



INO
ANNUAL REPORT
2015-2016





IN MEMORIAM: ROBERT DESPRÉS

O.C., G.O.Q., MSC., FCPA, FCMA, FCGA, FICD, FCAS

This year, INO lost one of its pillars, Mr. Robert Després, a member of the Board of Directors since the beginning of its operation in 1988. Mr. Després held a bachelor's degree and a master's in business administration from Laval University. He was also a member and Fellow of the Order of Accredited Management Accountants and the Order of Certified General Accountants.

Throughout his storied career, he put his experience as a corporate director to work for organizations such as Atomic Energy of Canada, Campeau Corporation, Cinar, Domosys, Obzerv Technologies, McWatters Mining, Cablevision Nationale, Netcom and Alliance Forest Products Inc. He played a key role in the creation of the Régie de l'assurance maladie du Québec, of which he was founding president and chief executive officer, and he also held the positions of controller for Quebec Power, manager of the National Trust Company, deputy minister of revenue in Quebec and president of Université du Québec. He had also been a member of the Study Committee on Financial Institutions and of the Royal Commission on Financial Management and Accountability.

Amongst his many honours, he received: Officer of the Order of Canada, Grand Officier de l'Ordre national du Québec, honorary doctorate from Université Laval and Université du Québec, member of the Académie des Grands Québécois, Excellence award of Quebec's public administration, Career award from the Quebec Employers Council, Merit award from the Quebec interprofessionnal council, Fellow of the College of Corporate Directors and the Institute of Corporate Directors, and recipient of the Grand Artisan de la Révolution tranquille medal.

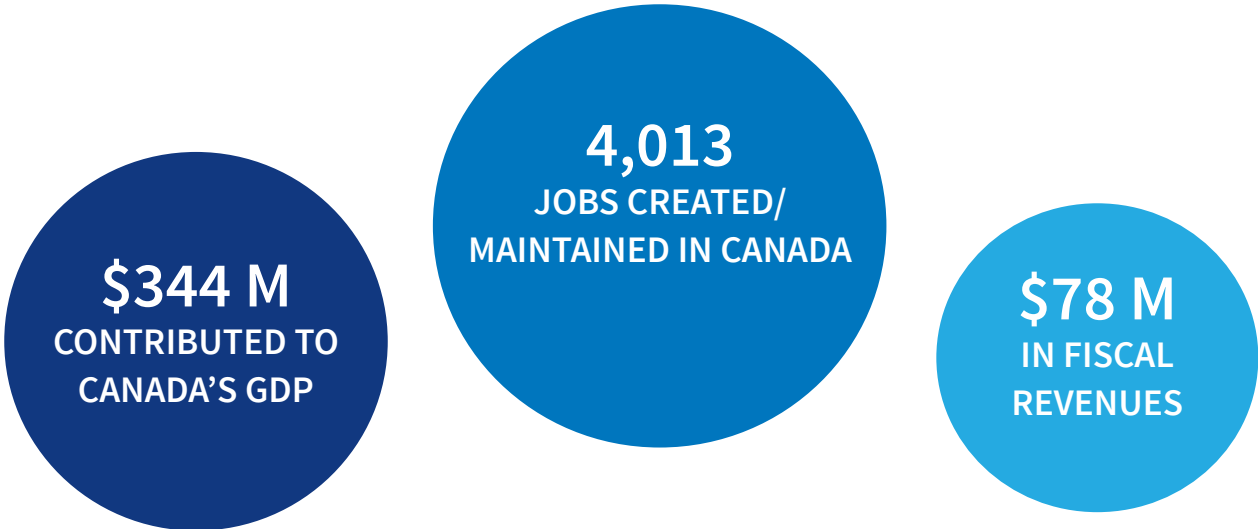
More recently, Mr. Després continued his work, particularly as chairman of the board at Cominar Real Estate Investment Trust, and of course, with INO. His significant involvement in our organization's governance helped make us what we are today: a wealth-creating organization. New governance rules and the establishment of an audit committee, which he presided, are but a few examples of his important contributions to INO. We are immensely proud and grateful to have benefited from his long experience and his valuable advice all these years.



INO: CREATING WEALTH SINCE 1988

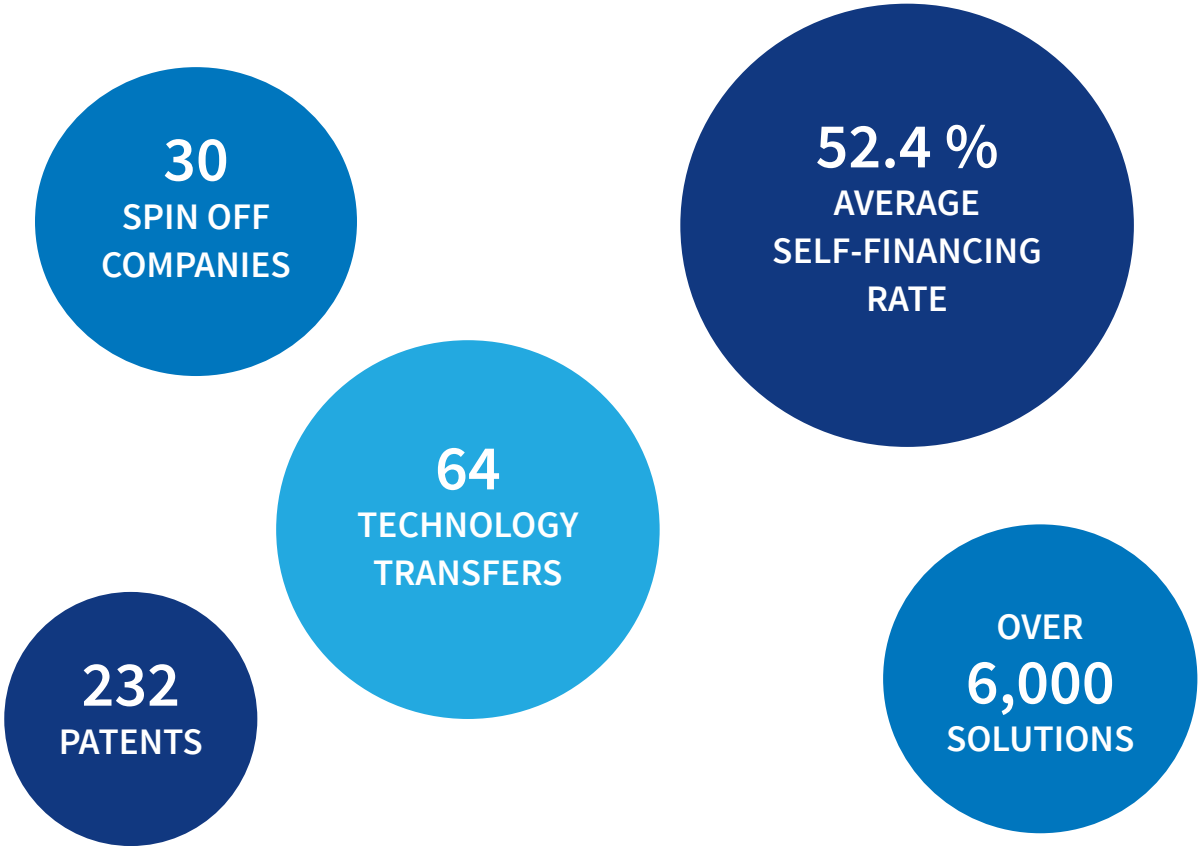
INO'S IMPACT ON THE CANADIAN ECONOMY IN 2014

Source: Deloitte, Study on the economic impacts of the National Optics Institute, 2014



KEY NUMBERS SINCE 1988

As at March 31, 2016



REVIEW OF ACTIVITIES

The 2015–2016 fiscal year was a turning point not only for INO, but also for the Canadian and Quebec economies. Both levels of government have demonstrated strong ambitions for economic development and are taking action to reinforce the competitiveness of Canadian businesses. We are delighted with these initiatives as we are convinced that economic growth and wealth creation are driven by innovation.

Innovation: Cornerstone of Economic Growth

Each year, INO's activities contribute \$344 million to Canada's GDP, including \$211 million in Quebec. These activities create or maintain 4,013 full-time jobs per year in Canada (source: Deloitte, Study on the economic impacts of the National Optics Institute, 2014). The leverage ratio of INO's activities is 1:10, which testifies to the impact of innovation on value and job creation in the country.

The 2015–2016 fiscal year was one of INO's most prolific with respect to research and development contracts, technology transfers, royalties and short run production, with outside revenues of \$19.3 million. One of the main factors driving this exceptional year is the growing need for innovation among businesses. Regardless of their size or location, businesses look to INO as a catalyst for innovation that enables them to fulfill their needs, giving them the means to be world leaders in their respective industries.

This year also saw the renewal of our agreements with both levels of government. We wish to commend them for their clear resolve to support business innovation and consequently create greater wealth. INO's activities are made possible through the ongoing collaboration of Canada Economic Development for Quebec Regions and the Quebec Ministry of Economy, Science and Innovation.

Synergy, Intellectual Property and Business Creation

In addition to the record outside revenues that contributed to our self-financing rate of 56.9%, the 2015–2016 fiscal year brought other good news as well. This year, INO obtained its ISO-13485 certification, the gold standard for medical device design and manufacture. Having been active for several years in the innovative manufacturing sector, we also entered into a partnership with the Manufacturers & Exporters of Quebec with a view to better meeting manufacturers' needs in innovation and automation.



This year, INO received the Canada Award for Excellence - Gold Level, presented by the Governor General of Canada

In the course of the year, we secured twenty patents and completed five technology transfers, including a new spinoff. Generating intellectual property through R & D is INO's raison d'être. We develop it and then transfer it to the industry so that it can be exploited commercially.

INO has created 30 spinoffs since its inception and recently launched an Entrepreneur-in-Residence program aimed at creating businesses in Quebec City using INO technologies as a commercial basis. Under the program, INO provides carefully selected entrepreneurs with an opportunity to start a business by

offering them complete technological support. The program, implemented jointly with the City of Quebec, has already proven successful with the launch of Ray-Secur, the program's first active venture, in June 2015. In January 2016 we had the pleasure of announcing the nomination of two new entrepreneurs-in-residence who will pursue projects in the fields of mobile robotics and pipeline securement.

It is with great pride that we present to you the INO annual report for 2015-2016, which looks back on the key elements of an exceptional fiscal year.



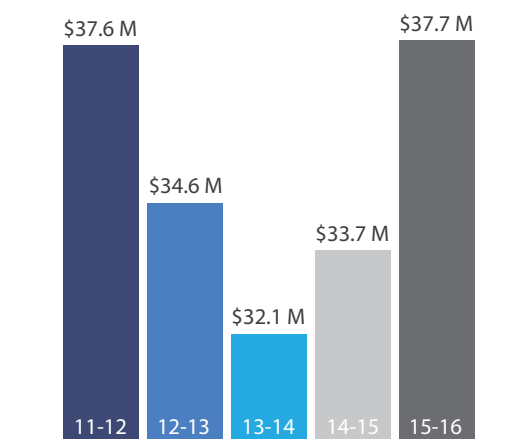
Jean-Guy Paquet,
Chairman of the Board of Directors



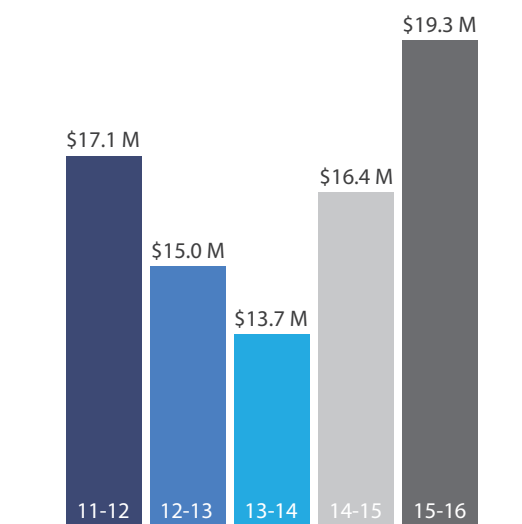
Jean-Yves Roy,
President and CEO



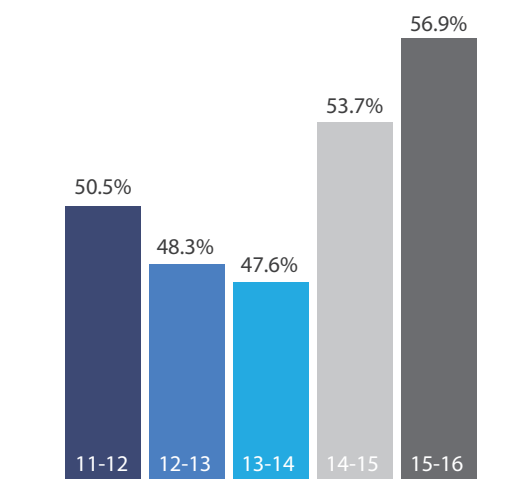
YEAR-TO-YEAR REVENUES



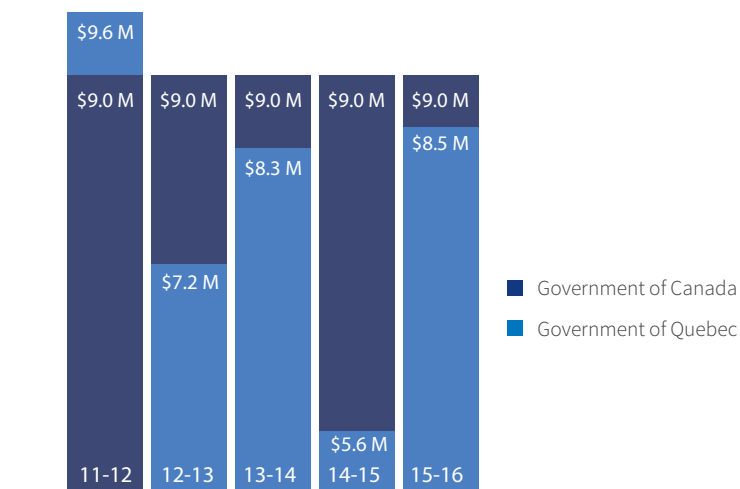
Year-to-year overall revenues
(outside revenues, governments financial support and diverse revenues)



Year-to-year breakdown of outside revenues
(R & D contracts, sales, transfer counterparts, royalties)



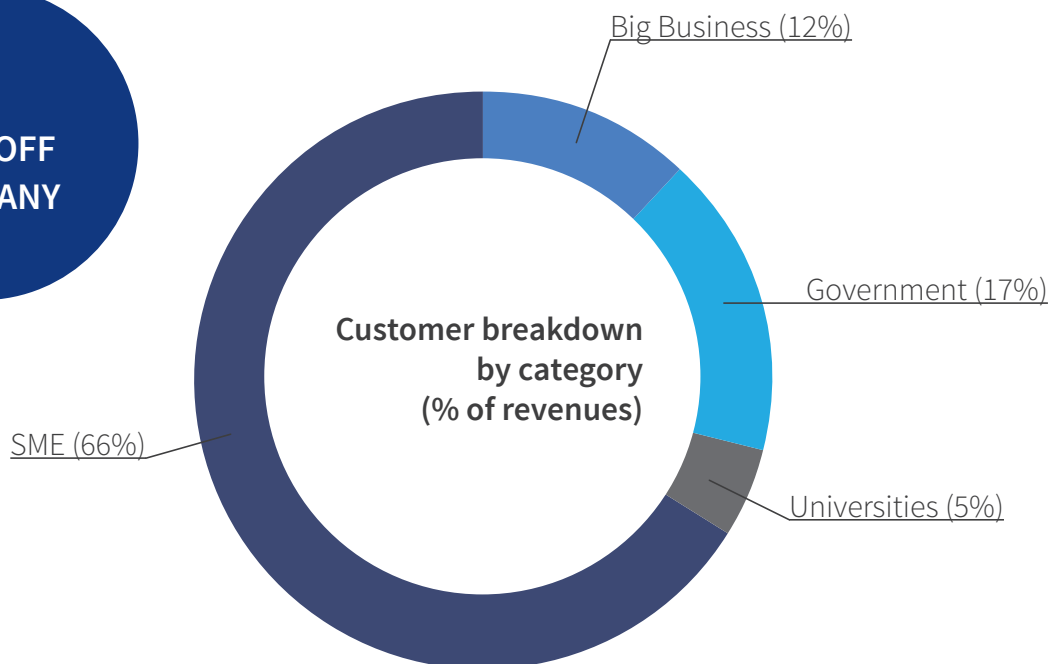
Year-to-year self-financing rate



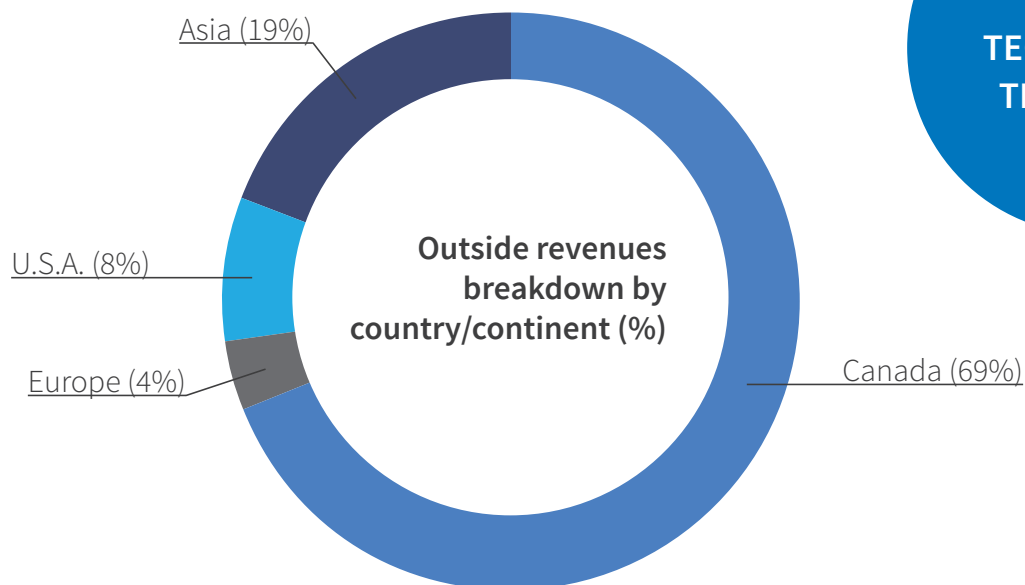
Year-to-year breakdown of governments financial support

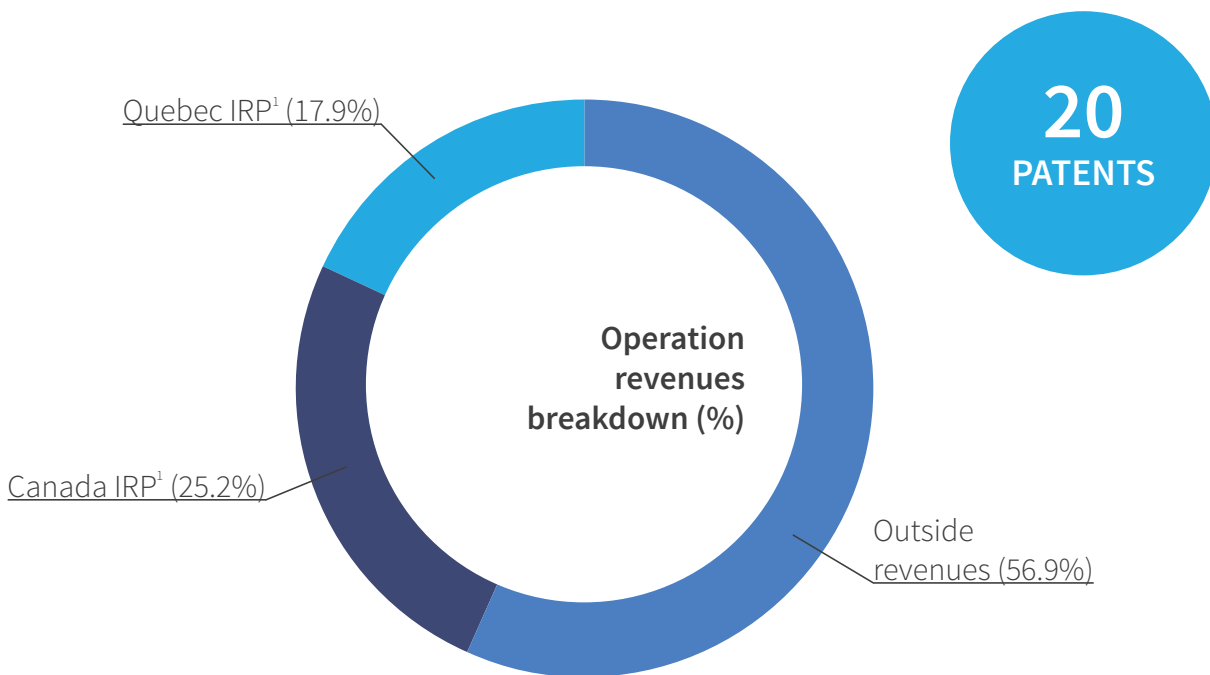
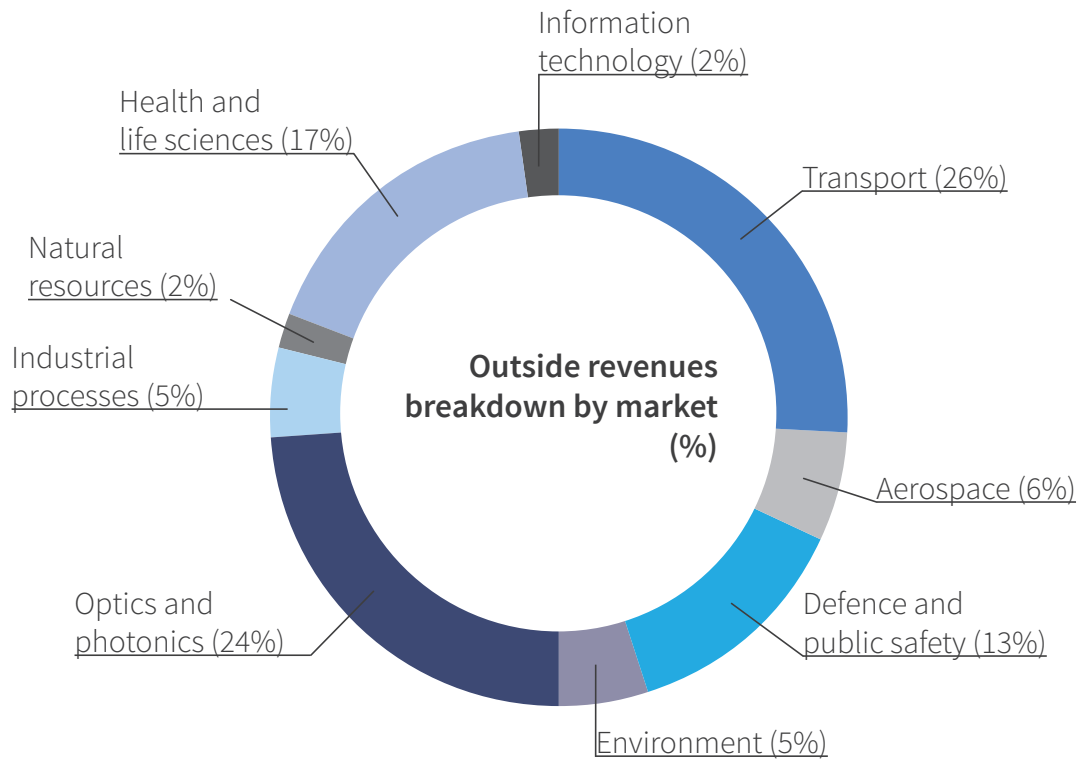
THE YEAR IN NUMBERS

1
SPIN OFF
COMPANY



5
TECHNOLOGY
TRANSFERS





¹ Government financial support for the Internal Research Program operating expenses

RESEARCH ACTIVITIES REVIEW

INO's internal research program aims to develop technologies adapted to industry requirements in a timely manner, in order to promote national economic growth. To this end, INO:

- Develops game-changing technologies that offer a distinct competitive edge in important markets;
- Offers technologies with a sufficient level of maturity to allow for industry transfers;
- Aligns technological developments with windows of opportunity and expected industry needs.

In order to better manage and coordinate roadmap development for all of INO's technologies, we have grouped them into eight programs. The technology roadmaps are regularly reviewed to ensure they remain in line with both our objectives and the technological developments themselves. This regular monitoring consists of internal reviews three times a year and biannual reviews by a committee of external experts.

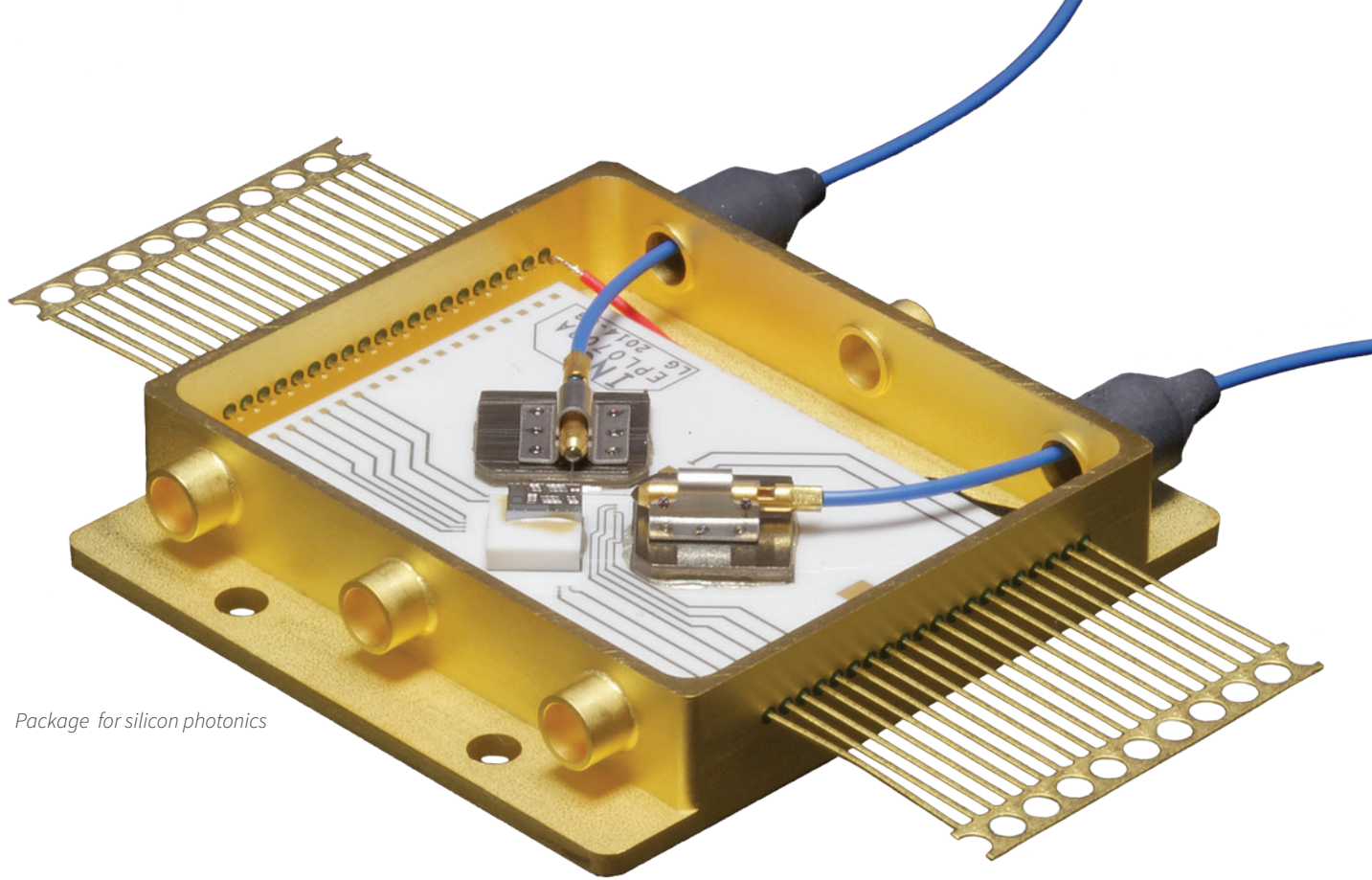
Highlights for the 2015–2016 Fiscal Year

In 2015–2016, our internal research program saw the launch of the Entrepreneur-in-Residence program, a joint initiative of INO and the City of Quebec. For the program's first project, we brought our world-renowned expertise in terahertz to bear, combining it with our product development know-how to deliver a mail inspection system demonstration prototype.

Two other projects have been initiated through this program. The first project aims to develop an airborne pipeline surveillance system using a combination of INO know-how in video analytics, lidar, and airborne platform integration. The second project aims to develop a distance sensor for mobile robotics with the goal of creating a very low-cost telemeter able to map a mobile robot's environment in real time for the purpose of autonomous driving.

MailSecur™, marketed by RaySecur, is a terahertz technology letter bomb detection system.





Package for silicon photonics

In addition to the significant efforts devoted to the Entrepreneur-in-Residence program, INO focused on maintaining its optics/photronics expertise in areas of key importance for industry and initiated development work on new platforms that will help give clients a competitive edge and also underpin new business development.

These development projects include the following:

- A feasibility study on a high resolution imaging system with a large depth of field compatible with the needs of neurosurgery;
- Through the development of a low cost real time granulometer, compatible with the PM10 norm—the equivalent of INO’s method with a registered technique has been demonstrated with particles larger than 500 nm;
- In the field of chemical sensors, demonstration of how the principle of liquid optodes can overcome problems caused by the degradation of selective membranes, in order to increase sensor’s durability;
- Two generic packages developed for the silicon photonics (Si-P) field. Si-P fibre/circuit coupling techniques have been developed, enabling us to offer a Si-P prototype circuit packaging service;
- In printable photonics, use of a MOPAW fibre laser to decrease the ink annealing time by a factor of 4;
- Application of emerging methods of deep learning to situations of detection and target monitoring with mobile cameras, in order to precisely identify tracked objects.

ENTREPRENEUR-IN-RESIDENCE PROGRAM...

Program Introduction

The Entrepreneur-in-Residence program is a joint initiative by INO and the City of Quebec in collaboration with Angés Québec. Coordinated by INO, the project aims to offer entrepreneurs a better chance of successfully establishing new businesses derived from optics or photonics research and to help them navigate through the period known as the “Valley of Death”, referring to the critical period of time from when a startup firm receives an initial capital contribution to when it begins generating revenues.

The program includes technical support provided by INO, office space at INO for a period of 12 to 18 months and \$200,000 in repayable financial assistance from the City of Quebec to cover pre-startup expenses. Participating entrepreneurs commit to starting a business in Quebec City and to using one of INO’s technologies once the residency period is over. The first business stemming from this program was established in 2015 and two others are currently in incubation.

“ When an entrepreneur steps through the door at INO, he feels like a kid in a candy store! ”

Éric Giroux,
founder and CEO, RaySecur

The Birth of a New Business...

RaySecur

Founded by Éric Giroux, RaySecur has developed an affordable device that uses terahertz technology to detect letter bombs.

“ Letter bomb attacks have become more frequent over the last few years and traditional technologies have proven to be ineffective in preventing those threats. Developed at INO, this revolutionary device transmits live video footage rather than static images. The device is compact, can easily be placed on a desk and is particularly user-friendly, making it an accessible and reliable asset for reinforcing security.”

RaySecur was started in June 2015 and is the first business spun off from INO’s new Entrepreneur-in-Residence program.

www.raysecur.com



...AND BUSINESS CREATION

...And Two Others in the Incubation Phase

FlyScan

Éric Bergeron, the entrepreneur behind the success of OptoSecurity, an INO startup that has grown into a world leader in airport security systems, has chosen to take up a new challenge and set up FlyScan.

“FlyScan will be the first company in the world to offer airborne detection services that can locate oil leaks in pipelines, including small leaks in underground pipelines, more rapidly, therefore allowing pipeline operators to intervene sooner and prevent environmental damage.”

Éric Bergeron,
President and CEO, FlyScan

www.flyscan.com

Umanx

Dr. Dragan Tubic, a seasoned entrepreneur and the technological co-founder of the successful business Creafom, has started a new business venture in mobile robotics: Umanx.

“Umanx’s objective is to develop and market mobile, intelligent and autonomous robots to perform routine tasks. The goal of this technology is to free human beings from manual, repetitive and dangerous labour in order to express their unique and most important quality: creativity. Umanx’s technological potential is limited only by our imagination.”

Dragan Tubic,
President and CEO, Umanx

www.umanx.com



EXAMPLES OF ACHIEVEMENTS

Amongst the projects undertaken or completed in 2015–2016, four illustrate INO's capacity to strengthen client competitiveness, regardless of their field.



MACHINEX



**INTELLIJOINT
SURGICAL**



**LIBERTY
SPRING**



**NRC
HERZBERG**

IDENTIFICATION SYSTEM FOR PLASTIC SORTING

Machinex, a world leader in the design and manufacturing of waste sorting, recycling and management equipment, called upon INO for its expertise in automated machine vision systems.

The Development of a New Sorting Station Line

Development work initiated in 2008 led to the creation of an optical sorting system to recycle plastics based on hyperspectral measurements. This collaborative project's main objective was to develop an efficient station that would minimize contamination between plastic materials (such as PTE, HDPE, PVC, PEBD, PP and PS), and sort them into different categories for an optimum recycling process.

The challenge was significant as these plastic materials have similar molecular composition. Another important challenge was the treatment speed, given the fact that a large volume of material has to be identified in an extremely short period of time. Ease of maintenance and plant safety were also deciding factors. Finally, particular attention was paid to the optical design in order to optimize the system's alignment stability. It features a light system optimized for this application, which has been patented.

The Results: An Efficiency Rate of 95% and Over

The optical solution has been integrated into the MACH Hyspec®, an ultra-performing sorting station for plastic. The station's high-speed detection system takes less than a millisecond to analyze the conveyor, exceeding industry standards and allowing for the processing of a high volume of material in a short time. The higher depth field detection of 430 mm on the belt has an unsurpassed efficiency on ejection of rolling objects such as bottles. This state-of-the-art equipment is now available worldwide.

A second project allowed for the expansion of the range of materials that can be sorted by this technology, such as wood and fiber. A third project is underway, and aims to further broaden Machinex's offerings.

The collaboration between Machinex and INO is a prime example of innovation at work in developing a competitive range of products for an international market. It has enabled a Quebec manufacturing flagship to increase its market share in a highly competitive industry.



Courtesy: Machinex

“Machinex’s project to develop optical sorters for the recycling industry was a significant challenge that required several years of work. INO helped us accelerate the development process, and their experts enabled us to find solutions to challenges we faced more quickly.”

Pierre Paré,
President and CEO, Machinex Group

A NEW STANDARD IN 3D MINI-OPTICAL NAVIGATION FOR TOTAL HIP ARTHROPLASTY

One of the biggest challenges surgeons face in hip arthroplasty is ensuring accurate selection, positioning and alignment of implant components, namely making sure that the acetabular component of the hip prosthesis is at the correct angle, the patient's legs are the same length post-operatively, and offset is restored. Traditional navigation solutions are inaccessible and impractical for the majority of hip surgeons due to high capital costs and resultant added surgical time. Therefore, most physicians have to rely on subjective measures like visual evaluations and muscle stiffness assessments. An error of a few millimeters can lead to serious problems for the patient and could result in a potential need for recurrent surgery for revision.

Making Hip Surgery More Accurate

Based in Waterloo, Ontario, Intellijoint Surgical develops and commercializes the new standard in miniature 3D mini-optical measurement. Their surgical Smart Tools enable surgeons and hospitals to improve surgical outcomes by reducing uncertainty and risk, while improving patient outcomes and economics.

A Joint Project That Led to a Disruptive Product

The collaboration between Intellijoint Surgical and INO began in 2012 with a technology feasibility study. This first phase proved successful, and the partnership continued to develop a limited market release version of the product. INO and Intellijoint Surgical worked together to develop a product that went to the market in 11 months and was released only to selected surgeons. Close interaction with INO's short-run production team during research and development further expedited shipping of test units to surgeons for validation.

Armen Bakirtzian, CEO, Director and Co-founder;
Andre Hladio, Chief Technology Officer and Co-founder;
Richard Fanson, Chief Science Officer, Director and Co-founder



Courtesy: Intellijoint-Surgical

End-user feedback was very positive and led Intellijoint Surgical to pursue product development in order to optimize and expand the scope of the technology. Continued collaboration with INO resulted in the introduction of a successful medical tracking device in May 2014. Ten months later, the first units were certified and the product received a license from Health Canada and clearance by the FDA in summer 2015.

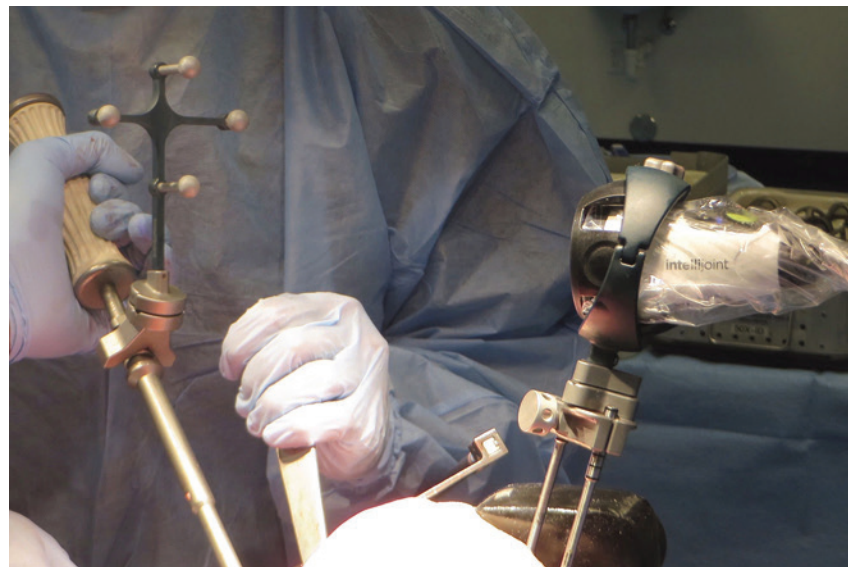
The final product, **intellijoint HIP®**, is simple and easy to use and provides surgeons with vital intra-operative measurements in real time, enabling proper cup position, equalization of leg length and restoration of hip offset. These critical measurements can assist in the prevention of recurrent instability, hip dislocation and leg length discrepancy. The solution is affordable and fast, integrates with surgical workflows and is compatible with all implant vendors.

To date, more than 350 successful surgeries have been performed using **intellijoint HIP®** in the United States and Canada. Intellijoint Surgical won several awards, including the North American Frost & Sullivan Award for Enabling Technology Leadership in 2015 and the Futurpreneur Shopify True Grit Award in 2016.

From feasibility study to product development, INO is proud to have supported Intellijoint Surgical in its development of an innovative surgical product.

“At Intellijoint, our design process is highly collaborative. INO was a great fit for us for this reason; we were able to maintain true collaboration while leveraging INO’s incredible technical competency and state-of-the-art infrastructure and facilities. I could tell our project’s success was important to INO; they have always been flexible, accommodating and responsive. I look forward to working with the INO team developing our next disruptive technology.”

Andre Hladio,
Chief Technology Officer and Co-founder,
Intellijoint Surgical



Courtesy: Intellijoint Surgical

ADAPTIVE OPTICS SUBSYSTEMS FOR THE THIRTY METER TELESCOPE

A New Vision of the Universe

The Thirty Meter Telescope (TMT) is an astronomical project to build a 30-meter class optical telescope, which would eventually be one of the most powerful optical telescopes in the new generation of extremely large telescope. The project was initiated in 2003 by Canadian and American universities and research centres, and the partnership was later extended to include Japanese, Chinese, and Indian astronomical institutes.

Canadian Expertise in Adaptive Optics

The Narrow Field Infrared Adaptive Optics System (NFIRAOS) is the “eye” of the telescope. Such an eye must be extremely sharp when looking at celestial objects located several million light years away, yet even the keenest eye cannot completely overcome one natural effect of Earth’s atmosphere: atmospheric turbulence, which causes astronomical images to be blurry. The solution to this challenge lies in a techno-

logy known as adaptive optics, which allows real-time sensing of atmospheric movements and applies optical corrections based on those movements. The result is clean, sharp images of the universe. As the TMT’s adaptive optics system, NFIRAOS is currently being developed by a group of experts in adaptive optics, including INO. The team is led by NRC Herzberg Astronomy and Astrophysics, based in Victoria, BC.



Courtesy: Thirty Meter Telescope

A System Capable of Withstanding the Harshest Conditions

INO brings its adaptive optics and optomechanical expertise to the project. INO's work on NFIRAOS includes four key optical subsystems that will be integrated into the telescope, namely the beamsplitters, instrument selection mirror, turbulence generator, and source simulator. Several challenges must be resolved for this mission to succeed. First, the mirrors in the telescope (and all the mechanical parts) are gigantic. The TMT's main mirror will have a diameter of 30 meters (approximately the width of an ice hockey rink), so the subsystems are massive as well. Of course, all of the components must be of irreproachable quality. The second challenge is the temperature requirements. In order to reduce background emissivity and obtain the best possible image quality, the system must be operated at temperatures of close to -30°C , so the built subsystems must be able to function in these very harsh environmental conditions.

“So far NFIRAOS was just a concept with a very long list of requirements. Now we have a detailed final design ready for fabrication. INO is turning our concept into reality!”

Olivier Lardière,
optical engineer, NFIRAOS team, NRC Herzberg

Technology Transfer to the Canadian Industry

INO has developed a pyramid wavefront sensor, a key component of the adaptive optics system. This technology has been transferred to ABB's Measurement and Analytics Business Unit in Quebec City.

NFIRAOS is an instrument well suited to the integration of a pyramid wavefront sensor. Because of its design, this sensor offers a very high resolution with a high dynamic range, a crucial requirement for the TMT's adaptive optics system.

Of the four subsystems INO is working on, two have made it past the design phase, while the other two are still at the design stage. The next step in the NFIRAOS project will be to fabricate and assemble the system. The TMT is scheduled to be up and running in 2022.

This is a good example of how Canadian organizations from coast to coast are working together and bringing complementary expertise to the table to build one of the largest optical systems ever made. With NFIRAOS as its eye, the TMT will give us a new view of the universe that may provide answers about its origins.

A CUSTOMIZED VISION SYSTEM FOR THE QUALITY CONTROL OF AUTOMOBILE PARTS

Our client, Liberty Spring, is a world leader in the manufacture and distribution of high-precision, high-tech springs for the automobile and recreational products industries. It produces close to 100 million springs annually for many of the biggest names in the auto industry—clients that are always on the lookout for the most effective technologies on the market.

After completing a first project in 2013 leading to the development of an inspection system capable of achieving zero-defect shipments, Liberty Spring and INO continued their collaboration and developed a new inspection system intended, this time, for another type of automobile part.

For quality control purposes, Liberty Spring wanted to make the inspection process for this new line of automobile parts faster and easier while at the same time achieving greater precision and better repeatability. In this context, repeatability is the ability to automatically measure the same characteristic several times over and obtain the same metrics. This can prove difficult to achieve, especially when the parts to inspect have complex shapes.

The main challenge was the variability in the dimensions of the inspected parts. The objective was to be able to measure the same type of multidimensional parts with the same system. To do so, it was necessary to create a tool with adaptable mechanics, optical configurations and software.

A More Precise System That is Three Times Faster

Within eight months, Liberty Spring and INO successfully developed a vision system that not only ensures measurement reliability and repeatability, but also improves measurement precision, with a margin of error of as little as five microns (by comparison, a hair measures about 100 microns in diameter). What's more, the length of time required to complete the measurements has been reduced threefold. Completed in September 2015, this automated system has had positive effects on the quality of our client's product and productivity and will help further strengthen its reputation as a world-class automobile parts supplier.



“The measurement device has simplified parts measurement. A part can now be measured with a higher degree of precision within a few seconds. The advantages include reduced employee training time, better control of production and a decrease in the time required for quality control. The time saved can then be used for other functions.”

Jean-François Fournier,
Product Specialist, Liberty Spring

INOVATION AWARDS

INO has been honouring its most innovative employees every year since 2009 with the INOvation Awards— 4 annual prizes recognizing accomplishments of the last 12 months, and a special prize awarded every 5 years. This is an opportunity to highlight the significance of innovation and recognize our employees' expertise, creative minds and commitment. Here are the 2015 winning teams.

INO*vation*
VOS IDÉES NOTRE AVENIR

SYNERGY!

The SYNERGY award is given to the team whose project made use of several technological platforms and favoured their reuse, leading to an innovative solution. The honours went to the FIRR instruments team, for the development of a mid and far infrared radiometer. FIRR will enable meteorologists to better predict winter storms that could sweep through Canada.

Congratulations to:

- Patrick Beaupré
- Guy Bergeron
- Yvon Bilodeau
- Mario Cantin
- Félix Cayer
- François Châteauneuf
- Yan Desroches
- Luc Favreau
- Bruno Fisette
- Lucie Gagnon
- Paul Grenier
- Frédéric Lamontagne
- André Lépine
- Frédéric Lévesque
- Louis Martin
- Martin Massicotte
- Ovidiu Pancrati
- Paul-François Paradis
- Christian Proulx
- Francis Provençal
- Christophe Rivière
- Maxime Savard
- Manon Thibault
- Mathieu N. Tremblay
- Simon Turbide
- Carl Vachon (absent from photo)
- Sonia Verreault
- Min Wang





EUREKA!

The EUREKA award is presented to the project or team whose invention disclosure holds the greatest potential to create economic value outside of INO. This year, the prize was awarded to the configurable, multi-frequency and broadband bolometer team. Their bolometer is a key element in the conception of infrared cameras.

Congratulations to:

- Christine Alain
- Hassane Oulachgar

ALL for ONE!

The ALL for ONE award is given to the project team that had high engagement and commitment levels and drew on a variety of expertise to implement a novel and successful solution. In 2015, the prize went to the team that developed the Purchase and Order Center, a web-based electronic requisition tool adapted to the reality of project management as well as to department budgets.

Congratulations to:

- Guy Arbour
- Michel Jr Gingras
- Thérèse Godbout
(absent from photo)
- Claudine Gosselin
- Jonathan Lavoie



MORE with LESS!

The MORE with LESS award is presented to the project team or individuals whose innovative method was adopted, resulted in real time and money savings, and has growth potential. Francis Provençal won this prize for his mechanical adaptation of a specialized micro-fabrication system for 150 mm substrates to make it compatible with 200 mm substrate, thus minimizing setup time.

Congratulations!



IMPACT!

The IMPACT is a special prize awarded every five years and first handed out in 2015. It is presented to a project team that has been instrumental to the success of INO business partners, as measured by the revenues generated or maintained as a result of INO technologies intrinsically linked to their commercial success. For this first edition, the IMPACT prize was awarded to the video analytics team for road defaults for their work in developing video analytics systems to inspect transportation infrastructure. This solution is sold by Pavemetrics Systems, one of INO's startup companies.

Congratulations to:

- Geneviève Anctil
- Guy Arbour
- Pierre Bergeron
- Martine Bouchard
- Yannick Cadoret
- Michel Doucet
- François Duchesne
- Philippe Goyette
- Daniel Lefebvre
- Stéphan Labbé
- Martin Larrivée
- Martin Massicotte
- Luc Mercier
- Nathalie Renaud
- Jo-Annie Roussin (absent from photo)
- Sébastien Roy (absent from photo)
- Marco St-Pierre
- Luc Veilleux
- Steve Vignet



INO MEMBERS

GOVERNMENT MEMBERS

Government of Quebec

Government of Canada

AFFILIATE MEMBERS

Bell Canada

Montreal (Quebec)

Communications Research Centre Canada

Ottawa (Ontario)

Desjardins Group

Quebec, Quebec

Industrial Alliance

Quebec (Quebec)

Thales Canada

Saint-Laurent (Quebec)

ASSOCIATE MEMBERS

ABB

Quebec (Quebec)

B-Con Engineering

Nepean (Ontario)

Airbus Defence and Space Canada

Ottawa (Ontario)

Celestica International

Toronto (Ontario)

CorActive High-Tech

Quebec (Quebec)

EXFO

Quebec (Quebec)

Faculty of Engineering and Design

Carleton University

Ottawa (Ontario)

Gentec Electro-Optics

Quebec (Quebec)

LeddarTech

Quebec (Quebec)

Obzerv Technologies

Quebec (Quebec)

Telops

Quebec (Quebec)

TeraXion

Quebec (Quebec)

Université Laval

Quebec (Quebec)

SPIN-OFFS

RaySecur

Terahertz technology to detect letter bombs, 2015

Technologies and services INOOXX

LiDAR measurement of Brasque level, and laser triangulation technology to measure truck load volume, 2013

handyem

Compact cytometer, 2011

Opti Rythmix

Virtuo library, 2011

Company in the environment domain

Confidential, 2010

Pavemetrics Systems

Machine vision systems for transport infrastructure inspection, 2009

RealTraffic Technologies

Image analysis technologies, 2008

Hedzopt

Thermal weapon sight, 2007

LeddarTech

LEDs for detection and distance measurement 2007

Quantum BioMedical (QBM)

Endoscopic probe for intravascular diagnosis, 2006

IRphotonics

Fluoride glass and fibers, 2004

Neoptix

Fiber optic temperature sensors, 2004

OpSens

Fiber sensors, 2004

Optosecurity

Optical correlator, 2004

PyroPhotonics Lasers

PEFL laser technology, 2004

Cybiocare

Hypoglycemia sensor and glucose measurement, 2003

Obzerv Technologies

Vision systems, 2002

NEKS Technologies

Color-based gingival tartar detection, 2001

TeraXion

Optical components, 2000

CorActive High-Tech

Specialty Fibers, 1998

Pierre Langlois Consultant

Diffraction optics consulting, 1997

P&P Optica

Optics Engineering Shop, 1995

FISO Technologies

Fiber optic sensors, 1994

Lentilles Doric

Microlenses, 1994

Optiwave Corporation

Integrated Optics Software, 1994

AEREX Avionique

Optoelectronics consulting, 1993

I/FO Technologies

Fiber optic technology consulting, 1993

Optel Vision

Optical instrumentation, 1992

Instruments Régent

Optical instrumentation, 1990

Nortech Fibronic

Optical instrumentation, 1989

TECHNOLOGY TRANSFERS

ABB

Pyramid wavefront sensor

Arcane Technologies

Computing Library – Amazon

Asian enterprise

Bolometers

Asian enterprise

Bolometers

Asian enterprise

Fiber components

Asian enterprise

Reading circuit

Asian enterprise

Terahertz imaging

Asian integrator

MOPAW laser

Asian Research Institute

Bolometers

Autolog

3D imaging calibration software

Autolog

Planovision

Autolog

Source code

Avensys/Bragg Photonics

All-fiber photo-induced filters

Brio Conseils

Development process management innovation

Bristol Aerospace

Infrared detector

Canadian enterprise

Bolometers

Canadian enterprise

Infrared imaging

Communication Research Center Canada

Integrated processes system - SPI

CorActive High-Tech

Triple-clad specialty optical fiber

CTEX

Bolometers

Cybiocare

Hypoglycemia sensor and glucose measurement

Dellux Technologies

LED lights

FISO Technologies

End-of-service indicator for respiratory protective device

FISO Technologies

Fiber optic sensors for temperature, constraint and pressure

Gentec Electro-Optics

Holographic wave sampler

handyem

Flow cytometry

Hedzopt

Thermal weapon sight

Industries Maibec

Features detection on cedar wood shingles

Instruments Régent

Optical instrumentation

IRphotonics

Fluoride fibers

Krispy Kernels

Hyperspectral system for automatic sorting of contaminants

Lasiris

Diffractive optical elements

LeddarTech

LEDs for detection and distance measurement

Lentilles Doric

Refraction index gradient microlens

Microsphere

Optical correlator for inspection of plastic components

MPB

Infrared spectrometer

NEKS Technologies

Color-based gingival tartar detection

Netcorp

Optical switch

Normand PROJEX

Inspection system for 3D verification of hardwood floor mortise and tenon dimensions

Nortech Fibronic

Fiber optics temperature sensors

Nortech Fibronic

Tunable fiber laser

Obzerv Technologies

DALIS™ laser illuminator

Opti Rythmix

Virtuo library

Optiwave Corporation

Integrated optics software

Optosecurity

INOSegmenter - Image segmentation software

Optosecurity

Numerical optical correlator technology

Optosecurity

Optical correlator

Pavemetrics Systems

Machine vision systems for transport infrastructure inspection

Pavemetrics Systems

Machine vision systems for a new field of views

Petroleum sector enterprise

Fiber sensor technology

PyroPhotonics Lasers

PEFL laser technology

PyroPhotonics Lasers

PYFL fiber laser unfolded cavity configuration

Quantum Biomedical (QBM)

Fiber endoscope for intravascular diagnosis

RealTraffic Technologies

Image analysis technologies

RaySecur

Terahertz technology

Searidge Technologies

Video monitoring technology

Searidge Technologies

Video surveillance and video processing technology and source codes

Seastar Optics

Erbium fiber laser

Solvision

Structured light projector

STAS

Hydrogen fluoride detector

SYGIF International

Integrated processes system - SPI

Symbiotech Medical

Intra-arterial analysis and detection

Telops

Integrated processes system - SPI

West Coast petroleum sector enterprise

Fiber sensor technology

SUMMARY FINANCIAL STATEMENTS

March 31, 2016



June 9, 2016

Report of the independent auditor on the summary financial statements

To the Members of the National Optics Institute

The accompanying summary financial statements, which comprise the summary statement of financial position as at March 31, 2016 and the summary statements of operations, changes in net assets and cash flows for the year then ended, and related notes, are derived from the audited financial statements of the National Optics Institute for the year ended March 31, 2016. We expressed an unmodified audit opinion on those financial statements in our report dated June 9, 2016.

The summary financial statements do not contain all the disclosures required by Canadian accounting standards for not-for-profit organizations. Reading the summary financial statements, therefore, is not a substitute for reading the audited financial statements of the National Optics Institute that are available from the organization.

Management's responsibility for the summary financial statements

Management is responsible for the preparation of a summary of the audited financial statements.

Auditor's responsibility

Our responsibility is to express an opinion on the summary financial statements based on our procedures, which were conducted in accordance with Canadian Auditing Standard (CAS) 810, *Engagements to Report on Summary Financial Statements*.

Opinion

In our opinion, the summary financial statements derived from the audited financial statements of the National Optics Institute for the year ended March 31, 2016 are a fair summary of those financial statements.

*PricewaterhouseCoopers s.r.l./s.e.n.c.r.l.*¹

¹ CPA auditor, CA, public accountancy permit No. A118597

SUMMARY STATEMENT OF FINANCIAL POSITION

As at March 31, 2016

	2016 \$	2015 \$
ASSETS		
Current assets		
Cash	1 398 976	-
Accounts receivable	3 189 753	3 139 360
Financial support receivable related to Internal Research Program (note 2a)	900 000	969 578
Tangible capital assets and intangible assets (note 2b, i)	626 956	1 459 763
Inventories	2 478 094	1 620 855
Research contracts in progress	899 954	997 836
Prepaid expenses	792 830	664 824
Net investment in a finance lease	134 593	167 429
	10 421 156	9 019 645
Investments in private companies	229 233	229 233
Net investment in a finance lease	104 524	104 621
Financial support receivable related to tangible capital assets and intangible assets (note 2b, i)	1 662 121	1 253 912
Financial support related to the building (note 2c)	205 353	-
Tangible capital assets	24 116 719	22 792 638
Land held for sale	-	1 075 692
Intangible assets	146 582	185 300
	36 885 688	34 661 041
LIABILITIES		
Current liabilities		
Excess of outstanding cheques over bank balances	-	741 985
Bank loans	548 781	764 883
Accounts payable and accrued liabilities	9 758 326	6 061 667
Deferred revenues and advances on contracts	2 040 378	1 849 439
Current portion of long-term debt	679 533	1 640 561
	13 027 018	11 058 535
Long-term debt	626 852	1 394 820
Employee future benefit obligations (note 3)	4 957 000	535 005
Deferred financial support related to		
Tangible capital assets and intangible assets (note 2b, ii)	17 549 595	17 194 357
Business and Regional Growth / Innovation program (note 2d)	48 741	81 236
	36 209 206	30 263 953
	676 482	4 397 088
	36 885 688	34 661 041
NET ASSETS		
	676 482	4 397 088
	36 885 688	34 661 041
Contingency (note 4)		

Approved by the Board of Directors



Director



Director

The accompanying notes are an integral part of these summary financial statements.

SUMMARY STATEMENT OF OPERATIONS AND CHANGES IN NET ASSETS

For the year ended March 31, 2016

	2016 \$	2015 \$
REVENUES		
Financial support related to		
Internal Research Program (note 2a)	15 400 000	14 600 000
Tangible capital assets and intangible assets (note 2b, ii)	1 863 922	2 087 428
Financing costs (note 2b, iii)	55 405	36 470
Business and Regional Growth / Innovation program (note 2d)	32 495	48 626
Sales and contracts	16 356 699	15 365 823
Royalties	98 226	124 246
Technology transfer agreements and other agreements	2 895 469	933 980
Rent and other revenues	488 434	446 045
Gain on disposal of land held for sale	381 396	-
Members' contributions	63 100	63 100
Foreign exchange gain	89 056	4 051
	37 724 202	33 709 769
EXPENSES		
Salaries and fringe benefits (note 3)	20 133 398	16 686 419
Cost of goods and services pertaining to project completion	6 559 285	6 881 933
Other operating expenses	7 065 015	7 518 225
Other than temporary decline in value on investments in private companies	-	275 000
Interest on long-term debt	75 220	87 729
Interest and bank charges	99 978	165 298
Depreciation of tangible capital assets	2 575 669	2 829 310
Amortization of intangible assets	82 644	127 694
	36 591 209	34 571 608
EXCESS OF REVENUES OVER EXPENSES (EXPENSES OVER REVENUES) FOR THE YEAR	1 132 993	(861 839)
NET ASSETS – BEGINNING OF YEAR	4 397 088	724 527
Excess of revenues over expenses (expenses over revenues) for the year	1 132 993	(861 839)
	5 530 081	(137 312)
Remeasurements and other items	(4 853 599)	4 534 400
NET ASSETS – END OF YEAR	676 482	4 397 088

The accompanying notes are an integral part of these summary financial statements.

SUMMARY STATEMENT OF CASH FLOW

For the year ended March 31, 2016

	2016 \$	2015 \$
CASH FLOWS FROM OPERATING ACTIVITIES		
Excess of revenues over expenses (expenses over revenues) for the year	1 132 993	(861 839)
Items not affecting cash		
Depreciation of tangible capital assets	2 575 669	2 829 310
Amortization of intangible assets	82 644	127 694
Adjustment related to employee future benefits	(438 400)	(132 500)
Financial support related to tangible capital assets and intangible assets (note 2b and c)	(1 896 417)	(2 136 054)
Capitalized interest on financial support repayable	15 949	44 524
Other than temporary decline in value on investments in private companies	-	275 000
Gain on disposal of land held for sale	(381 396)	-
	<u>1 091 042</u>	146 135
Changes in non-cash working capital items	4 146 071	804 621
	<u>5 237 113</u>	950 756
CASH FLOWS FROM FINANCING ACTIVITIES		
Variation in bank loans	(216 102)	(1 441 876)
Long-term debt contracted	-	1 880 868
Repayment of long-term debt	(285 078)	(188 113)
	<u>(501 180)</u>	250 879
CASH FLOWS FROM INVESTING ACTIVITIES		
Acquisition of tangible capital assets	(3 769 016)	(1 565 417)
Acquisition of intangible assets	(43 926)	(78 149)
Proceeds from disposal of tangible capital assets	1 457 087	-
Finance lease, net of repayments	(239 117)	-
	<u>(2 594 972)</u>	(1 643 566)
NET CHANGE IN CASH	2 140 961	(441 931)
EXCESS OF OUTSTANDING CHEQUES OVER BANK BALANCES		
- BEGINNING OF YEAR	(741 985)	(300 054)
CASH (EXCESS OF OUTSTANDING CHEQUES OVER BANK BALANCES)		
- END OF YEAR	<u>1 398 976</u>	<u>(741 985)</u>

The accompanying notes are an integral part of these summary financial statements.

NOTES TO SUMMARY FINANCIAL STATEMENTS

March 31, 2016

1. STATUTES AND NATURE OF ACTIVITIES

The National Optics Institute (INO) was incorporated on December 13, 1985 under Part II of the Canada Corporations Act and continued on September 11, 2013 under the Canada Not-for-profit Corporations Act. Its mandate is to provide the Canadian optics industry with research and development support and the technical assistance necessary to sustain its growth and to play a leading role in the development and application of optics in Canada.

As a non-profit organization, INO is exempt from income tax.

2. FINANCIAL SUPPORT

a) Financial support – Internal Research Program

The financial support that INO receives as part of the Internal Research Program is as follows:

	Aide totale (2012 à 2016) \$	Solde de l'aide disponible au 31 mars 2016 \$	Revenus	
			2016 \$	2015 \$
Government of Canada Canada Economic Development	45 000 000	-	9 000 000	9 000 000
Government of Quebec Financial support	32 851 600	-	6 400 000	5 600 000
- Internal Research Program	77 851 600	-	15 400 000	14 600 000

Government of Canada

In June 2011, the Government of Canada, through the Business and Regional Growth Program of Canada Economic Development, granted INO a maximum financial support of \$45,000,000 for the five-year period ending on March 31, 2016, so as to fund its Internal Research Program. As at March 31, 2016, an amount of \$900,000 (\$969,578 as at March 31, 2015) was still receivable on the fifth tranche of \$9,000,000 allocated for the year.

Government of Quebec

The Government of Quebec granted INO financial support of \$32,851,600 over 5 years, ending on March 31, 2016 related to INO's Internal Research Program. The original amount granted in 2012 amounted to \$36,098,000. The financial support allocated for the year in the amount of \$6,400,000 was received in full as at March 31, 2016.

In its March 22, 2016 budget, the Government of Canada announced the renewal of financing for INO's Internal Research Program from April 1, 2016 to March 31, 2021 for a total contribution of \$50,000,000, at the rate of \$10,000,000 annually. Concerning the Government of Quebec, discussions are underway to renew financing for the operation of the Internal Research Program until March 31, 2021 for a total contribution of \$32,000,000, at the rate of \$6,400,000 annually.

NOTES TO SUMMARY FINANCIAL STATEMENTS

March 31, 2016

b) Support program for the purchase of research equipment – Government of Quebec

i) Financial support receivable related to tangible capital assets and intangible assets

The financial support receivable pertains to the following items:

	2016	2015
	\$	\$
Term loan of an original amount of \$1,880,868 *	1 253 808	1 880 868
Term loan of an original amount of \$2,442,421 *	-	832 807
Purchase of research equipment **	1 035 269	-
	<u>2 289 077</u>	<u>2 713 675</u>
Less: Current portion	626 956	1 459 763
	<u>1 662 121</u>	<u>1 253 912</u>

* These loans were contracted for tangible capital assets and intangible assets and payments on these loans (principal and interest) are made directly by the Government of Quebec to the lending financial institution. As a result, financial support receivable is recorded for an amount equal to the principal of the corresponding debt.

** Under the financial support agreement, the Government of Quebec repays directly INO 80% of the acquisition cost of equipment up to a maximum of \$2,059,287.

For the five-year period ending on March 31, 2016, the Government of Quebec granted an amount of \$6,382,576 as financial support related to tangible capital assets and intangible assets.

ii) Deferred financial support related to tangible capital assets and intangible assets

	2016	2015
	\$	\$
Balance – Beginning of year	17 194 357	18 100 776
Financial support related to the purchase of tangible capital assets and intangible assets for the year	1 859 269	1 181 009
Financial support related to the building for the year	359 891	-
Transfer to the revenues for the year to offset the corresponding depreciation and amortization	<u>(1 863 922)</u>	<u>(2 087 428)</u>
Balance – End of year	<u>17 549 595</u>	<u>17 194 357</u>

iii) Financial support related to financing costs

INO receives financial support for the interest charges related to certain long-term debt items. The financial support received for this purpose amounts to \$55,405 (\$36,470 in 2015) and has been included in revenues.

c) Financial support related to the building

During the year, the Government of Quebec granted INO financial support of up to \$772,691 for the execution of major work to the building. Financial support is paid as disbursements are made by INO. As at March 31, 2016, an amount of \$250,353 is receivable for the disbursements made during the year, and work is in progress.

NOTES TO SUMMARY FINANCIAL STATEMENTS

March 31, 2016

d) Business and Regional Growth / Innovation program

In 2009, INO obtained a special financial support through the Business and Regional Growth / Innovation program of Canada Economic Development for the purpose of improving its ability to market the technology and technological know-how produced by its Internal Research Program.

The deferred financial support related to tangible capital assets and intangible assets is broken down as follows:

	2016	2015
	\$	\$
Balance – Beginning of year	81 236	129 862
Transfer to the revenues for the year to offset the corresponding depreciation and amortization	(32 495)	(48 626)
Balance – End of year	<u>48 741</u>	<u>81 236</u>

3. EMPLOYEE FUTURE BENEFITS

INO offers employee future benefit plans, including a defined benefit plan guaranteeing the payment of pension benefits to some of its employees.

Defined benefit pension plan

The most recent actuarial valuation of the pension plan was performed on December 31, 2014 and was extrapolated as at March 31, 2016. Information related to the defined benefit pension plan is as follows:

	2016	2015
	\$	\$
Defined benefit obligations	(39 358 700)	(35 061 500)
Fair value of plan assets	34 527 500	34 645 500
Defined benefit liability	<u>(4 831 200)</u>	<u>(416 000)</u>

As at March 31, 2016, the employee future benefit obligations are as follows:

	2016	2015
	\$	\$
Defined benefit pension plan	4 831 200	416 000
Other employee future benefits	125 800	119 005
	<u>4 957 000</u>	<u>535 005</u>

4. CONTINGENCY

Lawsuits have been initiated against INO in the normal course of its operations. Although management contests these claims, there is a risk that an amount will need to be disbursed to settle the lawsuits. Accordingly, the provision for litigation amounting to CAN\$600,000, which was recognized in the year ended March 31, 2015, is still recorded.

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Quebec (Quebec)

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Quebec (Quebec)

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President of MAXXAB
Rimouski (Quebec)

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Corporate Director
Quebec (Quebec)

Jean-Marie Toulouse

Professor Emeritus
HEC Montreal
Montreal (Quebec)

¹ Executive Committee Members

² Audit Committee Members

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Quebec (Quebec)

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Bellingham (Washington)

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Ottawa (Ontario)

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Polar Knowledge Canada
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University of Ottawa
Ottawa (Ontario)

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INO
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Telops
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DRDC-Valcartier
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Toronto (Ontario)

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André Fougères

Vice-President, Business Development
and Operations

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Vice-President and Chief Technology Officer

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Vice-President, Finance

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Université de Sherbrooke

Jacques Albert

Carleton University

Claudine Allen

Université Laval

David Allen

National Institute of Standards and Technology (NIST)

Hamed Pishvai Barzargani

Institut national de la recherche scientifique (INRS)

Simon Benwell

Optelian, United States

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CEREMA, Clermont-Ferrand, France

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École de technologie supérieure (ÉTS)

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