 500 petaflops.

The most powerful computer known in the world today, in Wuxi, China, has 93 petaflops of power. The new computer room, at a cost of about \$US20 million, will be built in Texas or Malaysia.

“We tried to do it in Perth. It doesn't work in Perth. Taxes and power (prices) are too high,” he said. Electricity in Texas was a third of the WA price.

DownUnder plans to fill the computer room to its capacity over the next five years at a cost of about \$US250 million.

Mr Lamont said that during the past few lean years of low oil prices DownUnder chased market share at the expense of margins. Over 100 staff were hired last financial year.

“We had to get bigger to get our R&D up to the point where we can compete with everybody,” he said.

DownUnder has over 30 staff, almost all in Perth, conducting research and development into new algorithms and software.

Half the technical staff have a PhD or master's degree, and they can be mathematicians, physicists, and software developers as well as geophysicists. Employees own about 85 per cent of the company.

Mr Lamont said DownUnder was in a constant race with its bigger competitors to help lower drilling risk.

“The results are stunningly better today than they were 10 years ago, or five years ago, or one year ago,” he said.

“The quality of seismic being produced by everybody is substantially better, and that will absolutely lower the risk.”



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