

CLEAN INNOVATION IN FOCUS

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THIS ISSUE FEATURING

Tesera Systems Inc.

Company Vitals

Incorporated: *1997*

Founder: *Bruce MacArthur*

Products/Services: *Data Analytics (Geomatics & Web Services)*

Market Niche: *Data intensive sectors*

Geographic Market: *Canada*

Current Number of Employees: *22*



tesera®

Delivering excellence by solving complex customer problems

In 1993, Bruce MacArthur was hired by a non-profit organization to head up a research and development project, funded through the Government of Canada's Model Forest Program – Canada's commitment from the Rio Earth Summit. The Model Forest Program was developed with an eye to bringing traditional adversaries in forest resource management issues to the same table to build consensus on programs, policies, and approaches to achieving sustainable forest management. The challenge Bruce faced was to “build a spatial planning technology that could model large landscapes, using hundreds of different types of data sets, forecasting over time and space to help meet and optimise differing stakeholder objectives.” Those stakeholders included 40 organizations ranging from Provincial and Federal governments to first nations, research and development organizations as well as environmental groups. They were also tasked with incorporating natural processes like fire, insects and disease that impact the forest landscape over time. The project was both a social experiment and a technical challenge.

| 1997 |

Bruce had previously worked for the BC Council of Forest Industries as Manager of Forest Economics. He knew the industry players, he had an understanding of the technology and he had the

skills to bring the various stakeholders together. The technology was starting to gain traction and in 1997 the Model Forest Program incorporated a 'For-Profit' company to commercialize the technology. Bruce was now both General Manager of the 'Not-for-Profit' and President of the 'For-Profit' company.



Bruce MacArthur, President & CEO

| 1999 |

As the 'For-Profit' started to grow, Bruce faced a potential conflict of interest and had to make a choice. In 1999 Bruce decided to pursue the business opportunity of commercializing the technology and he incorporated Tesera Systems

Inc. (Tesera). A number of the staff came with him. At that time, Tesera's contract work was 100% in the forestry industry and primarily for one large integrated company. **The company grew rapidly** to 40 people along with the associated computer infrastructure required to support them.



Spatial and temporal mapping of hundreds of data sets.

| 2001 |

2001 saw an unanticipated cancellation of the primary contract when there was a new government in BC, and for a twelve-month period the funding for the program was cut. Tesera's work dried up instantly. Bruce spent most of that year hoping that the government would

“ Build the company as if you are going to sell it, diversify your customer base and maintain a strong financial position.”

reinstate the funding for the program. By the end of 2001 he had let go nearly 80% of the staff, and would not take a salary himself for the next year and a half. Although the project funding was eventually reinstated by the next

government, and Tesera won the contract back, the entire experience taught Bruce some valuable lessons.

| 2002 |

Bruce spent from 2002 to 2004 rebuilding the company. He had time to rethink and reached out to organizations like CETAC-WEST. He participated in the Entrepreneur to CEO workshops and learned important lessons that still guide him to this day. Build the company as

“ He knew the industry players, he had an understanding of the technology and he had the skills to bring the various stakeholders together.”

if you are going to sell it, build a diversified customer base and maintain a strong financial position. As Bruce says, **“You need to pay close attention to the booked work on hand, your working capital and your balance sheet. To this day I am debt averse.”**

Bruce had experienced, first hand, the vulnerabilities and risks of having one primary customer in one sector. He felt that going forward Tesera's technology could be applied to different industry sectors as they all face similar business challenges. His primary objective now was to **diversify**. He spent time from 2002 to 2006 leveraging existing relationships to build new market connections. He identified key players within each industry sector and brought them together as part of an integrated pilot project to address a fundamental business need. Tesera utilized the National Research Council - Industrial Research Assistance Program (NRC-IRAP) and the Scientific Research and Experimental Development (SR&ED) tax credit program to prototype and pilot Tesera's core technology in each of those sectors. This pre-operational phase allowed Tesera, in effect, to test and build market awareness before going to market.

| 2003 |

Bruce was still in Prince George. He knew that if he was going to diversify and grow the company he had to move. In 2003 he made the decision to move closer to a larger urban centre, Calgary. Cochrane, Alberta, made sense due to its proximity to both BC and to the East. Bruce was also interested in exploring possible applications in the oil and gas sector. In 2003 Tesera opened its Cochrane office and Bruce moved there in 2004.

| 2006 |

In 2006, Bruce and his team saw an opportunity to analyze seemingly disparate data sets across differing sectors, that share a common set of issues, to identify hidden relationships and unrealized value. This was a significant milestone for the company. Tesera's team had solved a class of problems and recognized that. They understood the underlying mathematics and algorithms that could be applied across a variety of industry sectors sharing common values. The team identified quick wins and started to approach key players.



Bruce and his team saw an opportunity to link data sets across differing sectors that share common values.

| 2008 |

Tesera is an employee-owned company and right from the outset his team, scattered across Canada, has worked virtually from their own homes. This has given Bruce a pool of talented developers to draw from, and allows the

employees to live and work wherever they want, without the need for a conventional office setting and the associated commute. Tesera was an early adopter of remote communication technologies. What started out as primitive audio/video conferencing has now evolved into fully integrated online SAAS communication and business management tools that the company uses to operate efficiently and cost-effectively. Originally they purchased and managed 40 servers. In 2008 when operating in the Cloud became a reality, Tesera immediately made the switch, sold all their servers, making Tesera one of the first companies to operate entirely 'in the Cloud'. By bringing developers on board in other parts of the world, Bruce is now looking at the opportunity of being open for business 24 hours a day.

“Bruce has always been debt-averse and ran the company the same way.”

Tesera had been operating as a service provider addressing specific customer problems. Tesera now recognized that there was room in the market to also **develop their own products**. Bruce has always been debt-averse and ran the company the same way. The business model allowed them to self fund R&D along with National Research Council – Industrial Research Assistance Program (NRC-IRAP) funding and SR&ED credits. Their professional services generate the revenue to reinvest into product development. This model helped to identify patterns for the type of applications they want to develop. **Tesera is launching two new products this year. And as for diversification, they always have 4 or 5 projects in different sectors at all times.**

The market is now catching up to Tesera. Monetizing data is now an art form of its own. Shaw Communications, for example, considers its data its most valuable asset. Organizations are challenged with a lot of data, and their main concern is how to monetize the data that has been stored for decades and never used. Does it even have value? This is the space in which Tesera operates.

With their expertise, Tesera can open up the possibilities of what can be done with data. Tesera is an “integrator of people, data and technology,” mining the internet for open source programs, reworking them, if need be, and parsing them together to find solutions for customers’ problems.

Operating in the Cloud allows Tesera to cost effectively undertake complex analytics and compete head-on with larger companies. Tesera’s management set up systems internally that allow them to fail fast on projects, quickly make adjustments and get back on track fast. Every Friday they have their ‘project scrums’ where they identify the next week’s tasks. Senior managers then meet and allocate resources. Monday morning each employee receives an email clearly indicating what they need to work on that week.

For an example of what Tesera does, look at their Municipal Risk Assessment Tool (MRAT). The insurance industry has always used historical claims data to predict future risk, and they price their insurance products accordingly. However, with the advent of climate change affecting outcomes so quickly, the paradigm of using the past to predict the future is no longer reliable. Tesera uses an ensemble of climate predictions, and municipal infrastructure data to generate risk equations that can generate alternative scenarios and present the results on urban maps. MRAT can predict the potential risk of a severe climate event on basement flooding (sewer and stormwater) for certain types of infrastructure in a specific geographic location.

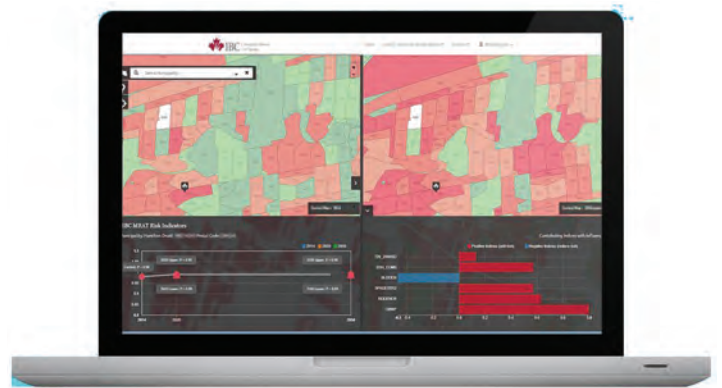
“ Giving customers the tools to track and manage large complex databases simply and in real time.”

The ultimate goal of MRAT is to provide insight as to why basement flooding damages are occurring, by way of selection and weighting of certain kinds of indicators. It also provides an indication of what proportion of the

damage can be explained using a risk equation or model. In this way, the MRAT provides city engineers, planners and managers with an objective means for testing their preconceptions of what are the most probable causes of damage, and so too, for determining how much of the damage can be reduced under different scenarios.

| 2015 |

The Insurance Bureau of Canada (IBC) funded the development of the MRAT technology between 2010 and 2015 through Tesera and Dillon Consulting Limited. In August 2015, Tesera was invited to bid on operationalizing MRAT and subsequently won the contract in January 2016. IBC also assigned the technology rights and patent ownership to Tesera.



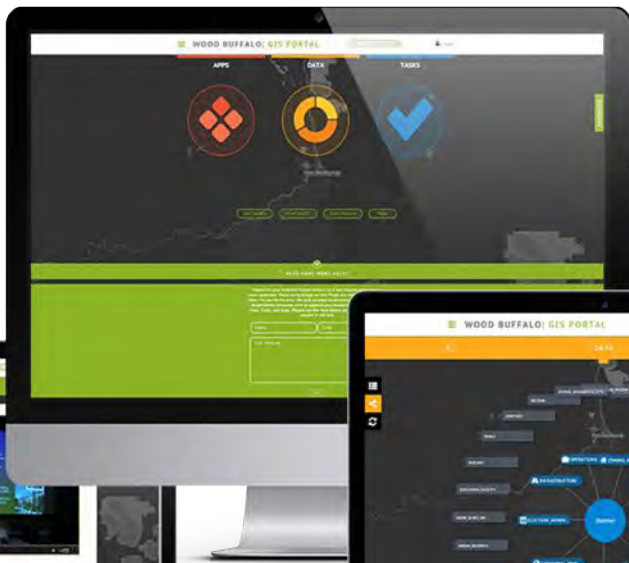
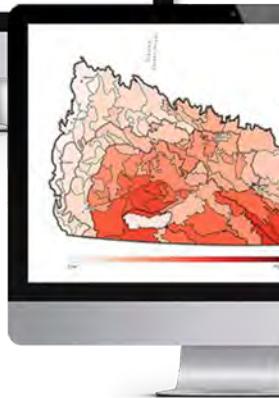
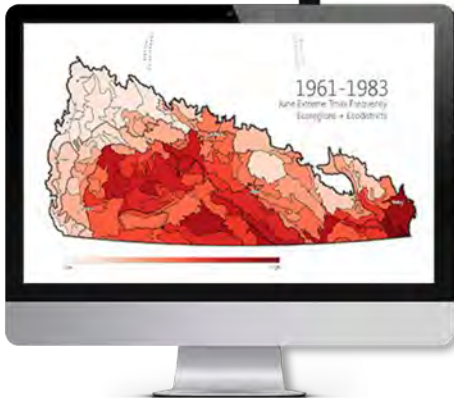
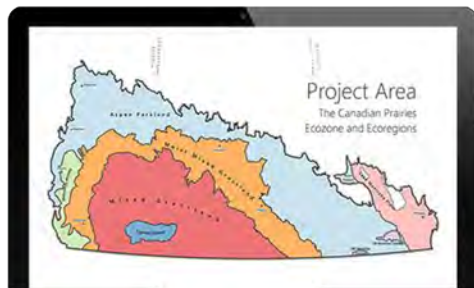
Tesera was retained by the Insurance Bureau of Canada to design, build, and implement the Municipal Risk Assessment Tool (MRAT) - a climate risk management technology to help reduce basement flooding and insurance claims, and prioritize improvements to municipal infrastructure.



The Tesera Team

| **The Future** |

Tesera's values focus on finding organizations with which they can build long-term relationships, trust and loyalty. Tesera's Team also shares the corporate objective of taking on projects that will make the world a better place to live in the future. Has Tesera diversified? They have done that and more. To date they have delivered over 500 projects and operate in 6 to 7 sectors. They now have 20 employees and expect to double their annual revenues each year until 2020.



The generous and timely support by the **National Research Council – Industrial Research Assistance Program** has been a significant contribution to the company's growth.



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