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# INVEST IN CANADA



## CANADA'S ROBOTICS INDUSTRY



With a 35% annual growth in robot orders from 2010-2015, Canada leads the North American rise in demand for robots, with strong growth in the automotive, Unmanned Aerial Vehicle (UAV) and space segments<sup>1</sup>

# CANADA'S POSITION IN THE GLOBAL ROBOTICS VALUE CHAIN

The global robotics market is experiencing a strong upswing in demand, with 2014 seeing global robot sales increase by 29% (YoY) to 229,261 units—by far the highest level ever recorded for one year.<sup>2</sup> The automotive and electronics industries are the main drivers of this growth. Growing global demand for silicon-based products such as in-vehicle electronics, together with new production technologies, have brought about an increased need for flexible automation and boosted investments in retooling of factories in these industries.

In other sectors, such as distribution and defence, bandwidth growth and command & control capacity have resulted in new delivery methods—leading to increased robot sales in these sectors. Health care is another sector which is seeing innovative advances and an increased demand for medical/assistive robots.

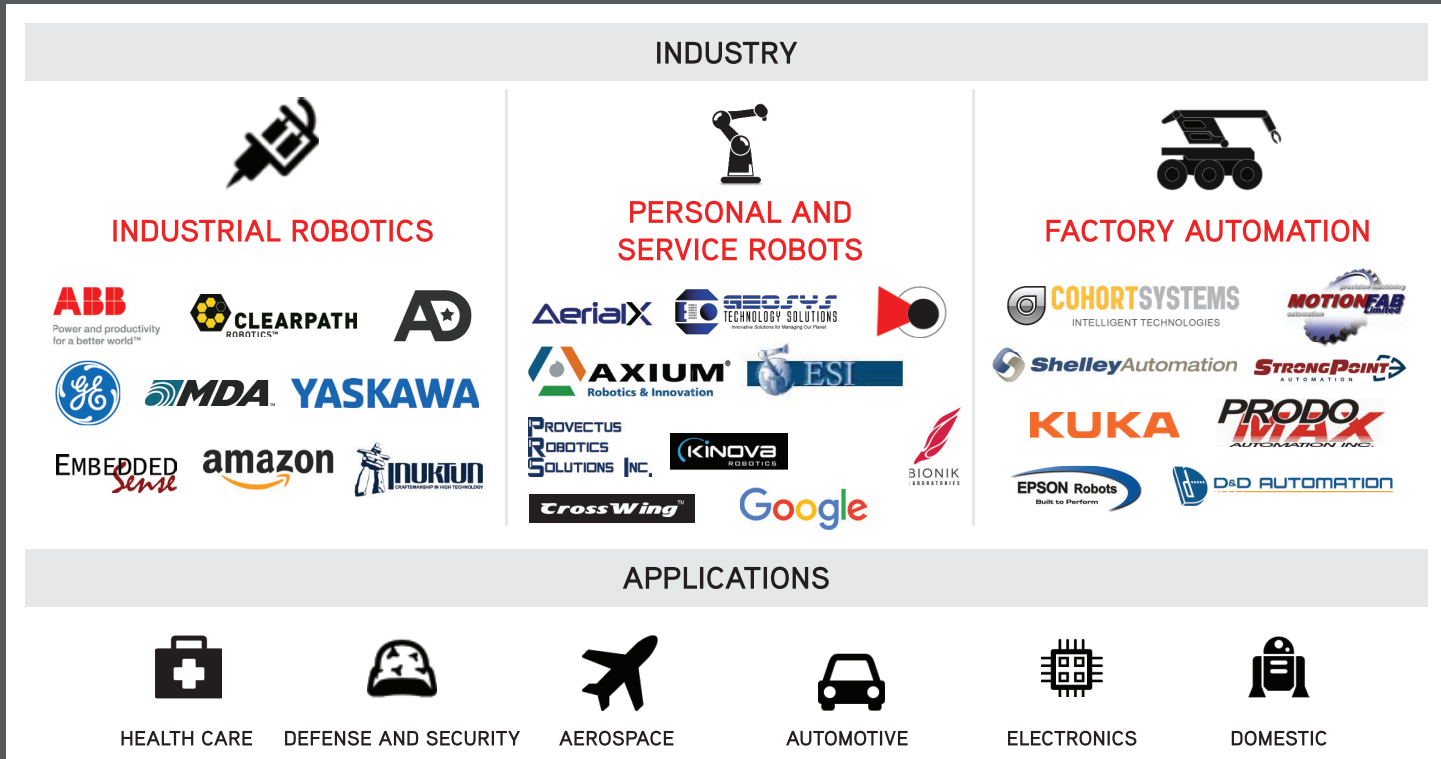
Canada has been at the forefront of this global robotics investment cycle. A major

push among large manufacturing, oil & gas, automotive and electronics companies in Canada to reduce manufacturing labour costs has resulted in venture capital-funded start-up investments in Canada, and investments by key foreign companies in the Canadian marketplace. Canadian and foreign robotics companies are also currently working with the Canadian Armed Forces (CAF), with increasing use of robots by first responders, within law enforcement agencies and on projects such as nuclear automation and space exploration.

Foreign investment in the robotics sector has seen a steady upswing in Canada, with global incumbents such as ABB, Amazon and General Electric making sizeable investments for their robotics divisions in this country, paralleling the efforts of local Canadian innovators such as MDA, Clearpath Robotics, Bionik Labs, D&D Automation, Kinova Robotics and Provectus Robotics.

Robotics is the branch of mechanical engineering, electrical engineering and computer science that deals with the design, construction, operation and application of robots, as well as computer systems for their control, sensory feedback and information processing.

## THE ROBOTICS ECOSYSTEM IN CANADA



1 Canadian Industrial Machinery (CIM). *Industrial Robot Orders Break All Records.*  
 2 International Federation of Robotics. *World Robotics 2015: Industrial Robots.*

# ROBOTICS AND AUTOMATION: KEY BUSINESS ATTRACTION FACTORS IN CANADA

Canada is a hotbed of automation potential. The pace of robotics adoption among key Canadian manufacturers is speeding up, and Canada offers robotics companies one of the best test and development regulatory environments in the world.

Another important factor is well-established robotics-centred university and technical training with over twenty Canadian universities and technical colleges offering programs in robotics, mechatronics, computer control methods, hydraulics and pneumatics. This ensures that foreign investors will have readily available talent for their development efforts in Canada.

35% 

AVERAGE ANNUAL GROWTH IN CANADA'S ROBOT ORDERS (COMPARED TO 26% IN NORTH AMERICA) FROM 2010 TO 2015<sup>3</sup>

32% 

AVERAGE ANNUAL GROWTH IN CANADA'S ROBOT SHIPMENTS (COMPARED TO 21% IN NORTH AMERICA) FROM 2010 TO 2015<sup>4</sup>

\$201 million 

VALUE OF CANADA'S OVERALL ORDER OF 3,222 ROBOTS IN THE FIRST HALF OF 2015<sup>5</sup>

20+ 

CANADIAN UNIVERSITIES AND COLLEGES OFFERING ADVANCED ROBOTICS COURSES AND TECHNICAL CERTIFICATIONS

\$36 million 

NATURAL SCIENCES AND ENGINEERING RESEARCH COUNCIL OF CANADA FUNDING, FOR A 5-YEAR PERIOD, ALLOCATED TO ROBOTICS R&D CONDUCTED BY ACADEMIC AND BUSINESS INSTITUTIONS<sup>6</sup>

13th 

CANADA'S GLOBAL RANKING IN TERMS OF "ROBOT DENSITY," OR THE NUMBER OF MULTIPURPOSE INDUSTRIAL ROBOTS PER 10,000 PERSONS EMPLOYED IN MANUFACTURING<sup>7</sup>

<sup>3</sup> Canadian Industrial Machinery (CIM). *Industrial Robot Orders Break All Records*.

<sup>4</sup> Ibid.

<sup>5</sup> Ibid.

<sup>6</sup> NSERC. *Government of Canada Invests in High-Quality Jobs and Growth*.

<sup>7</sup> IFR Statistical Department. *World Robotics: Industrial Robots 2015*.

## CANADIAN HEALTH CARE IS GLOBALLY RECOGNIZED AS A ROBOTICS INNOVATOR: NORTH AMERICA'S FIRST "FULLY DIGITAL" HOSPITAL IS IN ONTARIO, AND USES ROBOTS FOR PATIENT CARE

The Humber River Hospital in Toronto, Ontario, uses automated kiosks where patients can enter their information into robotic arms that administer medication.<sup>8</sup> Service robots have been tested in Calgary for three years, and are being used for child care in Alberta.<sup>9</sup> Saskatchewan has 11 medical robots in clinical practice—more than anywhere else in Canada.<sup>10</sup>

## THE GOVERNMENT OF CANADA HAS AN INNOVATION-FOCUSSED APPROACH TO SUPPORTING THE ROBOTICS VALUE CHAIN

The Natural Sciences and Engineering Research Council of Canada's (NSERC) Canadian Field Robotics Network has an annual budget of \$2 million and consists of a network spanning eight universities and 14 partner organizations.

The government of Canada has also deemed robotics a priority area for economic stimulus funding, allocating \$110 million to the Canadian Space Agency, to principally fund development of rover and robotic arm prototypes.<sup>11</sup>

## CANADA HAS ADVANTAGEOUS REGULATIONS FOR THE TESTING AND DEVELOPMENT OF UNMANNED AERIAL VEHICLE (UAV) SYSTEMS

Approval times for commercial UAV testing are measured in days<sup>12</sup> in Canada, compared to the United States, where commercial drone testing licences can take months, is generally prohibited and companies must seek an exemption from the ban.

Drone operators in Canada also do not need a pilot's licence (a requirement in the US), and UAV testers in Canada can obtain their own private restricted airspace to test out-of-sight flights.<sup>13</sup>

## CANADIAN MANUFACTURERS ARE GOING THROUGH A MULTI-YEAR ROBOTICS INVESTMENT UPCYCLE

Canadian firms in a wide range of industry verticals are investing heavily in innovative production technologies to take advantage of new processes and retooling of factories that emphasize flexible automation.

With a 35% increase in robot orders from Canada in 2015,<sup>14</sup> foreign investors in this country are seeing a rise in demand for a wide range of industrial robotics applications, including articulated, collaborative, parallel and paint robots.

8 CTV News. *First "fully-digital" hospital in North America to open in Toronto.*

9 CBC News. *MEDi robots being used to comfort Alberta Children's Hospital patients.*

10 CBC News. *5 ways robots are delivering health care in Saskatchewan.*

11 Space.com. *Canada Funds Space Robot Projects Amid Competition.*

12 CBC News. *Amazon tests delivery drones at a secret site in Canada—here's why.*

13 Ibid.

14 Canadian Industrial Machinery (CIM). *Industrial Robot Orders Break All Records.*

# ROBOTICS ACTIVITY IN CANADA



## British Columbia

- British Columbia is home to Richmond-based MDA, the robotics firm behind Canada's space shuttle remote manipulator system, or Canadarm.
- Favourable regulations, optimal weather and wide-open testing grounds have made British Columbia an optimal UAV testbed for global companies like Amazon.

## Alberta

- Alberta's oil and gas industry is seeing increasing use of robotics, such as Suncor Energy Inc.'s self-driving trucks, which are being used in Fort McMurray's oil-sands sites.
- Medical robotics has seen sizeable commercial advances in Calgary's hospitals: Alberta's Children's Hospital is the first in Canada to use service robots designed to help patients deal with the anxiety of medical procedures.

## Saskatchewan

- Saskatchewan is seeing the growing commercial utilization of robotics in the healthcare industry: 11 medical robots and portable devices are in use in clinical practice in the province—more than anywhere else in Canada.
- Saskatchewan is already using Remote Presence technology, an advanced robotics telemedicine platform that enables health care providers to instantly connect with a patient remotely, and perform real-time assessment, diagnosis and patient management.<sup>15</sup>

## Ontario

- Ontario's manufacturing strength has driven the growth of local robotics automation companies such as Clearpath Robotics, ABI Automation and Independent Robotics Inc.

## Quebec

- The province of Quebec is a base for several world-class robotics laboratories with extensive ongoing R&D activity in this space: Laval University robotics laboratory, École Polytechnique de Montréal robotics laboratory, ÉTS Robotics and Command Laboratory, McGill Centre for Intelligent Machines and University of Sherbrooke IntRoLab robot lab.
- Montréal is the base for both global robotics incumbents and local vendors such as ABB, Fanuc, Motoman and Kuka Industrial Robots.
- Advanced manufacturing is hard at work at General Electric's Bromont aviation facility, where robots are building components for some of the world's most efficient jet engines. One million added person-hours of capacity was achieved with the help of robotics.

## RECENT ROBOTICS INVESTMENTS IN CANADA

- New York-based RRE Venture Capital invested \$14 million in Ontario-based **Clearpath Robotics**, along with support from iNovia Capital.<sup>16</sup>
- China-based Shenzhen Bauzer Investment Group invested \$300 million in the acquisition of Ontario-based robotics firm, **Engineering Services Inc.**<sup>17</sup>
- Boston-based Summit Partners invested \$60 million in Waterloo-based drone-manufacturer, **Aeryon Labs.**<sup>18</sup>
- **Amazon** has chosen British Columbia as a testing ground for drone technology, due to favourable regulatory requirements.<sup>19</sup>
- In 2015, **ABB** invested \$70 million in expanding its Canadian presence, aimed at creating a new high-tech centre focussing on robotics, remote sensing gear and the transportation sector.<sup>20</sup> In 2014, ABB Canada partnered with Sheridan College, Ontario, to set up a new ABB Robotics Centre to provide training in robotics applications.<sup>21</sup>

<sup>15</sup> CBC News. *5 ways robots are delivering health care in Saskatchewan.*

<sup>16</sup> Clearpath Robotics. *Clearpath Robotics Raises \$14 Million to Accelerate Vision for Ethical Industrial Robotics.*

<sup>17</sup> Engineering Services Inc. *Announcements: ESI is announcing the completion of its acquisition by Shenzhen Bauzer Investment Group Co. Ltd., a company with extensive business operations in China.*

<sup>18</sup> The Record.com. *Aeryon Labs takes flight with \$60 million in financing.*

<sup>19</sup> CBC News. *Amazon tests delivery drones at a secret site in Canada—here's why.*

<sup>20</sup> Montreal Gazette. *ABB Canada gets new \$70-million digs in Technoparc.*

<sup>21</sup> Sheridan College. *Sheridan and ABB Canada announce partnership to enrich robotics education, support manufacturers.*

# WHY CANADA FOR R&D AND INNOVATION?

KPMG shows that Canada has emerged once again as the most cost-competitive country in the G7 in which to do business, with a **14.6%** cost advantage over the US.

In knowledge-based areas such as R&D Services (which includes Product Testing services), development and testing firms typically enjoy **27.8%** lower costs relative to their US-based counterparts. These cost advantages are significant for foreign investors in the robotics industry, where product development and testing is the single largest expense during the development phase of a project.

## CANADA-WIDE PROGRAMS

As a world leader in cutting-edge R&D, Canada supports the innovation and entrepreneurship of investors through significant incentive support, from both the federal and provincial governments, for R&D activity in this country.

Listed here are just some of the programs available to investors and technology innovators in Canada:



### **AUTOMOTIVE SUPPLIER INNOVATION PROGRAM (ASIP)**

ASIP is designed to support product development and technology demonstration projects undertaken by automotive parts suppliers in Canada that are developing innovative products and/or processes in this sector. These projects could include acquiring advanced manufacturing technology and equipment such as robotics.



### **STRATEGIC AEROSPACE AND DEFENCE INITIATIVE**

This program assists investors undertaking strategic R&D in the aerospace, space, defence and security sectors. A key objective of this program is to encourage strategic R&D that will result in innovation and excellence in new or improved products, services and processes.



### **TECHNOLOGY DEMONSTRATION PROGRAM**

This program supports investors' large-scale technology demonstration projects in the aerospace, defence, space and security sectors. Projects funded through this program are expected to be the basis for next-generation manufacturing and services in Canada. The program will support technological development in areas that have significant potential for broad-based and long-term economic benefits to Canada.



### **INDUSTRIAL RESEARCH ASSISTANCE PROGRAM (IRAP)**

IRAP provides small and medium-sized investors engaged in technology innovation in Canada with technical advisory services and financial support.



### **SCIENTIFIC RESEARCH AND EXPERIMENTAL DEVELOPMENT PROGRAM (SR&ED)**

SR&ED provides investors with refundable tax credits for their R&D activities. This program allows investors to claim expenditures, including: wages and salaries of employees engaged in R&D work, overhead expenditures, material expenditures and contract expenditures for R&D activities performed on behalf of investors in Canada.

For a comprehensive list of programs, please visit:  
[www.investincanada.com](http://www.investincanada.com)





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