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Together with our bilateral stakeholder community, CIIRDF would like to extend special thanks to the following investors and partners that directly support Canada-Israel R&D collaboration: the National Technology Innovation Authority or NTIA (the former Office of the Chief Scientist, Ministry of Economy), State of Israel; Global Affairs Canada (GAC); Natural Resources Canada (NRCan); the Governments of Ontario, Saskatchewan and Nova Scotia; the Natural Sciences and Engineering Research Council (NSERC); and the National Research Council Canada (NRC). Your commitment to bilateral technology partnerships increases the global competitiveness of Canadian and Israeli firms, and our nations more broadly.
With base funding of $1 million per year from the Government of Canada and the Government of Israel, CIIRDF:

- Stimulates collaborative research and development between companies in both countries, with a focus on the commercialization of new technologies;
- Pools Canadian and Israeli know-how to provide both countries with improved market access, sustainable competitive advantage, and long-term market opportunity in global economies;
- Strengthens ties between Canada and Israel, and delivers economic benefits to both countries by helping to build resilient companies that develop new products, create new jobs and generate new global revenues that build our domestic economies; and
- Leverages additional regional and sector-based funding that is matched by the Government of Israel.

CIIRDF has:

- Engaged more than 1,000 participants in partnership development activities; this includes more than 400 industry leaders who actively contributed to R&D collaboration discussions;
- Processed more than 230 bilateral R&D applications; and
- Funded 110 projects engaging more than 200 companies from Canada and Israel.

These alliances have:

- Enabled the joint development, marketing and sales of more than 50 technologically improved new products for global markets;
- Generated $60 million in initial sales, and $300 to $500 million in additional economic value to collaborating companies; and
- Created hundreds of jobs in both countries.

These benefits are described by the leaders of CIIRDF-supported companies throughout this report.
CIIRDF facilitates joint technology development between companies in Canada and Israel. It adds value and technological capacity to all partners, and enables the commercialization of new products and services. To achieve these objectives, CIIRDF:

- Promotes the benefits of Canada-Israel R&D collaboration;
- Offers a matchmaking service that brings together Canadian and Israeli companies seeking R&D partners; and
- Provides funding in support of bilateral R&D projects with strong science, and the best potential to add commercial value to both companies.

Established in 1994 under a formal mandate from the Government of Canada and the State of Israel, CIIRDF is connected institutionally with Israel’s National Technology Innovation Authority or NTIA (the former Office of the Chief Scientist in Israel’s Ministry of Economy). CIIRDF-funded projects cross many scientific disciplines, technologies and industrial sectors. These include biotechnology, agriculture, information and communications technologies, automotive, natural resource management, public safety and aerospace.

With equal contributions from the Canadian and Israeli governments, CIIRDF offers partnership services to companies in Canada and Israel at no cost. With technology evaluation specialists on the ground in each country, CIIRDF provides financial support for R&D projects, assuming reasonable potential for commercial value that is commensurate with the risk. CIIRDF does not take an equity position or claim any intellectual property rights in jointly developed technologies. CIIRDF-funded companies are required to repay the contribution should the R&D project result in the specific product or service envisaged in the original proposal. If the project does not lead to revenue generation, repayment to CIIRDF is not required, even though the companies have derived significant value from the collaboration. This is the case with many CIIRDF-supported projects.

Recognized as one of the most successful partnership models of its kind, CIIRDF-supported R&D partnerships have generated a wealth of direct and indirect economic benefits for both nations. Based on conservative data provided directly by participating companies, CIIRDF-enabled technology development projects have generated commercial value to the Canadian and Israeli economies that far exceeds the original grant investment. While the exact amount solely attributable to the CIIRDF effort is difficult to quantify, the value derived by the companies is clearly presented in this report. This value validates the basic assumptions of the Canadian and Israeli governments: that technology partnerships benefit both nations, while reinforcing bilateral economic and overall relations.

“Our association with CIIRDF began on a pilot project aimed at adapting Israeli technology on unmanned air vehicles in Canada’s resource sector. Since then, Israel Aerospace Industries has built important and mutually beneficial business and technology relations with a number of Canadian firms, and has also invested in bilateral projects supported by CIIRDF. We have gained much value from these activities and continue to benefit from CIIRDF. Most recently, CIIRDF has provided us with excellent visibility on technological applications in Canada’s energy sector.”

Leah Boehm, Chief Scientist, Israel Aerospace Industries
Why Canada and Israel?

Canada and Israel enjoy strong bilateral relations that span more than 60 years. Originally founded on political and cultural attributes, CIIRDF was designed to add an economic dimension to this relationship. It builds on complementary strengths in science and industry, establishing a solid foundation for R&D partnerships.

These include:
- A world-class science, technology and research base;
- A highly educated workforce and multilingual population with political, economic, cultural, historical and business ties to many nations around the world;
- Well established people-to-people linkages; there are approximately 20,000 Canadian citizens living in Israel and many Canadians have family in Israel; the Canadian Jewish community, which stands at around 350,000, acts as an important bridge between Canada and Israel;
- A strong and long-standing trade relationship; the 1997 Canada-Israel Free Trade Agreement (CIFTA) propelled bilateral merchandise trade between the two countries to $1.6 billion in 2014; and
- Many common values as developed, modern and democratic nations including: a commitment to knowledge creation; a strategic approach to innovation; and rules-based governance and decision-making.

Delivering Results

CIIRDF enables Canadian and Israeli firms to combine complementary technologies, expertise and other resources for the development of new products and services. This delivers clear benefit to both economies as the emerging innovations are procured by customers in markets outside of Canada and Israel. This underscores how industry-led bilateral partnerships stimulate commercial activity, open new markets, and increase trade and exports.

In this report, Canadian and Israeli firms attest that CIIRDF-supported technology partnerships have positioned their companies in global markets. These technology partnerships do not simply enable the creation of a new product or two. They provide firms with a sustainable competitive edge, and position them for long-term opportunity in new markets. This is one of the most prominent facets of the CIIRDF value proposition and track record. Perhaps most impressive: CIIRDF has achieved these results and exceptional project quality by leveraging a modest $1 million per year from both governments, as well as additional regional and sectoral programs. As such, CIIRDF delivered a total program valued at more than $20 million from 2013 to 2016. Although the outcomes of each individual project constitute success, it is the summation of these results that speaks to the power of bilateral R&D partnerships. The success stories featured in this report provide examples of the economic value derived from this investment in terms of company valuation, product sales, jobs created and other metrics. These benefits are equally enjoyed by Canadian and Israeli partners, a clear measure of the success of the CIIRDF program and its delivery model. This impact is validated by testimonials from CIIRDF-supported industry leaders, our success story collection and statements from other firms — all of which underpin this impact report.

CIIRDF has provided $36 million in grants to support bilateral R&D projects that generated hundreds of millions of dollars in economic value for participating Canadian and Israeli companies.
Avi Hasson  
Chief Scientist and Chairman, National Technology Innovation Authority (NTIA), State of Israel  
Chair, CIIRDF Board of Directors

Israel is a nation founded on science, technology and innovation. Bilateral research and innovation cooperation programs serve as a cornerstone to Israel’s economic development, trade and innovation strategy – and they catalyze our global competitiveness as a country. The industry-led partnerships that emerge from these programs enable us to translate our scientific and technological expertise into products that address global market needs, while minimizing risk for entrepreneurs and investors. This increases the commercial potential of the resulting technologies, and the commercial success of the entrepreneurs who create them.

Leveraging our technological and entrepreneurial strengths as the Start-up Nation, Israel has established collaborative technology development programs with many R&D-intensive nations around the world. The National Technology Innovation Authority (NTIA) is the main governmental policy making and support arm for industrial R&D in Israel. Within my role as Chief Scientist and Chairman of Israel’s NTIA, and also as Chair of the CIIRDF Board of Directors, I have unique perspective on the impact of such initiatives. I can say with confidence that the bilateral R&D program established with Canada through CIIRDF is among the most productive and impactful binational cooperation programs employed by Israel. The results achieved to date are a testament to the power of the CIIRDF model.

Canada and Israel’s investment in CIIRDF-supported research and technology development projects has generated significant return
over the last two decades. The economic impact for both countries is very significant. This is especially true when we consider the opportunities for mutually reinforcing technology and business relations ahead of us in the energy sector. This represents an important opportunity for both countries. This trail is being blazed by CiIRDF. This report highlights some of the specific technology and market objectives achieved by Canadian and Israeli collaborators with CiIRDF support. These stories reinforce the true value of bilateral partnerships, and CiIRDF more broadly as a collaboration platform. They underscore the long-term impact of science and technology cooperation on participating firms — from the creation of new, revenue-generating products to new global market opportunities, job creation and follow-on investment for high potential firms. These outcomes not only build competitive and sustainable companies; they help build competitive and sustainable economies.

And, as importantly, science and technology partnerships brokered and supported by CiIRDF, are instrumental in strengthening bilateral relations between Canada and Israel. While more challenging to quantify, these linkages influence many facets of our trade and economic policy, and culture; and human relationships that span many generations. They also enable us to pool our collective expertise and develop solutions to some of the greatest challenges facing our society today — from depleting natural resources, to sustainable and affordable healthcare and energy, and cures to some of the world’s most debilitating diseases. Such innovation is a critical driver to our collective prosperity and well-being. This is the very reason Israel invests hundreds of millions dollars annually into R&D and innovation programs, including bilateral S&T partnerships. They are essential to achieve our collective economic and social objectives.

Over the coming year, we aim to significantly increase our technology collaboration through CiIRDF to maximize the value for entrepreneurs; increase our competitiveness; and further strengthen the economies of both countries. The NTIA, and the State of Israel more broadly, will strive to continue working cooperatively with our Canadian partners to build on CiIRDF results to date, and further leverage this proven platform to achieve even greater economic and social benefits.

Chief Scientist and Chairman
NTIA, State of Israel;
Chair, CiIRDF Board of Directors
CIIRDF was founded on a powerful vision. It is one that was based on a premise that science and technology (S&T) are major engines of economic growth, and that bilateral collaboration in new technologies are mutually beneficial, reinforcing overall economic ties between countries. This impact report demonstrates how CIIRDF has validated this premise, and realized this vision for the benefit of Canada and Israel. It is a vision that continues to guide us today. In fact, with S&T more economically relevant now than 20 years back, programs such as CIIRDF have become even more important.

Our specific goal is still to provide value to both countries. The CIIRDF program adds a key element to Canada-Israel bilateral relations that directly addresses the self-interest of each nation. Mutual benefit is a hallmark of our CIIRDF platform. It underpins every technology partnership we support. The success of programs such as CIIRDF is sometimes difficult to measure. It is important not to be lured by the promise of fast metric-producing results. This is not to say that we have not delivered hard evidence. This report aims to demonstrate that real value comes in many different forms – many of which are presented in the success stories featured in this report. I am pleased to have the opportunity to discuss them in this letter.

In the area of Internet technology, the project that brought together Israel’s Altair Semiconductor and Canada’s SiGe Semiconductor delivered important financial results to SiGe. This includes annual revenues valued in the tens of millions of dollars. It also served as a key factor in its acquisition—a deal valued at almost $300 million. This acquisition consolidated company growth in Canada, along with scores of good jobs and exciting global market prospects. In the important area of medical technologies, the project engaging Quanser of Canada and Simbionix of Israel also produced tangible outcomes. As a result of the project, Quanser has almost doubled its labor force, and rapidly expanded its global market outreach across 80 countries. Through this CIIRDF project, Simbionix has generated a 20 percent increase in overall sales every year since its launch.

The critical area of food production increasingly benefits from multidisciplinary applications that combine computational biology, genetics and other scientific fields. A CIIRDF project brought together Crop Production Services or CPS (initially through the Saskatchewan Wheat Pool and Viterra) and Evogene, an Israeli leader in plant
These companies are staking key growth in global markets on the development of a new strain of crops that aims to dramatically enhance crop productivity. With support from CIIRDF, the firms aimed to develop a hardier, more disease-resistant strain of canola through new biotechnological processes. While the project did not yield a specific market-ready product, it is a success story because both companies gained important and measurable value as a result. CPS enhanced its intellectual property, making it a much stronger performer in the agriculture sector. To be specific, CPS has doubled its capacity to produce a pipeline of new inbred canola.

Each of these success stories has a narrative that is real and compelling. As described by the company leaders themselves, technology partnerships enable high-risk, high-reward R&D that might not otherwise be possible. The resulting commercial activity generates revenues that build our domestic economies, and lead to increased trade, new jobs and wealth creation in Canada and Israel. CIIRDF is building such partnerships, project-by-project, leveraging every dollar invested by a minimum of three-to-one given the matching funding required by Canadian and Israeli firms. Moreover, these technology partnerships are positive sum endeavors that strengthen our overall bilateral relations, promoting a culture of Canada-Israel R&D collaboration that will benefit generations to come.

But CIIRDF is much more than a delivery mechanism for a binational fund. Our structure and broad networks have enabled CIIRDF to become a flexible and efficient platform for seizing strategic opportunity; and designing and operating new program elements. For example, we have established provincial initiatives that significantly extend the CIIRDF program in Ontario, Saskatchewan and Nova Scotia. These new provincial accords will result in additional bilateral technology partnerships that specifically address key technological and economic priorities across these regions of Canada. CIIRDF is currently in discussions with other provinces to explore similar programs.

We have also engaged innovators across specific sectors of importance to both economies. In 2013, Natural Resources Canada (NRCan) selected CIIRDF to deliver the Canada-Israel Energy Science and Technology (CIEST) Fund. In less than three years, the CIEST Fund has had a major impact on the application of advanced Israeli technologies in Canada’s energy sector, particularly in the oil sands. We have generated more than 60 linkages between Canadian and Israeli energy technology firms, and increased Israel’s presence in this region. The results achieved through the CIEST Fund (and described in this report) are significant.

The subsequent admission of CIIRDF as an Associate Member of the Canadian Oil Sands Innovation Alliance (COSIA) has created even greater opportunities for Canada-Israel technology partnerships in this vital sector of Canada’s economy. During our first year of association with COSIA, Israeli innovators and firms provided more than 20 technology solutions with the potential to address environmental challenges to COSIA members for review.

And, we are poised to achieve even greater impact in the years ahead. Our impressive results would not be possible without the involvement and support of our binational Board of Directors; expert evaluators in both countries; our small, dedicated and talented staff; and numerous partners and colleagues in business, research and government across both countries. We are especially grateful for our core support from the Israel’s NTIA, and from Global Affairs Canada (GAC).

I am proud to join Avi Hasson in presenting the work of CIIRDF. Our impact on Canada-Israel bilateral relations is significant. Our work is of growing relevance given the increasing importance of innovation to the global economy. Our operations are effective and far-reaching. The following pages present the evidence.
To stimulate collaborative research, technology development and commercialization between private sector companies in both countries, CIIRDF:

- Provides on-going **technology matchmaking** to broker initial linkages between companies with compatible R&D objectives, interests and market opportunities;
- Facilitates specific **partnership development activities (PDAs)** that bring together Canadian and Israeli companies to explore new ideas and technology development opportunities in roundtables, workshops, and symposia; and
- Invests in bilateral **research and technology development projects**.

### Matchmaking Services

Matchmaking is the process of connecting companies with complementary R&D, technology or business strengths for mutually beneficial R&D collaboration, or business partnerships. Matchmaking may result in a decision to undertake a cooperative R&D project, or another form of collaboration.

Through its matchmaking services, CIIRDF has developed a platform that enables companies to access:

- Relevant technological and market information on technical and business capabilities in the partner country; and
- Specific lists of technology partners with complementary strengths that help firms to address key R&D challenges and new market opportunities.

Over the past seven years, CIIRDF has delivered matchmaking services to more than 250 firms. CIIRDF has recently enhanced its technological matchmaking services to help more Canadian companies develop linkages with suitable Israeli companies, and establish R&D collaborations. CIIRDF is leveraging its partnerships with key regional and national organizations to help facilitate the matchmaking process in priority sectors and research areas. These include neuroscience, water and energy.

CIIRDF promotes collaboration with Israeli and Canadian firms to help stimulate R&D cooperation in strategic areas, and open-up new market opportunities for participants. It also continues to build a comprehensive database of Israeli and Canadian companies, and related intelligence to support matchmaking activities.

“MDA has a long history of involvement with CIIRDF, and through its services and support, with partners in Israel that represent some of the best technology-based companies in the world. In fact, we currently have two bilateral cooperation projects with Israeli partners supported by CIIRDF. The value of this involvement to our company is substantial and extends well beyond the commercial metrics associated with the envisaged product or service. Through the CIIRDF program, we have gained exposure to, and experience with, Israeli technological approaches that have improved the way we address complex problems. This in turn has helped to make MDA what it is today, a world leader in the provision of communications, surveillance and intelligence related information.”

David Hargreaves, Vice President, Aerospace and Defence, MDA (MacDonald, Dettwiler and Associates)
Partnership Development Activities

Partnership Development Activities (PDAs) may take the form of:
• Collaborative events such as workshops, symposia, roundtables, scientific seminars, and conferences; or
• Other activities that enable the mobility of highly qualified personnel, such as student internship programs or employee exchanges.

PDAs are strategic as they promote the identification of new opportunities for bilateral and multilateral cooperation, and prospective funding partners. This expands the vision, scope and reach of CIIRDF, helping to better deliver on the overall objectives of the program, and add greater value to participants. Over the last few years, CIIRDF has hosted bilateral and multilateral PDAs in areas of shared priority including: brain research and neurotechnology development; water technologies; marine and ocean technology; agri-innovation; clean technologies; and medical technologies.

Collaborative R&D Projects

CIIRDF invests in two types of bilateral R&D initiatives:
• **Feasibility studies** up to six months in duration: CIIRDF contributes up to 50 percent of the joint study costs up to a maximum of CDN $20,000; and
• **Collaborative R&D** projects up to three years in duration: CIIRDF contributes up to 50 percent of joint project costs up to a maximum of CDN $800,000. As technology commercialization is a key goal of CIIRDF, the jointly developed product should be near ‘market-ready’ by the conclusion of the project.

CIIRDF-funded feasibility studies and R&D projects cross many scientific disciplines, technologies and industrial sectors including: biotechnology, agriculture, information and communications technologies, automotive, natural resource management, public safety and aerospace.
“As a CIIRDF Director for 10 years, I have contributed to the evaluation of more than 150 bilateral R&D projects brought before the Board for funding decisions. I have always been struck by the scientific quality and potential of these projects to help the Canadian and Israeli partners be more competitive in world markets as a result of joint research collaboration. CIIRDF is a great model, and I am happy to see evidence of its good work published in this report.”

Dr. Michael Binder, President and Chief Executive Officer, Canadian Nuclear Safety Commission (CNSC)
In our technology-driven society, mobile device users take wireless connectivity for granted. We trust that smart phones, tablets and laptops will immediately connect to a network or the Internet. WiFi™ is the standard wireless system that provides such access, but it is a short-range system that only allows connections for users who are within several hundred metres of the wireless service point.

In 2008, the technical world was buzzing with the promise of Worldwide Interoperability for Microwave Access (WiMAX) as a next-generation technology for enhanced wireless connectivity. This long-range system proposed to enable users to connect to an Internet connection up to several kilometres away. With a focus on the potential of this new communications standard to improve the capability and experience of wireless users, companies around the world raced to address the technical challenges that limited its uptake. Among the most prominent issues: the power required for data transmission and reception over an extended wireless range. An Israeli and a Canadian company aimed to address this challenge and develop a complete WiMAX solution that delivered more power with greater efficiency. Although the promise of WiMAX waned with LTE (Long Term Evolution) emerging as the 4th generation of wireless communication, this collaboration delivered long-term benefit to both firms.

The companies aspired to develop a highly efficient power amplifier (a device that amplifies the power of an electrical signal) that incorporated the WiMAX communication standard into hand-held mobile devices. SiGe designed, prototyped, and tested versions of the amplifier, and Altair successfully evaluated and integrated SiGe’s prototypes with their solutions.

Outcomes

The lessons learned from this CIIRDF R&D project have generated new market opportunities for both companies.

“As a direct result of our CIIRDF project, SiGe gained 30 percent market share for WiFi power amplifiers for laptop USB ports, generating $10 million per year. This helped to catalyze its acquisition by Skyworks Solutions in 2011. This $290 million deal enabled us to maintain our talent base in Ottawa, and grow the capabilities of our team. By the time of the acquisition, SiGe had shipped wireless technology solutions valued at about $400 million. CIIRDF played a key role in this success. We aimed to generate higher radio frequency (RF) power within our amplifiers than anything we had ever designed before. While working towards this goal, we learned about the limitations of our technology. This forced us to be creative, leading to the development of a novel methodology that reduced design time and cost by 50 percent. We save more than $200,000 per year from this CIIRDF learning alone. Today, Skyworks is guiding for revenue of $718 million for the fourth quarter of our current fiscal year.”

Steve Kovacic, Former Technology Director at SiGe Semiconductor; Director of Technology, Skyworks Solutions, Inc.

“This CIIRDF project enabled our company to develop new expertise and gain valuable power amplifier technology experience. Although this CIIRDF project focused on WiMAX, we apply the knowledge acquired during this project to various other technology areas we are involved in. Our collaboration with SiGe accelerated our progression into LTE.”

David Hasenfeld, Finance Executive, Altair Semiconductor

Objective

With support from the Ontario-Israel Collaboration Program managed by CIIRDF, this R&D project brought together:

- **Altair Semiconductor**, a leading developer of ultra-low power, small footprint and high performance 4G chips for LTE based in Israel; and
- **SiGe Semiconductor** (now Skyworks Solutions, Inc.), a multinational innovator of high-performance analog semiconductors with an R&D team in Canada.
With the arrival of wearable technology in the world of sports, athletes are adding intelligent tools like smart eyewear, watches, and shoes to their training arsenal to improve their performance. These connected accessories feature combinations of sensors, electronics, computing power, and wireless technology. Dubbed ‘wearables’, these products gather, process, and share a host of information with the user—including heart rate, power output, speed, and cadence. Instant access to this data allows users to make educated decisions about their physical activity. The global wearable technology market is projected to grow to more than $6 billion by 2016. This lucrative opportunity prompted a Canadian-Israeli R&D team to pursue the development of novel wearable technology for athletes.

**Objective**

Initiated in 2013, this bilateral R&D project brought together:

- **Lifebeam**, an Israeli firm that develops and manufactures the world’s most advanced wearable physiological sensors for measuring human performance; and
- **Recon Instruments**, a Canadian world leader in smart eyewear technology for sports and high-intensity environments.

This Canadian-Israeli R&D team integrated Lifebeam sensors into early prototypes of Recon’s Jet smart eyewear for athletes, demonstrating that heart rate could be measured directly from the user’s temple during intense physical activity. The ability to see heart rate data on the Recon Jet display allowed users to train more safely and optimize their performance. While heart rate data can be tracked using dedicated chest- or wrist-mounted sensors, the ability to measure this data directly from the head of a user offers many advantages. This approach eliminates the need to wear a separate measurement device, reduces the latency of the displayed data (by removing the need for a wireless connection between the sensor and the smart eyewear), and offers athletes a single, integrated device that truly does it all. Following the completion of an initial prototype in 2014, Recon and Lifebeam confirmed the ability of the head-worn sensor to record highly accurate heart rate data.

As the prototype trial concluded, Recon was already committed to its first hardware design for Jet. This design shipped in early 2015 and did not include Lifebeam sensors. However, the trial validated Lifebeam’s consumer-oriented sensor technology and expedited the expansion of Lifebeam’s consumer product portfolio, including head-mounted heart rate sensing integrated in cycling helmets, hats, and visors. This collaborative R&D demonstrated the feasibility of integrating head-mounted heart rate sensors into future smart eyewear products.

In June 2015, Intel Corporation announced the acquisition of Recon Instruments, with the intention of jointly expanding the market for head-mounted display products and technologies. Recon products continue to be sold under the Recon brand name, and the team will remain in Vancouver, BC.
Benefits

“This CIIRDF project enabled us to validate our world-class sensor technology in partnership with the leader in smart eyewear for sports. This creates an invaluable opportunity to establish our brand with early adopters of wearable technology among athletes, and generate new revenue streams. Building on the outcomes of this collaboration, we expect to grow our team by 20 percent over the next two years, and pursue additional applications for our biotechnology.”

Omri Yoffe, CEO, Lifebeam

“Recon Instruments was the first company in the world to develop smart eyewear tailored to the needs of the athlete, and we are constantly pushing the boundaries to better fit the active lifestyles of our customers. Data-driven athletes view heart rate monitors as a necessary evil. The data is immensely helpful in optimizing their training, but the chest strap itself is annoying. When Lifebeam suggested a CIIRDF-facilitated project to address this customer pain point, we jumped on it. With CIIRDF’s non-dilutive funding and project management support, we developed a working prototype and demonstrated the ability to acquire accurate heart rate measurements from the user’s head. CIIRDF’s vote of confidence also helped Recon to secure additional investment during the critical development period of Recon Jet, the product that convinced Intel to initiate its acquisition of Recon. As an Intel company, we will remain in Vancouver, BC and gain access to the invaluable resources, technology, and expertise of the world’s most successful semiconductor company. This will significantly accelerate our development efforts, expand our reach into new sports and activities, and enable new enterprise and public-sector uses. It also allows us to further establish Vancouver as a Canadian technology hotspot. CIIRDF played a significant role in helping us achieve this success, and the associated impact on our local economy.”

Rudi Airisto, Head of Business Development and App Ecosystem
Recon Instruments
Imagine peering through a keyhole and having the ability to see the inner workings and organs of the human body. Laparoscopic (or keyhole) surgery is a minimally invasive technique that offers this capability. It enables a surgeon to use a laparoscope, a tiny telescope with a camera, to explore the inside of a patient’s body. The physician makes tiny incisions in the skin; inserts the instrument; and then maneuvers it while viewing the surgical site on a video screen. This approach offers many patient benefits, enabling faster recovery; reducing pain and blood loss; and lowering the risk of infection. It is used to diagnose diseases such as liver, pancreatic and colorectal cancer; assess trauma to internal organs; and monitor chronic conditions. Recognizing the importance of this innovation, a Canada-Israel R&D team aimed to help increase the quality of training in this surgical field.

The partners combined Simbionix software and Quanser hardware to develop this training system. CIIRDF funding catalyzed the development of a working prototype, enabling the team to refine and productize the tool. Driven to capitalize on the global market for laparoscopic devices, which is expected to reach US$8.5 billion by 2018¹, the partners launched the commercial product in 2009.

Benefits

Over the last five years, Quanser and Simbionix have continued to improve the quality and cost-effectiveness of the product. To date, the firms have sold more than 300 medical training systems, generating tens of millions in sales.

“This CIIRDF project had a significant impact on our company, catalyzing our rapid and dramatic growth. When we kicked-off the project in 2007, Quanser had 34 employees. By 2010, our revenues doubled. Our team now exceeds 60 people. CIIRDF enabled us to undertake higher-risk R&D, and develop teaching and research products that are now in use across more than 80 countries. This training tool has opened-up new worldwide academic markets for us. Our customers now include more than 3,500 leading universities across four continents. Lastly, this product has established a sustainable revenue stream for us. This is invaluable for a company like Quanser.”

Paul Gilbert, CEO, Quanser

Objective

Industry leaders in Canada and Israel have developed one of the most effective surgical training tools of its kind. Drawing on haptic technology² to recreate the sense of touch, the product simulates a laparoscopy procedure, enabling a physician to visualize the surgical site and experience the physical sensation of an operation.

Supported by the Ontario-Israel Collaboration Program managed by CIIRDF, this bilateral R&D project brought together:

- Quanser Inc., a Canadian world leader in the design and manufacture of advanced systems for real-time control design and implementation used in industry, education and research; and
- Simbionix Corporation (acquired by 3D Systems in July 2014), a world-leading provider of a full spectrum of innovative training and education solutions for medical professionals and the healthcare industry based in Israel.
According to the World Health Organization, an estimated 17 million people die from cardiovascular disease each year. This number is expected to surge to 23.6 million by 2030. The ability to detect and diagnose cardiovascular diseases before the onset of a heart attack or stroke can enable early treatment that saves lives. Physicians often use cardiac imaging devices to evaluate the structure and function of the heart, and diagnose and manage heart diseases. Many existing imaging technologies fail to deliver all the functionality required by physicians – and the comfort required by patients.

This prompted leading Canadian and Israeli firms to combine their know-how and create the first cardiac camera of its kind.

Outcomes

“This CIIRDF-supported innovation represents an important product for Spectrum. Over the last three years, we have sold multiple imaging systems to hospitals and healthcare facilities around the world that incorporate Redlen’s detectors, generating millions of dollars in sales. This is tremendous return on our CIIRDF-supported technology partnership. We established a strategic supplier relationship with Redlen in 2013 as their CZT detector differentiates our products. As there is a shortage of CZT worldwide, this agreement served as an important driver for Spectrum’s recent acquisition by Biosensors International Group. With the global market for cardiac cameras expected to grow significantly by 2018, we are well positioned to grow our share of this market year over year.”

Gilad Yoeli, Chief Financial Officer, Spectrum Dynamics, a part of Biosensors International Group

“CIIRDF provided critical seed funding that enabled Redlen to develop a gamma imaging module for applications in nuclear medicine. Redlen’s single high quality Cadmium Zinc Telluride (CZT) crystal is at the core of these modules. Over the last four years, we have improved CZT quality and performance, reduced production cost, and increased yield by 50 percent to meet Spectrum’s order volumes. These efficiencies enabled us to pursue broader applications for our technology, and develop new products such as customized detectors for baggage scanning systems in airports. The impact of this CIIRDF project on Redlen is perhaps best illustrated by the growth of our detector business. In 2009, detectors comprised 20 percent of our sales. Today, they represent 60 percent of our total revenue generation. CIIRDF influenced all aspects of our technology and business development, and helped us to acquire additional investment including $3.2 million under Canada’s Western Innovation Initiative (WINN).”

Eric Erikson, Chief Financial Officer, Redlen Technologies

Objectives

This bilateral R&D project brought together:

• **Redlen Technologies**, a leading Canadian manufacturer of high resolution Cadmium Zinc Telluride (CZT) semiconductor radiation detectors, devices that are used to detect, track or identify high energy particles in high performance detection and imaging equipment; and

• **Spectrum Dynamics**, part of the Biosensors International Group; this Israeli medical device company is dedicated to bringing clinicians state-of-the-art nuclear medicine systems and technology including advanced imaging products.

The partners integrated Redlen’s CZT radiation detectors inside a Spectrum heart scan imaging device called D-SPECT. The team incorporated nine rotating columns of Redlen CZT detectors into Spectrum Dynamics D-SPECT cardiac camera, creating the ability to focus on specific anatomical points in the body. It eliminates the need to rotate the structure that holds the camera or the patient when sampling the organ of interest. With low radiation, this flexible imaging increases patient safety and comfort. Moreover, it improves the detection, diagnosis and treatment of cardiac issues and diseases.
A Perfect 10: Increasing the Data Throughput of Satellite Communications Ten-Fold
Enabling Smart TV Consumers to Receive More Data, Faster

Today, the global market for connected TV devices, such as smart TVs and game consoles, is estimated to be 1 billion installed units. By 2018, the size of this market is expected to reach 2 billion⁶. The data that streams from these connected devices is enabled by satellite communications. Embedded within these systems, modulators are unsung heroes that help to facilitate the transmission of this data.

In telecommunications, modulation is the process that enables a signal to be transmitted from one point to another⁷. Much like a musician might modify the pitch or volume of a tone from a musical instrument⁸, modulators are tiny devices that alter the characteristics of a signal, and transform it into data that can be received by connected devices such as smart TVs. A Canada-Israel R&D team aimed to create a world-first modulator that increases the data throughput of satellite communications, enabling connected consumers to receive more data, faster.

Modulators typically transmit signals at a rate of up to 60 mega symbols (the number of signal changes) per second. The collaborators developed a modulator unit that generates 500 mega symbols per second, providing ten times the data throughput of any competing technology on the market today. This increases the information transmitted in each communications signal by a factor of 10, significantly improving the performance of satellite communications. It will enable satellite television subscribers to download a much higher volume of data more rapidly. The new modulator also enables satellite service providers to use more bandwidth in the communications spectrum. It is a significant breakthrough in the satellite communications industry.

Outcomes

“This new modulator offers satellite service providers significant cost savings that could exceed $2 billion over the lifetime of a satellite. With no competing product on the market today, we are well positioned to increase our share of this $100 million market. We have already started to promote this new modulator to satellite service providers. We delivered a presentation to more than 350 prospective customers at VSAT, the premier event for the satellite industry, in September 2014. CIIRDF helped us to hit this critical market window. We aim to bring this modulator to market, and generate an estimated $30 million over the next five years.”

David Gelerman, CEO, Advantech Wireless

“Without the support of CIIRDF, it would have been impossible for us to undertake this R&D in its entirety. It would have taken us five times longer to complete this project on our own. More importantly, we may have missed the opportunity to develop a game-changing technology for satellite communications. This partnership increased our R&D capacity by providing access to complementary expertise and technology. By combining our know-how and resources, we accelerated our time to product development and commercialization. It was a true team effort, enabling collaboration that is greater than the sum of its parts.”

Yoel Gat, CEO, SatixFy

Objective

This CIIRDF-supported R&D project brought together:
• Advantech Wireless, a leading Canadian wireless broadband communications solution provider for commercial, critical infrastructure and military clients; and
• SatixFy, an Israeli fabless company that develops Application Specific Integrated Circuits (ASIC), microchips designed to significantly enhance ground equipment performance, lower costs and allow a broader audience to enjoy a large variety of applications via satellite.

The team aimed to design a modulator that increased the rate of data transmission in satellite communications. Advantech Wireless developed the hardware for the device, while SatixFy developed the chipsets embedded inside. Much like the engine of a car, these chips power the modulator and enable it to perform the actions required.
Increasing the Productivity and Profitability of Manufacturers

Metal Extrusion Technology Opens Up New Global Markets for Collaborators

Light metal extrusion is an established manufacturing process that is used to create a product with a fixed cross-sectional profile. The metal billet, often an alloy or combination of different metals, is heated until soft and then pushed through a die of the desired cross-section. While this process enables manufacturers to economically create very complex cross-sections, the extrusion of hard metal alloys is riddled with challenges. For example, it is difficult to maintain a consistent temperature and ensure the alloy forms properly and uniformly. As the extrusion of hard alloys is relatively slow, the die gets progressively colder and press pressure gets higher, which can cause the extrusion to slow down or stop. An Israeli and a Canadian firm joined forces to develop a groundbreaking innovation for the light metal alloy extrusion industry.

Outcomes

“We installed the complete thermally controlled tooling system from Castool on one of our extrusion presses, with initial pilot tests yielding excellent results. This CIIRDF-supported system reduced breakthrough pressure that can bend or break the die by 40 percent as opposed to the 20 percent we typically achieve. Delivering faster extrusion speed, it also enables the creation of more aggressive die designs and maintenance of cooler billet temperature. This increases our competitiveness in many ways, as it is something that has not been done before. It boosts our production rates, ensures consistent and optimum extrusion, and allows us to produce more advanced profiles. This positions us as a supplier of choice for entirely new, high-end markets such as aerospace, and improves the performance and productivity of firms such as SHL-Alubin. CIIRDF helped to make this innovation possible, and we are now reaping the benefits on our production floor, and in our business.”

Yoram Rami, Technical Manager, SHL-Alubin

“The knowledge acquired during our CIIRDF project is helping us to build more competitive products – and a more competitive business – every day. We have applied the know-how garnered through this collaboration to many aspects of our R&D and operations. Since the conclusion of the project, we have realized 20 percent sales growth, adding millions to our revenues. And we are proud of the resulting product and the strength of our cooperation. This partnership has allowed us to access new and high growth sectors. This includes high speed train, aeronautical, and other industrial manufacturers that require complex profiles in hard alloys. We look forward to building on the outcomes of this collaboration, and developing new technology partnerships that will increase our visibility and traction in new global markets. These alliances are required to continue building the brand and commercial success of Castool around the world.”

Paul Robbins, CEO, Castool Tooling Systems

Objectives

Leveraging funding from the Ontario-Israel Collaboration Program managed by CIIRDF, this bilateral R&D project brought together:
- SHL-Alubin, Israel’s largest aluminum profile manufacturer; and
- Castool Tooling Systems, a Canadian company that develops and manufactures innovative tooling for the light metal extrusion and die casting industries.

With CIIRDF support, the companies developed a smart tooling system that improves the process for extruding hard alloy metals such as aluminum and magnesium. It provides extrusion equipment operators with data on temperature, speed, time and pressure to support optimum die heating. It also records the formula for each die to enable re-use and benchmarking for future runs. For tool and die manufacturers, this increases productivity, reduces operating costs, and minimizes scrap and energy consumption. The collaborators estimate that the system will generate cost savings of $10,000 to $50,000 per day from the elimination of wasted billets.
Across North America and Europe, physicians increasingly perform image-guided surgery (IGS) on the brain, cancer tumors, and spiral cord injuries. During this computer-assisted surgery, the IGS system tracks the movement of the surgical instrument, and the surrounding patient anatomy. At the beginning of the procedure, the system captures and registers 3D images of the patient’s body. During the surgery, the IGS system displays the position of the surgical instruments within this imagery, which serves as a map for the surgeon. It is an innovation that improves surgical accuracy, and helps to prevent navigation errors that can impede treatment outcomes, or damage patient anatomy. A Canada-Israel R&D team aims to broaden the use of IGS to include stroke treatment and in-office sinus surgery.

Claron has acquired extensive expertise in 3D imaging and optical positioning technology for medical applications. Through its collaboration with BrainsGate, Claron has developed two new surgical IGS products including:

- **Navient** which guides ears, nose and throat surgeons as they perform sinus surgery in their office or at small clinic; and
- **Navident** which guides dental surgeons as they place dental implants in patients.

With support from CIIRDF, BrainsGate and Claron combined their technological expertise, and developed improved surgical navigation and implant delivery technologies. The companies are now integrating these technologies into the ISS, Navient and Navident products.

### Outcomes

“CIIRDF enabled us to develop a new neurosimulator implant and delivery system that enhances the capabilities of our ISS. This represents a major milestone towards the development of many other novel applications that we are working on to treat central nervous system disorders. Our company is devoting many resources to the conduct of a costly, large-scale ISS clinical trial. CIIRDF enabled us to undertake this R&D with Claron in parallel with the clinical trial, accelerating our technology development. We will apply the expertise acquired during this project for years to come.”

**Srulik Dvorsky**, Vice President, R&D and Operations, BrainsGate

“This CIIRDF project enabled us to develop and commercialize novel technology in collaboration with BrainsGate. We have recently completed patient trials, and acquired regulatory approval from Health Canada for Navident. We are now pursuing regulatory approval from the United States Food and Drug Administration (FDA), and the CE Mark in Europe to broaden our global marketing. We expect regulatory approvals for Navient to follow shortly. We have also established a new production facility, and expanded our navigation products team. We expect revenues from Navident and Navient to exceed $100 million within the next 10 years.”

**Doron Dekel**, Co-CEO and Director, Navigation, Claron

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**Objective**

This CIIRDF-supported R&D project brought together:

- **BrainsGate**, an Israeli medical device company that develops innovative therapies for Central Nervous System diseases; and
- **Claron**, a Canadian firm dedicated to the development of medical image processing solutions.

BrainsGate has developed the Ischemic Stroke System (ISS) to help those who suffer from ischemic stroke, a condition that prompts a loss of blood flow in the brain, impairing neurological function. The ISS features an electrode that is implanted in the roof of the patient’s mouth. It delivers electrical stimulation to a nervous centre, prompting the dilation of blood vessels and increasing blood flow in the brain. While existing treatments must be initiated within a few hours of a stroke, the ISS extends the patient treatment window up to 24 hours. To facilitate broad adoption of this technology, BrainsGate incorporated an IGS device into the system to further increase ease of use. With support from CIIRDF, the company is partnering with Claron to further simplify and improve the implantation process by incorporating innovative IGS technologies into this medical product.
Canola, a vegetable oil made from rapeseed, has the potential to help us address global sustainability challenges by producing healthier food stuffs; contributing to climate change solutions; and creating alternative energy sources. Developed by Canadian plant scientists, canola is low in saturated fats, generating extensive use as a primary food oil. While global demand for canola is high, its growth is limited by short growing seasons and environmental challenges.

Canada and Israel bring unique strengths to bear in this industry. Canada is the largest canola producer in the world. This crop contributed $19.3 billion to the Canadian economy in 2013\textsuperscript{10}. Israel is a global leader in multidisciplinary innovation and the development of agricultural technologies. This includes noteworthy breakthroughs in the efficient use of water, and the development of marginal lands for agriculture.

Global demand for canola production is expected to jump 40 percent by 2025\textsuperscript{11}. This prompted a Canada-Israel R&D to pool their expertise and address key challenges that inhibit the growth of this crop.

**Objective**

This R&D project brought together:

- **Crop Production Services (CPS)**, a leading Canadian supplier of quality products and services that help customers grow the best crops possible; and
- **Evogene**, an Israeli plant genomics company that uses proprietary technology to enhance seed traits underlying crop productivity.

CPS and Evogene aimed to develop hardier strains of canola that are capable of growing in harsh environmental conditions to enable increased production of this multi-purpose crop. The companies sought to produce new canola seed lines with improved resistance to abiotic stresses such as drought, heat and salinity. CPS integrated genes identified by Evogene into its canola germplasm, living tissue from which new plants can be grown\textsuperscript{12}. The companies then tested many different combinations to determine those with the greatest potential to increase canola yield and abiotic stress tolerance.

**Outcomes**

Bringing new crops to market is a long, risky and regulation-heavy process. Although the team did not commercialize a new variation of canola, this collaboration yielded important outcomes for both firms. CPS improved its knowledge of new seed line production, while Evogene gained valuable experience in the conduct of transgenic field trials, akin to clinical trials for new foods.

“This CIIRDF R&D project helped CPS to achieve an important breakthrough: a two-fold increase in efficiency within our canola breeding program. We achieved significant breeding process efficiencies that allowed us to double the capacity of our doubled-haploid\textsuperscript{13} inbred canola pipeline. Within our industry, this is considered valuable intellectual property. The resulting efficiency gains will enable CPS to develop new high performance canola hybrids more rapidly, accelerating our breeding process. This is essential to help CPS generate new revenue streams, and capture a greater share of the global canola market. This project also provided our team with unique training opportunities in the lab and the field, in addition to cultivating new expertise within our firm. This helps us to successfully create high performing hybrids for Canada and nations around the world.”

Bruce Harrison, Director, Research and New Business Development, CPS

“The CIIRDF project proved invaluable for Evogene even though commercialization of new hybrid canola seed did not occur as originally proposed. Working closely with CPS, we gained extensive experience in the design and conduct of field trials. We are now applying this knowledge to enhance our future commercialization plans, and strengthen our business more broadly. This know-how represents a critical element of Evogene’s intellectual property, and on-going success.”

Ofer Haviv, President and CEO, Evogene
Each day, millions of people draw water from their kitchen taps, trusting it is safe to drink. The need to proactively manage the health of drinking water is underscored by tragedies such as the deadly E. Coli contamination in Walkerton, Ontario, Canada in May 2000. This incident claimed seven lives, hospitalized hundreds of others, and cost more than $64 million. It is just one of many threats to drinking water quality. In 2011, it is estimated that almost 10,000 tonnes of chemicals spilled into US waters. These and other risks led a Canadian and Israeli firm to join forces and develop a novel water monitoring system that guards against contamination, and ensures the safety of drinking water.

Leveraging their shared R&D expertise, Mekorot and Real Tech’s joint partnership has resulted in the development of new water quality testing algorithms. The team integrated these step-by-step procedures into the software that manages Real Tech’s UV-based monitoring system. Preliminary field trials generated outstanding results.

**Outcomes**

“We are very thankful for the funding and guidance provided by CIIRDF. It made our joint partnership with Mekorot possible. As a growing business, this support has an enormous impact on our firm as it helps to foster innovation, and open-up new global market opportunities. The technical and commercial development emerging from this partnership will not only drive Real Tech’s growth, and create an estimated seven new jobs within our company. It will improve water quality and security for Mekorot’s many customers. We look forward to providing this new solution to global clients in more than 40 countries. The outcomes of this project have also helped us to secure the opportunity to supply water quality systems to the Government of India. This CIIRDF-supported partnership is helping us to achieve our vision of improving global water quality.”

Jodi Glover, CEO, Real Tech

Mekorot, Israel’s National Water Company, places high value on advancing and implementing innovative technology, such as that developed by Real Tech. For example, the company established WaTech®, a center for entrepreneurship that provides a platform for partnerships between Mekorot and start-ups, entrepreneurs, academics and established companies.

“This CIIRDF-supported water quality system further increases Mekorot’s technological capabilities. If our experiments generate effective results, it will enable our plant operators to continually improve the assessment of Israeli water quality; mitigate water contamination threats; and take immediate action when needed. This will help increase the security of our water supply, and our citizens. This is a top priority for Mekorot. If proven efficient, this new technology will also help us to reduce the overall cost of water quality monitoring, further maximizing our resources.”

Avraham Ben Yossef, Engineering & Technologies Vice President, Mekorot

**Objective**

Leveraging funding from the Ontario-Israel Collaboration Program managed by CIIRDF, this bilateral R&D project brought together:

- **Real Tech Inc.**, an award-winning Canadian company that has developed a product line of portable and real time water quality analyzers; and
- **Mekorot**, Israel’s national water company which provides 80 percent of the nation’s drinking water.

The companies collaborated on the development of custom software for Real Tech’s leading-edge Ultra Violet (UV) absorption technology real time monitoring solutions. These systems use light to assess water quality and rapidly detect contaminants such as organics and nitrates. If the experiments are successful, Mekorot will consider customizing this Canadian technology to address their unique needs, and distribute the systems throughout their national water network. Although Mekorot employs many instruments to monitor drinking water quality, the company aims to continuously strengthen its contaminant detection capabilities.
Today, the water treatment process employed to extract crude oil and bitumen from oil sands is costly and challenging. Mechanical Vapor Compression (MVC) Evaporators are a critical part of this practice. Comprised of a complex network of pipes that process heavy oil and sludge, these systems demand frequent chemical cleaning given scaling and the accumulation of unwanted materials. They also demand hundreds of thousands of gallons of water that cannot be recycled and reused. Moreover, processing plants must be shut down for days to cleanse the evaporator, impeding oil production. A Canada-Israel R&D team aims to address these challenges, and develop a more efficient and sustainable water treatment and cleansing process for oil sands producers.

This year, the companies conducted a bench-scale pilot program at an Alberta Innovates Technology Futures facility in Edmonton, achieving excellent efficiency at this early stage of development. Although it typically requires one week to cleanse an evaporator, the CIIRDF-supported technology achieved this objective within 24 hours. It also eliminated waste, and reduced water consumption by 97 percent, enabling recycled water to be used for steam generation. The pilot served as an excellent demonstration for prospective clients. Clean Harbors and IDE are now planning an industry-field demonstration of a semi-commercial evaporator system in Alberta’s oil sands.

Benefits

“The oil sands industry represents a critical global market for IDE. This sector faces unique water and environmental challenges that are complex and costly to address. The time to market for water management solutions for the oil sands can exceed five years. It is a high risk and expensive venture to undertake independently. This CIIRDF project provides the opportunity to reduce our R&D risk by partnering with a Canadian chemistry leader, and working shoulder-to-shoulder on a new water solution. CIIRDF’s project management structure and financing is accelerating our product development, time to market and revenue. It is also catalyzing our growth as an internationally-recognized water partner for the oil sands industry.”

Gilad Cohen, Director, Industrial Water Business Unit, IDE Technologies

“Clean Harbors possesses in-house chemistry expertise, enabling us to develop new chemical compounds for different applications. Working with the specifications provided by IDE and oil sands producers, we are developing novel chemical compounds for MVC evaporator cleansing. This CIIRDF project will enable us to add value to IDE systems and their multinational client base, increasing our global exposure and our global sales. Moreover, we can customize the chemistry emerging from this project, and apply it to a host of other challenges. This will enable the development of new products that expand our market reach into different sectors, and generate new revenue streams for our firm.”

Chris Porter, Senior Vice President, Industrial Services for Clean Harbors (Canada)
EllisDon, a world-leading construction services company with more than 60 years of experience; and RAFAEL Advanced Defence Systems, a world leader defense command and control, computing and communications system are combining their expertise to revolutionize energy management.

Valued at $14 million, this ground-breaking Canada-Israel R&D project is adapting technologies developed for civilian defense applications and develop a next-generation smart grid management system that improves energy efficiency and conservation, reduces waste, and lowers costs for utilities, operators and customers. CIIRDF awarded $1 million to this Canada-Israel team through the CIEST Fund. The project also engages municipal partners, Guelph Municipal Holdings Inc. (GMHI), industry partners, and academic collaborators at the University of Guelph, the University of Waterloo and Sheridan College. Once developed, the companies aim to pilot and commercialize the new product, and capitalize on the global smart grid market, which is expected to exceed $60 billion by 2020.

With support from CIIRDF, EllisDon will apply RAFAEL’s defense technology expertise to its energy assets, and develop a new system that revolutionizes the management of district energy and microgrid systems.

The emerging system will use command and control, and situational awareness capabilities developed for the defence sector to monitor and manage thermal and electrical energy delivery to a region. It will gather accurate, real time information from the grid; facilitate access to renewable fuel sources such as solar power and biofuel; and provide a central point of smart grid control. This will enable smart grid operators and service providers to take action that lowers operational expenses while reducing carbon emissions and waste. There are no competing products with such capabilities on the market today, creating a wealth of opportunity for the collaborators.

The project will play a key role in the Community Energy Initiative established by Guelph in 2007. As the population of Guelph is expected to catapult by 45 percent by 2031, the delivery of energy will be accomplished by an electrical and thermal distribution infrastructure. To address this challenge, Guelph aims to create the first North American city-wide district energy system to meet the energy demands of its rapidly growing population without expanding its borders. This CIEST Fund project will enable the development of an energy management system that supplies the city with fifty percent of the required energy demand by 2031, and provide economic benefit to the region. To achieve this objective and develop a robust commercial product, EllisDon will bring its wealth of construction and management services experience together with RAFAEL’s real time intelligence expertise and technology with CIIRDF support.

When employed, the system will help to reduce Ontario’s carbon footprint, and directly support Canada’s goal to reduce national greenhouse emissions by 30 percent below 2005 levels by 2030. For the energy consumer in Ontario, this innovation is intended to provide efficiencies in the delivery of district energy and community energy projects with focus on lower energy delivery costs and improved environmental protection. Moreover, the firms expect to create 50 new jobs with ongoing development and consulting services in Israel and Canada by 2018.
“This is a first critical step towards the development of a long-term relationship between RAFAEL and EllisDon. Together, we will build new products, technologies and systems that directly impact our local community, and improve the lives of citizens for generations to come. Moreover, these innovations will enrich the energy management market place, and help to redefine the role of the smart grid. This project creates a unique opportunity for EllisDon and RAFAEL to demonstrate leadership on global energy solutions.”

Robert Barnes, Director of Managed Services, EllisDon

When employed, the system will help to reduce Ontario’s carbon footprint, and directly support Canada’s goal to reduce national greenhouse emissions by 30 percent below 2005 levels by 2030.

“RAFAEL is delighted to contribute to this CIEST Fund project, and apply decades of defence and system of systems development and knowhow to address energy challenges. This initiative will expand our market reach, creating new commercial opportunities for our firm. Today, more than 850 district energy systems are deployed across North America alone, and the capacity of combined heat and power is expected to grow by 40 gigawatts by 2020 according to GlobalData. Our collaboration with EllisDon will enable us to capitalize on this and other global smart grid markets, while creating a more sustainable approach to energy management.”

Dr. Roni Potasman, Executive Vice President, Research and Development of RAFAEL
In 2013, CIIRDF undertook the challenge of launching the Canada-Israel Energy S&T (CIEST) Fund. It was a challenge because CIIRDF had to ensure that the $10 million associated with the CIEST Fund was committed to high quality collaborative R&D projects that could be sourced, assessed, evaluated and completed within a 30-month period. Moreover, the Israeli and Canadian energy R&D communities had almost no history of cooperation, or knowledge of each other's capabilities. Within three years of receiving this mandate, CIIRDF delivered high calibre Canada-Israel energy projects with a collective value of more than $24 million.
“CIIRDF delivered on the CIEST Fund – and delivered big! We are pleased to report that our very ambitious objectives will be met. CIIRDF will fully allocate the funding associated with the CIEST Fund to outstanding R&D projects. These initiatives reflect the growing presence of Israeli technology in Canada’s oil sands, smart grid applications and other critical facets of energy R&D. Through the CIEST Fund, CIIRDF can rightly claim to have added an important element to Canada-Israel economic relations.”

Mariette Mulaire, President & CEO, World Trade Centre Winnipeg; Director, CIIRDF
Harnessing the Power of Canada-Israel S&T Collaboration to Develop Energy Solutions

The Canada-Energy Science and Technology Fund (CIEST Fund)

In December 2012, Natural Resources Canada (NRCan) selected CIIRDF to deliver and manage the new Canada-Israel Energy Science and Technology (CIESTF) Fund.

The CIEST Fund was established to facilitate the bilateral development and commercialization of innovative energy technologies and processes. With a strong focus on key challenges in the unconventional oil and gas sector, the CIEST Fund supports industry-led R&D partnerships between Canada and Israel. These collaborations spur the development of innovative energy technologies and processes that enable the responsible development of unconventional oil and gas resources, with particular focus on applications to address environmental challenges. The Fund specifically promotes innovation that reduces environmental impact associated with energy exploration, extraction, processing and production. It also encourages initiatives on other critical energy sources, such as renewable energy, of interest to both countries. The emerging bilateral partnerships could yield groundbreaking new technologies that enable Canadian and Israeli innovators to capitalize on the evolving global unconventional oil and gas market.

The Government of Canada committed up to $5 million to the CIEST Fund over four years (2013 to 2016), with matching funds to be allocated by Israel’s NTIA (the former Office of the Chief Scientist, Ministry of Economy) on a project-by-project basis. The Natural Sciences and Engineering Research Council (NSERC) funds select collaborating Canadian researchers from universities and colleges in partnership with Canadian industry.

The CIEST Fund creates new mechanisms for two-way R&D cooperation in energy. Managed by CIIRDF, the CIEST Fund enables Canadian and Israeli companies and academic researchers to cooperate on the development of new innovations that address shared energy priorities. The primary focus of the fund is unconventional oil and gas with approximately 75 percent targeted to initiatives in this field. Other areas of focus include: energy efficiency in buildings, communities, industry and transportation; bioenergy and clean electricity generation; and the electrification of transportation.

The fund capitalizes on many synergies between the two nations. Israel is home to hundreds of technology-based SMEs with internationally recognized expertise in materials, intelligent systems, water technologies, robotics and unmanned systems, sensors, imaging and other enabling technologies.

In a few short years, and with remarkable leverage, CIIRDF has achieved key objectives of the CIEST Fund. By the end of March 2016, CIIRDF will have allocated almost all committed CIEST funds to seven outstanding bilateral R&D projects. With a collective value of more than $24 million, these initiatives leverage every dollar invested through the CIEST Fund by a factor of 5-to-1.

But the CIEST Fund will achieve far more than financial leverage. These bilateral collaborations will generate economic outputs, some of which are already being realized today. For example, CIIRDF established an exceptional bilateral cooperation platform with the Canadian Oil Sands Innovation Alliance (COSIA) through the CIEST Fund. This strategic alliance is already delivering direct and immediate value to Canada and Israel.
Israeli Technological Capabilities Ecosystem Map

To help facilitate bilateral partnership development and CIEST Fund R&D project applications, CIIRDF published an Israeli Technological Capabilities Ecosystem Map (Israel: Innovation for Oil Sands) developed by Signals Intelligence Group of Israel. This document provides a comprehensive overview of technological capabilities in Israel that could help to address key environmental and other challenges in Canada’s unconventional oil and gas sector. This helps Canadian companies to identify prospective Israeli R&D partners for CIEST Fund R&D projects.

During the first three years of the CIEST Fund, CIIRDF:

- Generated more than 60 linkages between Canadian and Israeli energy technology firms;
- Hosted three bilateral partnership development activities with Canadian and Israeli companies, researchers and other innovators in Tel Aviv, Israel; Calgary, Alberta; and Toronto, Ontario; this included three bilateral workshops that assembled more than 250 participants;
- Conducted two Calls for Proposals for R&D Projects and approved funding for seven collaborative technology projects. With a total value of more than $24 million, these initiatives leverage CIEST funding by a factor of 5-to-1, and strive to reduce environmental impact associated with energy exploration, extraction, processing and production; and
- Established a new bilateral platform with Canada’s Oil Sands Innovation Alliance (COSIA) to enable the development and application of novel technologies that promote the responsible development of Canada’s oil sands.

Did You Know?

- Unconventional oil and gas resources include heavy oils such as those found in the Canadian Oil Sands; and oil shales, sedimentary rock containing organic matter that when heated releases petroleum-like liquids
- The International Energy Agency estimates that unconventional gas may meet more than 40 percent of the increased global demand for gas by 2035
- This creates significant global market opportunity for Canada and Israel, particularly firms with innovative extraction and processing technology
CIEST Fund R&D Projects

CIIRDF is pleased to provide an overview of three Canada-Israel R&D projects supported by the CIEST Fund. Additional CIEST Fund R&D projects are profiled in the CIIRDF success story collection.

Increasing the Productivity and Profitability of Oil Sands Upgrader Plants

Nexen Energy ULC, a Canadian subsidiary of CNOOC Ltd. that is developing energy resources responsibly; and Merchav Engineering Ltd, an Israeli firm that specializes in process engineering and development, together with Ben-Gurion University’s Blechner Center for Industrial Catalysis and Process Development, have joined R&D forces with support from the CIEST Fund. These organizations are collaborating on the development of a new process that, if successful, will increase the production of light and sulphur-free synthetic crude oil from bitumen. Bitumen is oil that is too viscous to flow or be pumped without being diluted or heated. At 11 degrees Celsius, bitumen is as hard as a hockey puck. Experts estimate there are more than 2 trillion barrels of this highly dense and extremely viscous form of petroleum worldwide, including 169 billion barrels in Canada’s oil sands. Asphaltenes are extremely heavy and dense residues that are generated during the bitumen upgrading process. Asphaltenes are typically disposed in landfills, increasing the volume of non-biodegradable waste in these areas. Working together with researchers from the University of Alberta, the collaborators will develop a process that makes alternative use of the syngas produced from asphaltene by-products.

To achieve this R&D objective, the team will draw on the Fischer-Tropsch (FT) process which converts this syngas into liquid hydrocarbons. These hydrocarbons can be transformed into a variety of commercial products, including waxes, chemical compounds, gasoline and diesel. The innovators will demonstrate key aspects of the FT process, and its integration into Nexen’s Long Lake Facility, which is designed to upgrade 72,000 barrels of bitumen into premium synthetic crude oil per day in Fort McMurray, Alberta, Canada. By incorporating this process into upgrader facilities, the companies aim to increase the production of premium synthetic crude oil, and develop new hydrocarbon-based products that can be marketed and sold around the world. It is an innovation that promises to increase the productivity and profitability of upgrader plants, while opening-up new global oil sands markets for Nexen Energy ULC and Merchav Engineering Ltd.
Unlocking the Value of Oil Shales Responsibly in Canada and Israel

Israel Energy Initiatives Ltd., an Israeli company and world leader in in-situ oil shale development, and FG & Partners, a Canadian SME that specializes in the exploration of natural resources such as hydrocarbon and coal, are developing a new technology that enables the rapid and accurate assessment of Canadian and Israeli oil shale deposits. Israel and Canada possess vast shale deposits, however little is known about which shale basins are most suitable for recovery. This novel tool will assess the potential to recover shale oil and gas from source rocks in these regions, and the potential value of these unconventional resources. As part of this project, the team will:

- Create a database of oil shale deposits in Israel;
- Perform an environmental assessment of different Canadian and Israeli oil shale basins;
- Estimate the value of recoverable shale oil from select regions; and
- Develop a tool that evaluates the potential to extract shale oil using an in-situ thermal recovery process which applies heat to oil shale reserves; this approach enables the generation of high quality oil with less environmental impact than ex-situ mining and processing methods.

Following a pilot test of this technology in Israel, the companies aim to create a new Canadian company that will leverage this innovation to recover shale oil and gas responsibly in Canada.

Enabling the Safe and Cost-Effective Reuse of Water during Unconventional Oil and Gas Production

RWL Water Nirosoft, an Israeli company that specializes in advanced quality water treatment solutions and wastewater treatment systems; and KmX Corporation, a Canadian firm that converts spent solvent and wastewater streams into valuable reusable products, are collaborating on the development of an innovative water treatment and desalination system. The resulting technology will enable the recovery and re-use of high salinity water generated during unconventional oil and gas production. It will address some of the key challenges associated with traditional hydraulic fracturing (or fracking) techniques employed in the extraction of shale oil and gas. The fracking process uses high pressure water combined with chemicals to fracture the shale rock and enable the release of shale oil and gas. With the hydraulic fracking market valued at $37 billion in 2012, this approach is increasingly used around the world despite the many challenges of high salinity water disposal. This Canada-Israel team will develop, qualify and integrate innovative water technologies into a full treatment process that addresses key issues with fracking-produced water. For example, it will remove high levels of dissolved contaminants such as metals, oils, chemicals, solids, and bacteria to enable safe water re-use. This cost-effective system will feature a membrane that acts as a selective barrier allowing water vapor to transfer through the surface, leaving behind highly concentrated salt along with these undesirable elements. Following prototype development, the companies will treat high saline fracking-produced water to the level required for re-use in irrigation and industrial applications.

"Drawing on our proven model and 18-year track record in facilitating global technology partnerships, we are forging new Canada-Israel collaborations in the energy sector through the CIEST Fund. We are pleased to be working with our long-standing partner, the Natural Sciences and Engineering Research Council of Canada (NSERC), to fund academic collaborators on selected projects. These investments will enable the creation of innovative energy technologies and processes that open-up new markets, customer relationships and export opportunities for Canadian and Israeli firms." Dr. Henri Rothschild, President, CIIRDF
CIIRDF Becomes an Associate Member of Canada’s Oil Sands Innovation Alliance (COSIA)

In June 2014, CIIRDF became an Associate Member (AM) of the Canada Oil Sands Innovation Alliance (COSIA). CIIRDF joins an elite group of multinationals, institutes and organizations whose associate membership is predicated on their potential to provide technology solutions that address innovation challenges facing Canada’s 13 oil sands producers. This includes challenges in the following four Environmental Priority Areas (EPAs): land, water, air and greenhouse gases.

CIIRDF’s associate membership is driven, in part, by the early success of the CIEST Fund. As a COSIA AM, CIIRDF sources Israeli technological capabilities with the potential to address the EPA priority needs of COSIA members. Building on decades of science and technology achievements, Israel is home to world-renowned technologies with a host of applications in the oil and gas sector. These span water monitoring, desalination, and recirculation; advanced materials for specialized filtration; process engineering; and oil shale development. When combined with the expertise and innovations of leading Canadian oil sands producers, these technologies have the potential to address key environmental challenges facing the global oil and gas industry.

The ability to identify and connect Israeli firms and technologies to Canadian partners enabled CIIRDF to ensure full subscription of the CIEST Fund within the required timeframe. CIIRDF leverages these same capabilities to broker and maximize linkages between Canadian oil sands producers with EPA challenges, and Israeli firms with technological solutions.

During its first year as a COSIA AM, CIIRDF collaborated with the alliance on several bilateral R&D activities that enabled members to benefit from facilitated access to Israeli collaborators, knowhow and technologies through CIIRDF. For example, CIIRDF coordinated a one-week visit to Israel for two engineers from COSIA member companies (designated by all member companies to represent COSIA). Together with leaders from CIIRDF and Israel’s NTIA, these
COSIA representatives engaged more than 100 Israeli scientists and engineers in detailed discussions on the practical research and technology development required to bridge key innovation gaps and address key oil sands challenges.

As a result of these meetings, COSIA member companies are now assessing 20 Israeli technological offerings that address specific environmental and innovation needs. COSIA anticipates that some offerings will stimulate new research and technology development projects funded by member oil sands companies. The initial results of CIIRDF’s associate membership exceeded the expectation of COSIA and its members – a success noted and recognized during the 2015 COSIA Annual Meeting.

The significant outcomes achieved during CIIRDF’s first year as a COSIA AM reinforces the potential for this collaboration to deliver even greater value to oil sands companies going forward. COSIA and CIIRDF are now working together to develop an action plan for the coming year that enables member companies and Israeli technology partners to identify and seize even greater R&D opportunities.

“COSIA is delighted to welcome CIIRDF as an associate member of our alliance,” said Dr. Dan Wicklum, Chief Executive Officer of COSIA. “Through COSIA, participating companies have developed 777 technologies valued at more than $950 million to improve environmental performance in the oil sands. By combining Canadian and Israeli knowhow, we can potentially develop new solutions that address our key Environmental Priority Areas: tailings, water, land and greenhouse gases.”
CIIRDF embarked on an ambitious plan to work with the Canadian provinces, and establish specific bilateral R&D programs that directly address their unique technological and business needs. The Government of Ontario served as our inaugural provincial partner, and we are delighted the Ontario-Israel Collaboration Program is now entering its eighth year. The recent launch of the Saskatchewan-Israel R&D Collaboration Program provides another excellent example of how provincial programs complement CIIRDF’s national program. CIIRDF is currently in discussions with additional provincial agencies to explore the establishment of similar provincial programs with Israel. Collectively, these regional programs will help to establish a true pan-Canadian partnership with Israel that delivers economic, scientific and cultural benefits to both nations.

"The Government of Ontario was the first to realize the complementarity between the national CIIRDF program and provincial equivalents, and the value these regional programs could provide. This realization has led to a major increase in the connections between Ontario and Israeli scientific teams in a range of important and strategic technologies. The success of this program to date is impressive, and we are confident that we will see even greater expansion of the valuable Ontario-Israel connections in the coming years. As well, Ontarians are pleased that other provinces are now following this model and establishing their own valuable technological connections with Israel."

Gary Goldberg, Chair of the Ontario-Israel Collaboration Program; President of Gadango; and President of the Galin Foundation
Unleashing the Power of Ontario-Israel Technology Collaboration

In April 2005, the Governments of Ontario and Israel signed a Memorandum of Understanding (MoU) on Industrial and Technological Research and Development Cooperation. Under this agreement, the two governments committed to strengthen and promote industrial partnerships and project collaborations of mutual interest to Ontario and Israeli companies. The Ontario-Israel Collaboration Program (OICP) was established to help realize the objectives of this MoU. The Government of Ontario has committed $6 million to the OICP from 2007 to 2014, with matching funds allocated by OCS on a project-by-project basis. Valued at $12 million, this program provides grants for bilateral R&D initiatives valued at up to 50 percent of joint project costs, to a maximum of CDN $300,000. CIIRDF is proud to manage the OICP on behalf of the Government of Ontario.

Guided by the objectives of the Ontario-Israel MoU, the OICP aims to:
• Facilitate, encourage, enhance and contribute to the development of industrial and technological research and development cooperation between Ontario and Israel; and
• Identify, facilitate, support and promote specific projects or partnerships between Ontarian and Israeli corporations that could lead to industrial and technological research and development cooperation.

Building on its proven approach and model of technology collaboration, CIIRDF directly supports these objectives by:
• Brokering new bilateral relationships through technology matchmaking;
• Facilitating and leading Partnership Development Activities (PDAs); and
• Providing funding for Ontario-Israel R&D projects.

Over the last three years alone, CIIRDF has leveraged every dollar invested through the OICP by a factor of 6-to-1, reinforcing the value and efficiency of the R&D funding. More importantly, jointly developed products emerging from OICP-enabled technologies have already generated tens of millions in direct economic value for Ontario companies since 2008. Collaborating companies believe they are well positioned to multiply these economic returns up to four times within the next few years. In one project alone, OICP funding increased the valuation of one Ontario firm, helping the company to attract $300 million in investment and maintain associated jobs in the province.

Building on results achieved to date, the Government of Ontario and the former Office of the Chief Scientist, Ministry of Economy, State of Israel (now the National Technology Innovation Authority or NTIA), together with CIIRDF, announced that Ontario and Israel will extend the Memorandum of Understanding with another $3 million each to support industry-led collaborative R&D projects. CIIRDF will continue to serve as the OICP delivery agent from 2015 to 2017.

On the heels of the OICP announcement from the Honourable Reza Moridi, Minister of Innovation, Government of Ontario and Avi Hasson, Chief Scientist and Chairman, NTIA, State of Israel, CIIRDF launched a new Ontario-Israel Call for Proposals for joint R&D projects. The call solicited novel, industry-led technology projects in areas of shared priority including: clean technologies; life sciences and medical devices; cybersecurity; and Information and Communication Technologies (ICT).

Reinforcing Ontario’s commitment to cultivate strong Ontario-Israel collaboration, Premier Kathleen Wynne will lead a business delegation to the Start-up Nation in spring 2016 to build on Ontario’s existing relationships, create new partnerships and promote investment in the province.
Ontario-Israel R&D Projects

In May 2012, CIIRDF announced three new bilateral R&D projects under the OICP. Valued at more than $3.1 million, these Ontario-Israel R&D collaborations promise to open-up new markets for Ontario and Israeli firms. Leveraging more than $650,000 from the Government of Ontario, the projects bring together six Ontario and Israeli technology-based companies to develop and commercialize new innovations for life sciences and green technology. Over the next five years, collaborating companies expect the emerging commercial products to generate significant new sales and high-value jobs in both countries. Moreover, they will further position Ontario and Israel as leading suppliers of novel technologies for global markets.

The selected projects build on the complementary R&D strengths and resources of collaborating firms, and target well-defined market opportunities in priority economic sectors. The bilateral teams aim to develop new innovations such as a new software tool that enables new therapies for childhood Attention Deficit Hyperactivity Disorder; a novel monitoring system that detects contaminants in drinking water; and technology that improves the design and manufacture of carbon ion radiation therapies for cancer treatment.

“Ontario and Israel are world leaders in developing and commercializing innovative, leading-edge and ‘green’ technologies and systems. We continue to look for opportunities to work with Israel to develop new partnerships and further broaden and develop our relationship in ways that benefit our people, create good jobs and strengthen our economies.” The Honourable Brad Duguid, Minister of Economic Development, Employment and Infrastructure, Government of Ontario

“These Ontario-Israel R&D projects reinforce the innovation output and economic value that is consistently generated by CIIRDF. CIIRDF plays an instrumental role in helping companies from Israel, Ontario and Canada more broadly to increase their competitiveness and accelerate commercial success in global markets. It is one of the leading bilateral R&D programs managed by the Office of the Chief Scientist – and I hope that will grow substantially in the near future. This investment will generate economic returns for many years to come.” Avi Hasson, Chief Scientist and Chairman, NTIA, State of Israel

The success story collection featured in this report profiles four bilateral R&D projects supported by the Ontario-Israel Collaboration Program led by:
- Altair Semiconductor (Israel) and the former SiGe Semiconductor, now Skyworks Solutions (Canada);
- SHL-Aubin (Israel) and Castool Tooling Systems (Canada);
- Simbionix Corporation (Israel) and Quanser (Canada); and
- Mekorot (Israel) and Real Tech (Canada).

Dr. Henri Rothschild, President of CIIRDF, welcomes guests to the Bilateral Panel on Groundbreaking Brain Research in Toronto, Ontario in May 2012.
Partnership Development Activities and Technology Matchmaking

Over the last few years, CIIRDF hosted several Ontario-Israel technology matchmaking and industry-led partnership development activities (PDAs) that aimed to:

• Broker new relationships between Ontario and Israeli firms with complementary R&D strengths and interests;
• Stimulate discussion that catalyzes new ideas, technology collaboration and the development of joint solutions to key challenges facing industry; and
• Establish a pipeline of prospective bilateral R&D projects for annual Call for Proposals.

The following page provides an overview of select marquee Ontario-Israel PDAs.

CIIRDF, Baycrest, and the Ontario Brain Institute Host Bilateral Panel on Groundbreaking Brain Research with Shimon Peres, former President of Israel

In May 2012, Baycrest, the Ontario Brain Institute (OBI) and CIIRDF hosted a Canada-Israel Panel on Groundbreaking Brain Research with His Excellency, Shimon Peres, former President of Israel, and five prominent innovation leaders from Ontario and Israel.

Panelists explored new technological approaches that could unlock the secrets of the human brain, and proposed increased interdisciplinary research cooperation between innovators in Ontario, Canada more broadly, and Israel to capitalize on these opportunities. The leaders focused on bilateral technology partnerships that could lead to new breakthroughs in the diagnosis and treatment of neurological disorders such as Epilepsy, Stroke, Autism, Alzheimer’s and Parkinson’s Disease. This included an emphasis on the translation of research results into clinical applications that could benefit more than two billion people around the world who suffer from a neurological disorder. With the global neurology devices market forecast to reach $7.2 Billion by 2017, increased linkages among researchers, clinicians and entrepreneurs could stimulate new opportunities for Ontario and Israeli firms in this field.

Moderated by Dr. Henri Rothschild, President of CIIRDF, the panel brought together the following experts: David Naylor, MD, PhD, President, University of Toronto; Peter L. Carlen, MD, Senior Scientist, Toronto Western Research Institute; Rafi Gidron, PhD, Founder and Chairman, Israel Brain Technologies; Randy McIntosh, PhD, Vice President, Research, Director, Rotman Research Institute, Baycrest; and John Soloninka, President and CEO, HTX – The Health Technology Exchange.
Building Unprecedented Technology Bridges between Ontario and Israeli Companies from the Galilee Region

CIIRDF Hosts Business Matchmaking Sessions with the Largest Arab Israeli Industry Delegation to Visit Canada

In January 2016, CIIRDF and MATIMOP, the executive funding agency of Israel’s NTIA, hosted one of the first bilateral technology matchmaking activities of its kind on Canadian soil with companies from the Galilee Region, all of whom represent Israel’s Arab community.

Under the OICP managed by CIIRDF, the Ontario-Galil Business & Technology Partnering Forum connected 12 innovative technology companies from the Galilee Region with dozens of prospective R&D partner firms from Ottawa, Toronto and Ontario more broadly. The emerging linkages promise to generate increased technology collaboration between Ontario and Israel downstream, and help to create long-term economic value for the two jurisdictions. Moreover, this bold initiative has the potential to serve as a model for cooperation and bridge building that engages Israel’s Arab community in technology-based economic activities.

Building on Israel’s recognized entrepreneurial and innovation prowess, the Galilee delegation assembled companies from technology rich sectors such as life sciences, ICT, cleantech, natural resource management, defense and security. Israeli leaders set the stage for productive matchmaking with presentations on their technology and business objectives and requirements. Participants then engaged in pre-arranged company-to-company meetings to explore mutually beneficial R&D partnership and business opportunities. These sessions build directly on the outcomes and success of an initial Ontario-Israel business matchmaking event hosted in Galilee in November 2014.

CIIRDF hosted the Toronto matchmaking activity in collaboration with MaRS Discovery District, and the Ottawa matchmaking activity in partnership with Carleton University and its award-winning Technology Innovation Management (TIM) Program, Ontario Business Advisory Services, Invest Ottawa, the Ontario Centres of Excellence (OCE) and the University of Ottawa. These sessions featured distinguished speakers including: Dr. Henri Rothschild, President of CIIRDF; His Excellency Rafael Barak, Ambassador of Israel to Canada; Dr. Ilse Treurnicht, CEO of MaRS Discovery District; Dr. Roseann O’Reilly Runte, President and Vice-Chancellor of Carleton University; Dr. Tony Bailetti, Director, Carleton’s Technology Innovation Management Program; and Consul General DJ Schneeweiss, Consulate General of Israel (Toronto). The events also included an inspirational keynote presentation by Imad Younis, founding CEO of Alpha Omega, one of the most successful technology based firms to emerge from the Arab community in Israel.

This matchmaking session directly supports OICP objectives to promote research and business partnerships between Israeli technology companies and counterparts in Ontario.
This matchmaking initiative engages the Israeli Arab firms in an unprecedented way, and establishes a foundation for long-term collaboration with innovators across this important community, many of whom reside in Israel’s Galilee Region,” said Dr. Henri Rothschild, President of CIIRDF. “The emerging technology partnerships promise to stimulate new innovations, and create commercial advantage for participating companies downstream. It’s a groundbreaking approach that could be applied with companies across the Middle East in the future, creating opportunities for Canada to help forge new global ties, and serve as a model for the world.”

“Ontario’s capacity to compete in a highly competitive global economy depends on collaboration,” said the Honourable Reza Moridi, Minister of Research and Innovation, and Minister of Training, Colleges and Universities, Government of Ontario. “Connecting innovative technology companies in both jurisdictions to help them become more innovative and productive will create the jobs of tomorrow.”

“I am proud to welcome this delegation that brings together two defining features of Israeli society — multiculturalism and innovation,” said His Excellency Rafael Barak, Ambassador of Israel to Canada. “Hightech has emerged as not only the engine behind Israel’s booming economy, but an excellent tool for integrating all layers of our social mosaic, including Arab-Israeli citizens that comprise 20 percent of our population. It’s only fitting that Canada, which is also defined by its multicultural and highly educated population, will host this delegation and I am confident that natural business partnerships will emerge.”

“This event represents an important step towards addressing needs of Israel’s Arab community,” said Michael Khoury, Israel’s Trade Consul to Canada, who hails from the largely Arab city of Shfar’am, Israel. “It leverages the innovation strengths of Israeli Arab firms, enabling them to contribute to, and benefit from, bilateral economic development initiatives. We applaud CIIRDF for demonstrating such leadership, and broadening its reach and impact across Israel. It creates new opportunities to leverage technology cooperation as a building block for economic, political and social development within and beyond Israel’s borders.”
Saskatchewan and Israel Come Together to Create Technology Solutions for Global Food Challenges

CIIRDF, Israel’s NTIA, and Innovation Saskatchewan took an important step towards bilateral technology cooperation with the potential to transform agriculture and agri-food production. Senior leaders from Saskatchewan and Israel convened at a roundtable meeting in Tel Aviv, Israel on January 24, 2016 to establish actions that advance the collaborative development of technologies to address global food security challenges. The event culminated in the signing of the first declaration of its kind between the Governments of Israel and Saskatchewan. It reinforces the commitment of both regions to bring their innovation strengths to bear in agriculture for the benefit of both jurisdictions, agri-food producers and consumers around the world.

Building on a year of dialogue, the outcomes of the roundtable and declaration set the stage for a ground-breaking bilateral R&D initiative in agriculture that will draw on Israel’s international innovation support programs. This strategic partnership will leverage the complementary R&D strengths of Saskatchewan and Israel; address shared priorities, and help all participants to seize economic development and trade opportunities in the multi-billion dollar global market for agricultural technologies. It will facilitate R&D collaboration between technology developers and scientists in both regions, with an initial focus on next-generation crop and germplasm development, plant genomics, and data processing.

Organized and chaired by CIIRDF, the roundtable brought together more than 50 participants from both regions including:

- Saskatchewan-based scientists and leaders from Innovation Saskatchewan; the University of Saskatchewan; the Global Institute for Food Security (GIFS); the University of Regina; Genome Prairie; and the Canadian Embassy in Israel; and
- Israeli innovators and leaders from 10 world-class agricultural biotech companies; the Hebrew University of Jerusalem Faculty of Agriculture; Tel Aviv University; Weizmann Institute of Science; the Volcani Institute (the research arm of Israel’s Ministry of Agriculture); and the NTIA.

CIIRDF is now working with participating organizations on the preparation of an action plan that will take immediate effect, and begin to realize the objectives of this strategic partnership. It will leverage CIIRDF’s established collaboration platform and R&D funding programs, and propose initial technology priorities, resources and milestones.

“Scientific advances in genomics, proteomics, systems biology, big data and other fields create tremendous opportunities for agricultural and agri-food innovators in Saskatchewan and Israel,” said Dr. Henri Rothschild, President of CIIRDF. “The outcomes of this roundtable represent an important milestone towards groundbreaking technology collaboration in agriculture that harnesses the expertise
of both regions in these fields. The emerging innovations could help transform the agriculture industry, and enhance the performance, productivity and profitability of crop producers around the world."

“We are excited to explore potential avenues for cooperation in innovative technologies related to food security with the NTIA and Innovation Saskatchewan,” said Avi Hasson, Chief Scientist and Chairman of Israel’s NTIA. “We look forward to creating a framework for future cooperation between entities from the State of Israel and the Province of Saskatchewan.”

“Innovation Saskatchewan is proud to help facilitate this strategic R&D partnership with Israel on behalf of our province,” said Dr. Jerome Konecsni, President and CEO, Innovation Saskatchewan. “We are committed to enhancing the ability of the private sector to innovate and commercialize new, high value-added products. The collaboration proposed with Israel will help us to deliver on this mandate, and showcase Saskatchewan’s technology and agricultural strengths on the global stage. This will provide our innovators and crop producers with a competitive edge, and facilitate access to lucrative new markets.”

“This novel collaboration with Saskatchewan will enable Israel to build on its many breakthroughs in agri-innovation, crop plants breeding, water management, applied genomics, computational biology and related fields,” said Dr. Eli Khayat, Scientific Director of Rahan Meristem, Israel’s first operating commercial plant biotechnology and tissue culture in Israel. “It will allow us to capitalize on our strengths in plant breeding and biotechnology, and contribute to new technologies with the potential to improve crop yield and performance, and address global food scarcity challenges.”

Dr. Maurice Moloney, Executive Director and CEO of the Global Institute for Food Security (GIFS), delivers a presentation during the Saskatchewan-Israel Roundtable in Tel Aviv in January 2016.
“CIIRDF has been the most dynamic and significant factor in expanding the economic, scientific and technological links between Canada and Israel. For the past 21 years, it has nurtured our people-to-people ties by bringing together the best minds from our countries to develop new technologies, create new products, and foster new opportunities for economic growth and job creation. Looking forward, it will play an even more important role as it extends its network to the provinces and to the fields that will come to define the 21st century including cybersecurity, water and environmental technology, green energy, food security, space and aerospace, life sciences and medical devices.”

His Excellency Rafael Barak, Ambassador of Israel to Canada
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Endnotes

3. Haptic technology, or haptics, is a tactile feedback technology which recreates the sense of touch by applying forces, vibrations, or motions to the user. This mechanical stimulation can be used to assist in the creation of virtual objects in a computer simulation, to control such virtual objects, and to enhance the remote control of machines and devices (telerobotics).
   http://en.wikipedia.org/wiki/Haptic_technology
8. https://www.princeton.edu/~achaney/tmve/wiki100k/docs/Modulation.html
13. A doubled haploid plant features cells with two identical sets of genes.

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