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Tecterra Inc. leads Calgary's geomatics pack

Canada boasts more than 2,500 geomatic firms with revenues topping \$2.5 billion

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Nearly three millennia after their ancestors built the only one of the Seven Wonders of the Ancient World that still stands, Khifu Pyramid at Giza, engineers Mohamed Abousalem and Naser El-Sheimy aim to help Albertans achieve a durable feat. "They need to take their research to the next level – making science useful," Abousalem says in describing his role as chief executive officer of Tecterra Inc. "Evolution never stops," agrees El-Sheimy, who does double duty as the organization's scientific director and a University of Calgary professor.

Endowed with \$33.2 million in Alberta and federal government funds, Tecterra is embarking on a five-year program of turning knowledge into a growth industry. Abousalem sets his sights on multiplying that seed money 10-fold into a \$300-million business. He aims to make his agency into a matchmaker that forges fertile connections between academic, industry and government operations in one of the most highly technical and skilled fields where all three have strong interests in common.

It is pure coincidence that both leaders of Tecterra as a non-profit national "centre of excellence" grew up in the land of the Pyramids. But it is no accident that the pair's specialty – geomatics, or earth information – transplanted them to Calgary from Egypt. Abousalem started out in Alexandria, El-Sheimy in Cairo. When they stepped up from basic training in their homeland to advanced academic credentials and professional careers, the relocation came naturally.

"Canada has a very high profile in geomatics," Abousalem says. The country is studded with more than 2,500 firms in the field that have annual revenues exceeding \$2.5 billion and 35,000 employees. "Alberta alone has 40 per cent of the market and is definitely a hotbed of geomatics." El-Sheimy says, "Canada is a world leader. Calgary is the hub." U of C president Elizabeth Cannon is a geomatics engineer.

With a resource economy spread across 10 million square kilometers – the world's second-biggest landscape after Russia – Canadians require definition of locations from dam sites to railways on a large scale. The Geological Survey of Canada has explored and mapped the natural wealth since 1841, when it was born as the nation's first scientific agency and one of its earliest public services of any kind.

Nowhere has the need for precise geographical information been stronger than in Alberta. In the 63 years since the Leduc gusher ushered in the modern oil and gas industry, nearly 340,000 wells have been drilled across the province's 661,848 square kilometers, an area 95 per cent as big as



Photography by Jason Stang

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Even in severely depressed 2009 the number of Alberta fossil-fuel wells grew by more than 5,000. Geomatics pinpoints the spots, lays out access routes, defines work sites and records everything for regulation from the first land disturbance to abandonment after production ends. About 400,000 kilometers of pipelines have been installed to knit the dispersed production sites and processing plants into a colossal fossil-fuel factory. They hook up to long-distance lines that deliver most of the output to central Canada and the United States. Like the wells, every meter, twist and turn of the fossil-fuel transportation network is laid out and recorded by geomatics instruments and talent.

Responding to a push from the petroleum industry, led by Shell Canada, the U of C made the specialty into a recognized division of civil engineering in 1979 then elevated it to the stature of an academic department in 1982. The program grew into the largest geomatics school in Canada and one of the biggest in the world. The University of Alberta in Edmonton and the University of Lethbridge also have professional education and research in the field, plus affiliations with Tecterra. Trade schools provide training in practical aspects of putting the science to work, such as a surveying course at the Southern Alberta Institute of Technology in Calgary.

In Alberta, geomatics long ago spread far beyond its oil and gas industry roots. Other sectors such as agriculture, forestry and government services are becoming increasingly heavy users of the science as its technology develops.

Farm tractors, equipped with geographical positioning systems (GPS) that see in the dark and through clouds or fog, work longer hours and save money by operating plows, fertilizer spreaders and harvest equipment in straighter lines across crop fields. Forest fire crews track blazes and make projections of where to dig in for fights with geomatics systems. The science is a weapon in the war against the devastating pine beetle, providing guidance on where to take pest control action most effectively.

By devising new uses for advances in miniaturizing sensor and communications devices, geomatics is becoming a mainstay of public services. The science is behind a recent improvement of the dial-911 emergency service that nails down locations where cell phones are used to make interrupted calls for help. As a branch of business, Abousalem says, "The value of geomatics is huge if you have the right tools, the right technology, and the right people." Alberta has it all, but often in separate scholarly and commercial silos, he adds. With a pedigree that is a blend of scholarship and international industry experience, his mandate is to make Tecterra into a blender that makes profitable enterprises out of the dispersed ingredients.

"Our objective is to generate wealth," Abousalem says. The province has a base of about 500 geomatics firms with 7,300 employees. Starting with an initial batch of projects this fall, Tecterra is vowing to lay foundations for new or expanded geomatics products, services and companies by providing "commercialization" assistance. Abousalem and El-Sheimy set their sights on making a big contribution to training, retaining and employing Alberta engineering talent, as coaches in a blend of science and business that breeds stars at carrying out a high-tech version of the Olympics motto: Smaller, lighter, cheaper.

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