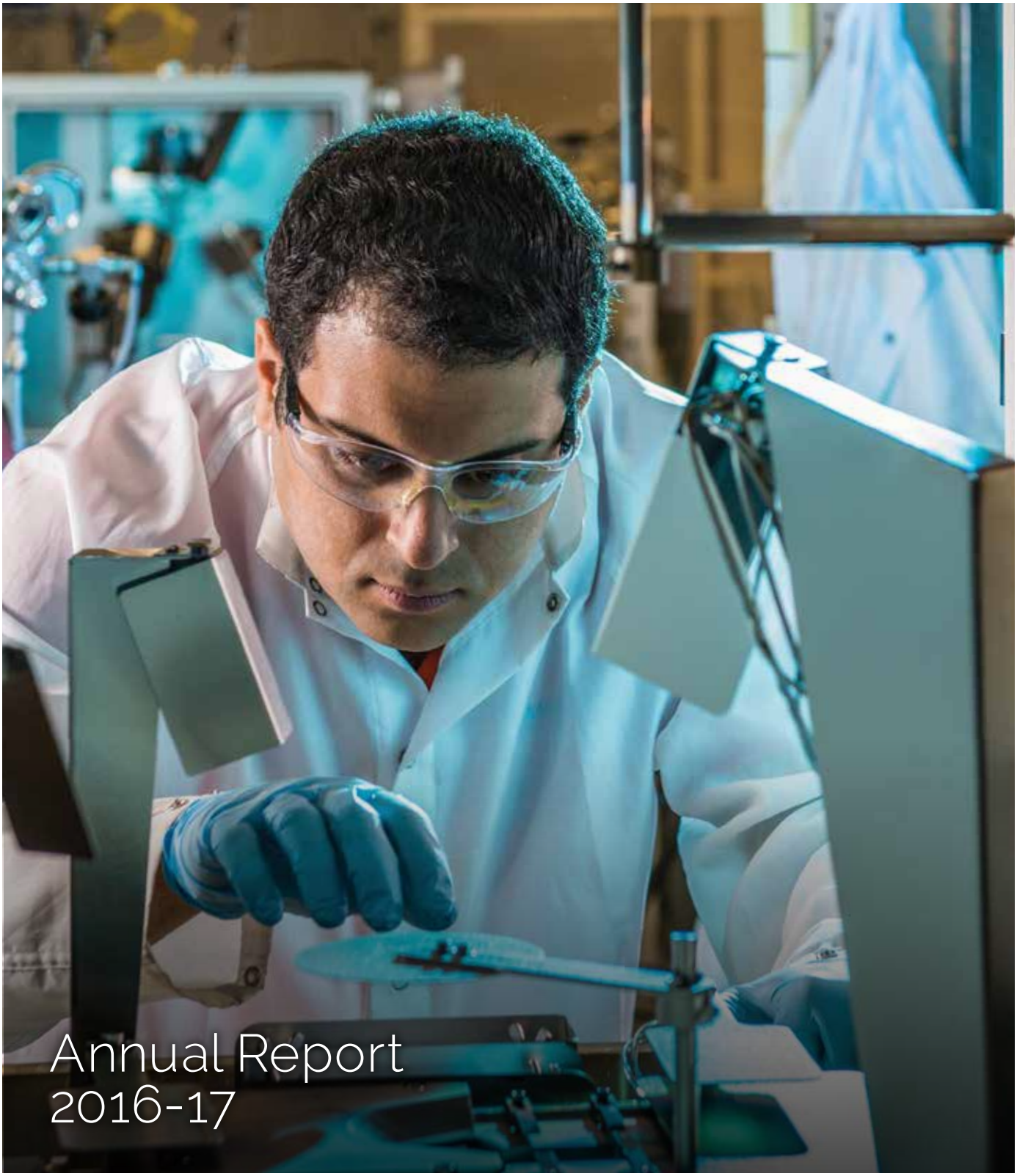


# Annual Report 2016-17

TRILLIUM NETWORK
FOR ADVANCED MANUFACTURING

# Contents



Photo Credits: *Angstrom (Cover, p. 3), Clearpath (p. 7), Magna (p. 9), Cavalier Tool (p. 11), Transformix (p. 15)*

# Message from the Chair

To many people in business, there is nothing quite like the excitement of being part of a start-up company. Entrepreneurs drive growth in our economy and as a start-up social entrepreneur, the Trillium Network is working to support the growth of Ontario manufacturing.

Like any start-up company, we have a vision of a successful future. In our case, success translates into a vibrant and growing manufacturing sector in Ontario that competes and wins in global markets to sell manufactured products and associated services around the world.

How do we support manufacturing? Our watch-words are “connect, convene and collaborate” and our first step is to build a network to make connecting a diverse group of manufacturing firms with organizations that support them ranging from government departments and educational institutions to independent think tanks and technical testing facilities. A look at our growing number of partners is testimony to our broadening network.

We have also begun to convene with our partners, firms and other industry actors to take the steps needed to move Ontario manufacturing forward. Trillium staff are participating in an increasing number and range of events designed to support manufacturing growth.

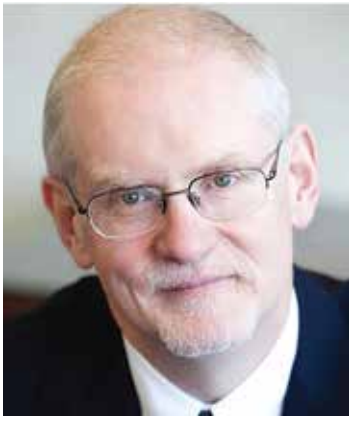
Finally, Trillium has started to collaborate with partners like BDC and EDC and others to move specific initiatives forward. The willingness of our partners to collaborate with Trillium to support the growth of manufacturing is both welcome and gratifying.

As with any start-up, Trillium is an ‘all-hands-on-deck’ enterprise, where everyone pitches in to get the job done, regardless of their title. The Board of Directors is proud of what has been accomplished by our staff in our second year of operation. We are looking forward to a bright future, both for Trillium and, more importantly, for Ontario manufacturing.

**CAROL STEPHENSON**

Chair of the Board
Trillium Network for Advanced Manufacturing

# Message from the Managing Director



The first year for many start-up companies is divided between getting set up and growing the business. The same was true for Trillium. Now completing our second year, we have focussed on growth and it's been a very busy and rewarding time. We've grown the number of partners in our network and the number profiles of successful manufacturing firms. Our social media reach has grown considerably, allowing us to spread the word about Ontario manufacturing news and events. We've made substantial progress on our key projects of Ontario Global 100 and Geo-Mapping.

To make this progress, the organization has changed and grown. We welcomed long-time senior public servant, Richard Dicerni, as the newest member of our Board of Directors. Alister Smith, who recently retired from his post as Canada's Executive Director at the World Bank, joined us as a Trillium Fellow. Bing Feng, an Honours BA in Economics, joined us as a Program Officer, replacing Omar Fayoumi who left to apply his growing skills in the private sector.

Big challenges lie ahead for Ontario manufacturing. Political changes in the US mean that market access is now more uncertain for many Ontario firms and underline the need to diversify our customer base. Rapid advances in digital technologies are making the next industrial revolution accessible to firms of all sizes.

It's an exciting time to be involved in manufacturing. At Trillium, one thing remains constant. Despite the challenges and technological changes that lie ahead, we will continue to do everything we can to help Ontario manufacturing firms grow and prosper.

**PAUL BOOTHE**

Managing Director
Trillium Network for Advanced Manufacturing

## Firm Profile: Clearpath Robotics

In 2009, with the world reeling from a global economic crisis, Clearpath Robotics (Clearpath) was established in Kitchener, Ontario by four University of Waterloo mechatronics engineering graduates. Despite public skepticism and hesitation from investors, Clearpath has continued to prove that innovation, hard work, and strong partnerships are reliable ingredients for success.

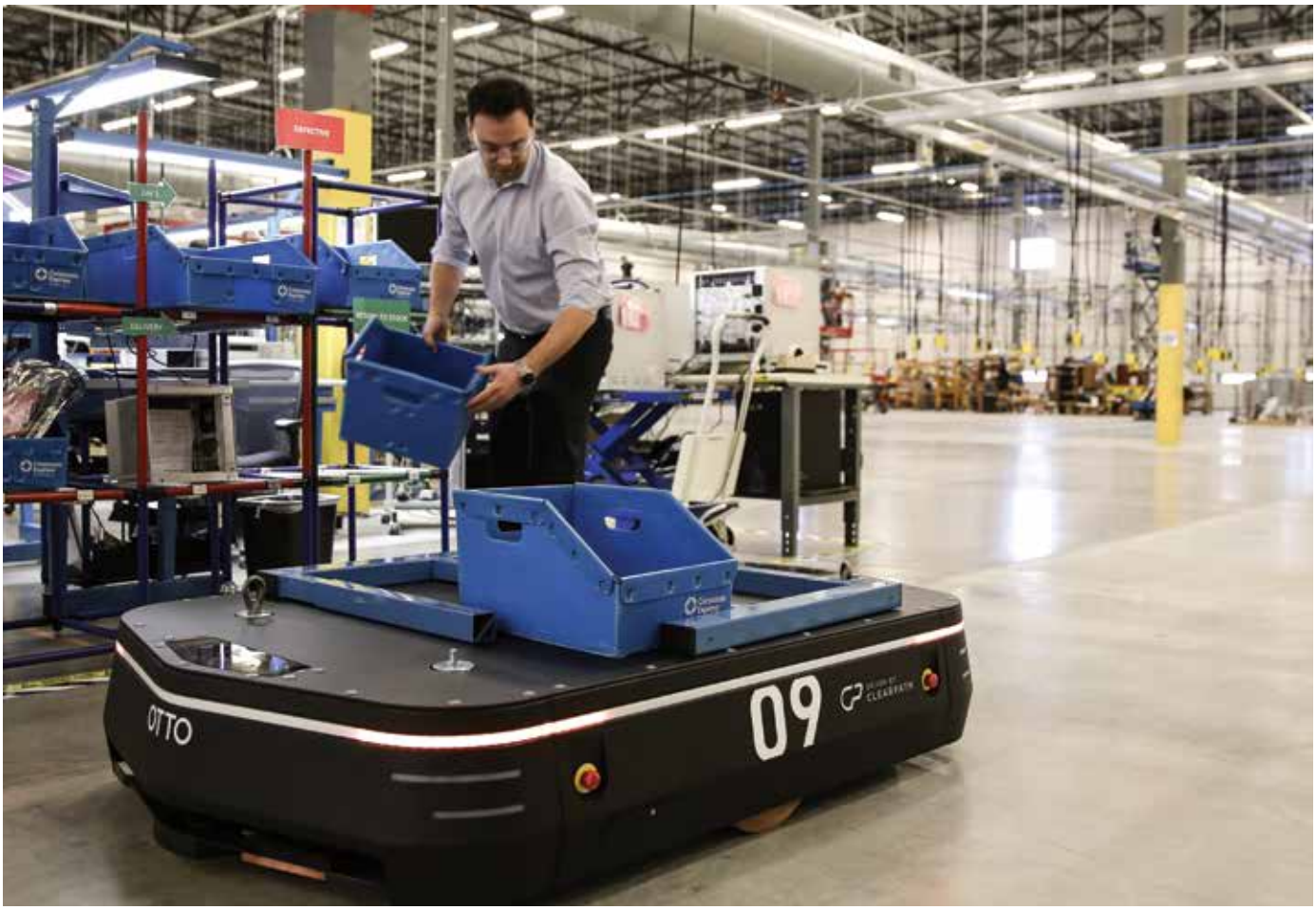
"Originally, the business idea was to build robots to clear landmines in war-torn countries; that's where the name Clearpath comes from," says Meghan Hennessey, marketing communications manager at Clearpath. However, facing significant barriers in 2009, the founders decided to shift the company's focus from military applications to customizable robotic platforms for academic research. Through six years of working with customers in this area, Clearpath expanded into different industrial applications.

Both Clearpath's research and industrial divisions are based on the vision of "building robots to automate . . . dull, dirty, and dangerous jobs." Research vehicles have been used in a variety of applications (e.g., military, agricultural, and mining), and clients include the University of Waterloo, Massachusetts Institute of Technology, and Harvard University. The research robotics have been exported to over 40 countries.

In April 2016, OTTO Motors, a division of Clearpath, was launched with the aim of building unmanned vehicles for industrial material handling. This division is now building self-driving vehicles for light-load and heavy-load material transport in factories and warehouses. These vehicles are used for different applications according to their size differences. OTTO Motors is currently selling to the North American market; prominent customers include General Electric and John Deere.

"With a $100 billion market per year in the United States for industrial robotics in manufacturing, there is plenty of opportunity to grow the OTTO Motors division within North America," says Hennessey. "We are focusing on . . . automating material transport within industrial centres." To achieve this goal, Clearpath adopts new concepts to innovate and enhance the OTTO Motors product offering. For instance, Hennessey notes, "Using a 360-degree perception method, and Clearpath's proprietary software, the firm's self-driving vehicles can figure out the most efficient route for transporting materials and dynamically move their way through the facility."

Clearpath is proud of its hard-working and talented team, comprised of 130 professionals. The majority of the employees are from the Waterloo region and the Greater Toronto Area, but due to Clearpath's reputation in the robotics industry, the company attracts talent from all over the world. Approximately 60 per cent of its employees are engineers with training in robotics automation, electronics, computer science, mechanical engineering, or electrical engineering; the remaining 40 per cent are split between roles in operations management, sales, and marketing.




Clearpath's founders continue to maintain a strong connection with the University of Waterloo and with other local educational institutions. The firm recruits students for co-ops and internships directly from the University of Waterloo, Wilfrid Laurier University, and Conestoga College. Clearpath also participates in events hosted by these institutions, and sponsors some of their robotics clubs. Further, the company has remained closely tied to the Accelerator Centre of Waterloo, a business centre that helped it to get started.

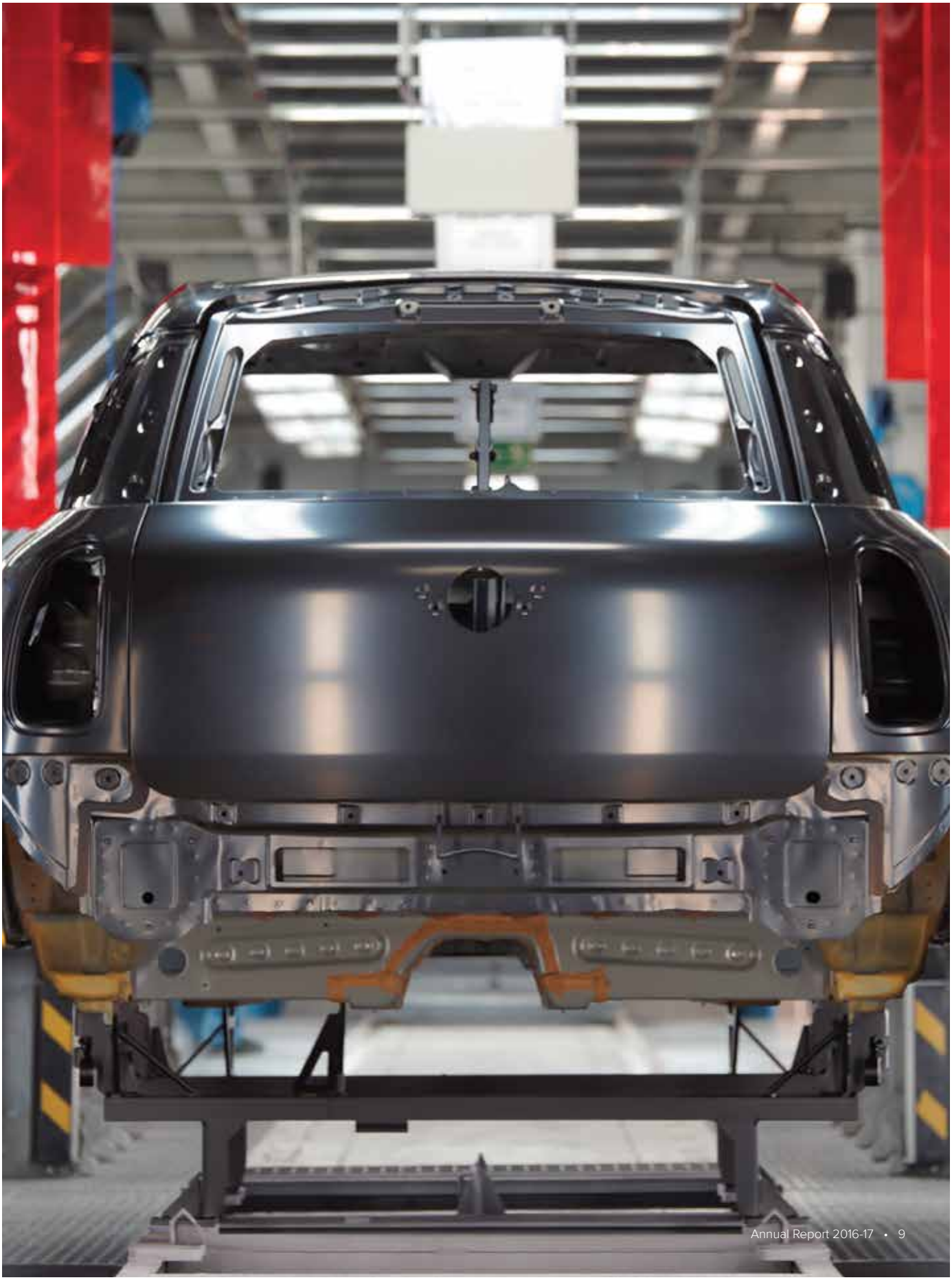
Clearpath utilizes the Scientific Research and Experimental Development (SR&ED) Tax Incentive program, the Industrial Research Assistance Program (IRAP), and FedDev Ontario's Investing in Business Innovation (IBI) program for research and innovation.

However, as the company moved beyond the start-up phase, Hennessey says relevant government grants became scarce: "For companies like Clearpath that sit between a start-up and a mid-sized company and focus on growth, government grants are somewhat limited."

When asked about Clearpath's upcoming plans, Hennessey replies without hesitation, "We will remain headquartered in Canada; . . . we love this area, and it is a hub with a great talent pool." The company is building technologies that anticipate the Fourth Industrial Revolution (Industry 4.0), and is prepared for any challenges and opportunities the future may bring. People, innovation, and partnership make Clearpath a prime example of a successful Ontario-based manufacturer.

## Our Mission

The Trillium Network for Advanced Manufacturing is a non-profit organization dedicated to supporting the growth of Ontario manufacturing. Working with our partners, Trillium connects, convenes and collaborates with like-minded individuals and organizations to support the manufacturing sector. We use our network to connect partners to make them aware of the many initiatives underway to encourage manufacturing. When appropriate, we convene groups to discuss issues and opportunities facing Ontario manufacturers. Finally, we look for opportunities to collaborate with partners on projects of common interest.



## The Trillium Team

**BOARD OF DIRECTORS**

Trillium is governed by a Board of Directors chaired by Carol Stephenson. Board members include Paul Boothe, Richard Dicerni, Ian Howcroft, Ray Tanguay (Vice-Chair), Peter Wallace and Ben Whitney.

**STAFF**

Paul Boothe, Managing Director
David Hudson, Deputy Director
David Moloney, Deputy Director
Alister Smith, Fellow
Denise Deschênes-McKay, Office Manager
Bing Feng, Program Officer

**PARTNERS**

The list of Trillium Network partners is growing. Current partners include:

Automotive Parts Manufacturers' Association
Automotive Policy Research Centre
Business Council of Canada
Business Development Bank of Canada
Canadian Manufacturers and Exporters
City of Toronto
Conference Board of Canada
Excellence in Manufacturing Consortium
Export Development Canada
FedDev Ontario
Innovation, Science and Economic Development Canada
Institute for Competitiveness and Prosperity
Invest Ontario
Lawrence National Centre for Policy and Management
Ministry of Economic Development, Employment and Infrastructure
Ministry of International Trade
Mowat Centre
National Research Council Canada
Waterloo Economic Development Corporation
Yves Landry Foundation

## What We Do

Building on the recommendations of the Lawrence Centre's study "Future of Canadian Manufacturing: Learning from Leading Firms", we are currently focusing on three areas:

**BUSINESS-TO-BUSINESS MENTORSHIP**

We are working with Business Development Bank of Canada and other partners to establish and grow Ontario Global 100, a business mentorship organization that aims to support the next generation of Ontario's global exporters.

**EDUCATIONAL PARTNERSHIPS**

We are working with our partners to collect and map current and potential future connections between firms and educational and research organizations to encourage collaboration on skills and business-led research and development.

**INVESTMENT ATTRACTION AND TRADE PROMOTION**

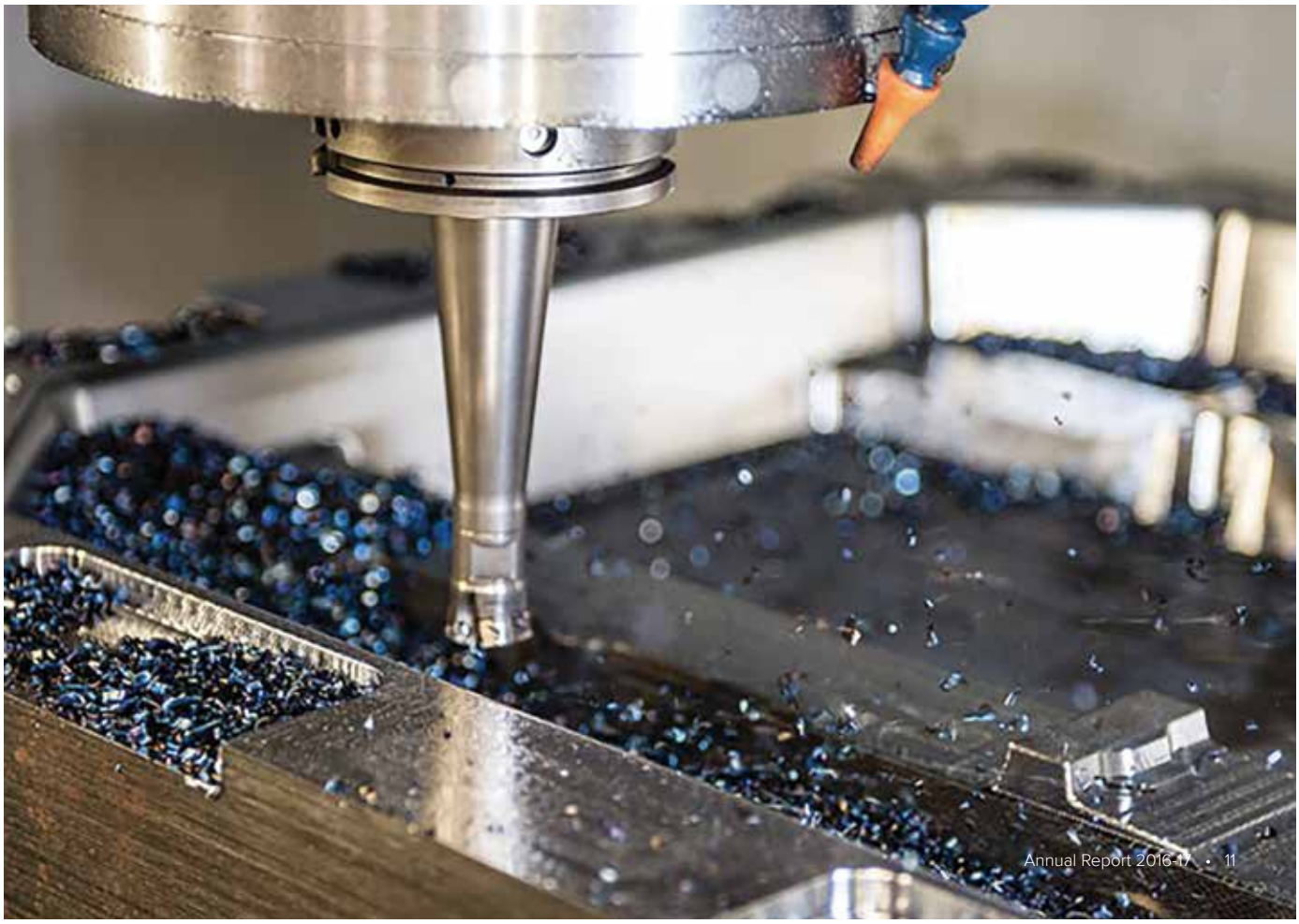
We are working with our federal, provincial and private-sector partners to develop software to support manufacturing investment attraction in Ontario. Working with OG100 and our partner, the Ministry of International Trade, we are disseminating information to firms seeking to locate or expand operations in Ontario or to grow sales in foreign markets.

## Year Two Performance Report

With the first-year administrative challenges facing every new organization behind us, in Year 2 we devoted ourselves fully to expanding the network and connecting, convening and collaborating with our partners to support the growth of Ontario manufacturing. In particular, we met our target of recruiting 5 new partners, bringing our total to 20. New partners include the Excellence in Manufacturing Consortium, Invest Ontario, the National Research Council Canada, the Ontario Ministry of International Trade, and the Yves Landry Foundation. Working with our partners, we used social media to greatly expand the reach of the network and profile more than 20 new manufacturing success stories.

Richard Dicerni joined the Board of Directors and Alister Smith was appointed a Network Fellow. Bing Feng took over from Omar Fayoumi as Program Officer.

As an environmentally-responsible organization, we conducted and published our first greenhouse-gas (GHG) audit. We offset necessary emissions to become a carbon-neutral entity.



# Initiatives

In keeping with our three priorities, we completed or made progress in a number of areas:

**FIRM PROFILES**

As part of our efforts to change the narrative around manufacturing in Ontario, Trillium profiled a selection of Ontario manufacturers. The profiles consist of a standard business description, as well as a short narrative article suitable for media dissemination. To date, more than 40 profiles have been completed, posted on the Trillium website, and promoted on social media.

**BUSINESS-TO-BUSINESS MENTORING**

Working with BDC, we developed the Ontario Global 100 concept patterned after the very successful Quebec organization, QG100. This year, Tom Jenkins of OpenText and Sandra Pupatello of PwC Management Services joined the Board of Directors as Chair and Vice-Chair. The number of Founding members grew from ten to fifteen with the addition of GM Canada, Linamar, Magna, Martinrea and OpenText. The number of regular members is growing as a result of our active recruitment process.

## Profiling Hidden Successes

For every high-profile plant closure reported in the media, there are many manufacturing firms being established or growing in Ontario. In an effort to find out about these hidden manufacturing success stories, the Trillium Network is working to disseminate their stories. On any given week, you can find student interns from Western University traveling around the province to interview firm executives and document their stories. We invite you to visit the Profiles page of the Trillium Network website to share in our excitement about these great, under-the-radar Ontario manufacturers.

## OG100

Trillium staff stepped in this year to manage OG100 while new management leadership is being recruited. In addition to managing the day-to-day operations of the organization and driving the recruitment of members, staff took on the organization of OG100's biggest event of the year: an evening for members and guests with His Excellency, Governor General David Johnston. The Governor General spoke about his new book on innovation, co-authored by OG100 Chair Tom Jenkins, entitled *Ingenious: How Canadian Innovators Made the World Smarter, Smaller, Kinder, Safer, Healthier, Wealthier, and Happier*. The March 29th event was held at the Rotman Business School with more than 100 people in attendance.

**EDUCATIONAL PARTNERSHIPS**

In year two we expanded our work on the Geo-Mapping Program (GMP) to address two of our areas of focus: educational partnerships and investment attraction. We continue to refine the software based on the feedback of stakeholders. A partnership with Scott's Directories has given us access to a large Ontario manufacturing database. We also devoted considerable time to disseminating our work to institutional partners. Discussions with our partner, FedDev Ontario, on further collaboration are advancing.

## The Geo-Mapping Program (GMP)

The GMP is a piece of innovative software that uses geo-spatial technology to locate manufacturing firms and education and research facilities on a searchable map of Ontario. The software will allow firms and educational and research organizations to find matches based on their needs and capacities. In the addition, the software can be used by economic development professionals and firms to compare investment locations based on proximity to suppliers and transportation facilities, skilled labour and R&D partners.

**INVESTMENT ATTRACTION AND TRADE PROMOTION**

We continued to support the Auto Advisor over the past year, as well as participate in activities and events with our partners to attract manufacturing investment. For example, Ray Tanguay, Paul Boothe and David Moloney were all speakers at the October 2016 FDI Forum in Toronto organized by Area Development Magazine for municipal and regional development professionals. Our social media collaboration with Invest Ontario has been especially productive in disseminating information about the Ontario investment climate and ecosystem.

## Concierge Service for FDI

One of the key recommendations of our year one work on Ontario (and Canada's) approach on investment attraction, was the need of a single-window "concierge" service that acted to coordinate programs across departments and orders of government. The recent effort of both the federal and Ontario governments to coordinate their investment attraction services more closely across departments is, in our view, a big step forward. We will watch with interest as these single-window organizations are set up, and look for opportunities for further coordination between the federal and Ontario governments.

## Firm Profile: Transformix Engineering

A multitude of success stories demonstrate the positive contributions of immigrants to Canada's economy and culture. Many of these immigrants overcame considerable adversity to come to Canada. Adversity can act as a powerful motivator, driving the ambition for a better life; this is certainly the case for Peng Sang Cau, president and chief executive officer of Transformix Engineering (Transformix).

Cau was born in Cambodia during the country's darkest period, the reign of the Khmer Rouge. After Vietnam invaded Cambodia in 1978, Cau and her surviving family members gained refugee status and arrived in Canada. Education and hard work were the focus of the family's new life in Saskatchewan. This dedication paid off for Cau when she graduated with a degree in commerce from Queen's University. However, her propensity for hard work continued to guide Cau, and in 1995, she and three engineering graduates founded Transformix, initially working from her basement.

Originating as an engineering consulting firm and later adding custom machine shop services, Transformix evolved steadily, taking its ambitions and products to the global forefront of advanced manufacturing. The firm's current efforts are focused on its trademarked "CNCAssembly®" technology and products, creating highly standardized and flexible assembly machinery that can be configured to assemble numerous products with incredible speed and accuracy.

Initially, when approached by businesses looking to automate repetitive assembly processes, Transformix had to design an end-to-end assembly process according to each customer's specific requirements. However, in 2009, a multi-year contract with a European agrochemical firm gave Transformix a new direction. The specific business application involved automating sugar cane processing, seed removal, and planting in Brazil. The research and development (R&D) spurred by this contract led to new system products that have been granted patent protection.

CNCAssembly® technology works from a set of standardized proprietary, programmable robotic "engines" that are physically linked and supported by customized software. Using standard yet flexible engines to configure customized solutions for a wide range of customer needs resulted in significant efficiencies and cost reductions for Transformix, thereby offering a major advantage for its customers as well. Tooling requirements are reduced by 80 to 90 per cent with these systems, saving time and money. With the implementation of CNCAssembly®, manufacturers are also able to condense a conventional assembly process into a much smaller area, eliminating wasted time spent moving parts from one process (machine) to the next. CNCAssembly® optimizes assembly footprints, while maintaining high speed and quality. Finally, the inherent flexibility of the CNCAssembly® technology offers gains beyond operational savings since it enables customers to take new products to market more quickly.

Transformix's new technology is not only resulting in international patents, but is also attracting attention from far-flung customers: the company currently exports 100 per cent of its product (50 per cent to Europe, 45 per cent to the United States, and 5 per cent to South America). Cau emphasizes the need for Canadian manufacturers to make similar investments in machinery and systems to stay technologically innovative and cost-competitive.

Transformix has a total of 53 employees, 23 of whom are engineers, which aligns with the firm's focus on innovation. The company's Kingston, Ontario location means the majority of its engineers are Queen's University graduates, like the original founders. However, an engineering degree is not enough to guarantee a position at Transformix. The company looks for individuals who can think "outside the box," work on a fixed timeline and budget, and demonstrate integrity innovation, respect, and passion. One of the ways that Transformix tests/identifies prospective employees is through co-op programs and summer student positions.

R&D has been critical to Transformix' success. Cau names the federal government's SR&ED Tax Incentive as one of the best programs for firms like hers, although she also notes that certain gradual changes to the program "have been detrimental."

True to its name, Transformix is "transforming" the applicability of automated assembly—a testament to its founders' skillfulness and perseverance.

# Statement of Financial Position as of March 31, 2017

| **ASSETS**<br>**CURRENT** | **2017** | **2016** |
|---|---|---|
| Cash | $ 64,264 | 99,235 |
| HST rebate recoverable | 2,456 | 11,865 |
| Prepaid expenses | 24,737 | - |
| | 91,457 | 111,100 |
| Capital assets | 22,200 | 25,115 |
| | **$ 113,657** | **136,215** |

| **LIABILITIES AND NET ASSETS**<br>**CURRENT** | | |
|---|---|---|
| Accounts payable and accrued liabilities | $ 11,051 | 4,500 |
| Source deductions payable | 14,177 | 45,977 |
| Deferred revenue | 66,229 | 60,623 |
| | 91,457 | 111,100 |
| Deferred contributions related to capital assets | 22,200 | 25,115 |
| NET ASSETS | | – |
| | **$ 113,657** | **136,215** |

# Statement of Operations as of March 31, 2017

| REVENUE | 2017 | 2016 |
|---|---|---|
| Grants | $ 490,251 | 411,225 |
| Amortization of deferred contributions related to capital assets | 5,612 | 3,037 |
| Interest | 1,021 | 1,446 |
| | **$ 496,884** | **415,708** |

| EXPENSES | | |
|---|---|---|
| Salaries, benefits and consulting fees | $ 377,809 | 295,612 |
| OG 100 membership fees | 50,000 | 50,000 |
| Geomapping programming fees | 1,846 | 29,103 |
| Rent | 13,912 | 9,576 |
| Professional fees | 7,649 | 9,198 |
| Website development and maintenance | - | 7,536 |
| Meetings and travel | 24,952 | 6,649 |
| Amortization of capital assets | 5,612 | 3,037 |
| Utilities | 3,789 | 2,365 |
| Office and general | 9,479 | 1,979 |
| Insurance | 1,836 | 653 |
| | **$ 496,884** | **415,708** |

**Auditor's statement:**
This financial summary is an excerpt from the complete Financial Statements of the organization, which were audited by BDO Canada LLP, dated May 9, 2017 and as such does not contain all disclosures required under Canadian accounting standards for not-for-profit organizations. A copy of the complete audited Financial Statements is available from the organization upon request.

# Year Three Operating Plan

With successful completion of almost all Year 2 objectives and of our financial targets, Year 3 will be devoted to a mix of existing and new initiatives.

### Objective 1: Building the Network

Using our website and social media, we will continue to promote work by our partners and others that supports the growth of Ontario manufacturing. We will increase the target number of completed profiles from 40 to 60 firms and our average monthly social media presence by 20 percent.

### Objective 2: Work in Priority Areas

**BUSINESS-TO-BUSINESS MENTORING:** We will continue to support the growth of OG100 by providing administrative services for the organization during the transition to a permanent administrative structure. We will recruit permanent management personnel and support the growth of the organization to 50 members by March 2018.

**EDUCATIONAL PARTNERSHIPS AND INVESTMENT ATTRACTION:** We will complete discussions with FedDev Ontario regarding collaboration on the GMP. We will launch the first public-facing version of the GMP using our new, expanded manufacturing data set in 2017-18 and disseminate information regarding the uses of the GMP to our partners and stakeholders.

**TRADE PROMOTION:** Through our work with OG100 and our collaboration with Ontario Ministry of International Trade, we will develop our analytical capacity in this new priority area, as well as disseminating information on trade to our manufacturing stakeholders.

**DIGITAL MANUFACTURING:** We will build analytical capacity in this new priority area and will use our social media tools to disseminate information to firms on the adoption of Industry 4.0 techniques.

**FINANCIAL:** We will meet our target of budget balance.

**ENVIRONMENTAL:** We will conduct and publish a GHG audit of our activities, offsetting all necessary emissions to continue as a carbon neutral entity.

# 2018-20 Financial Plan

| REVENUE | | YEAR ENDING (CAD $) 2018 | 2019 | 2020 |
|---|---|---|---|---|
| Province | | 500,000 | 500,000 | 500,000 |
| Carry-forward | | 64,000 | – | – |
| | Total | 564,000 | 500,000 | 500,000 |

| EXPENSES | | | | |
|---|---|---|---|---|
| Staff | | 421,000 | 400,000 | 400,000 |
| Accommodation | | 20,000 | 20,000 | 20,000 |
| Office Expenses and Supplies | | 20,000 | 20,000 | 20,000 |
| OG100 | | 50,000 | 15,000 | 15,000 |
| Events and Travel | | 20,000 | 20,000 | 20,000 |
| Projects and Miscellaneous | | 33,000 | 25,000 | 25,000 |
| | Total | 564,000 | 500,000 | 500,000 |

**TRILLIUM NETWORK**
FOR ADVANCED MANUFACTURING

Connect.
Convene.
Collaborate.

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Advanced Manufacturing
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