



CANARIE ANNUAL REPORT

for
Innovation, Science and Economic Development (ISED)
Canada

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1.0 Overview

Context for CANARIE

CANARIE's role in Canada's innovation ecosystem was set out in its 1993 Articles of Incorporation, and reiterated in its 2013 Articles of Continuance: *to contribute to Canadian competitiveness in all sectors of the economy, to wealth and job creation and to the quality of life of Canadians.*

Throughout its history, CANARIE has evolved to support Canadian competitiveness through the development and deployment of digital technology for Canada's research, education and innovation communities. Over the course of its 24-year history, CANARIE has helped shape Canada's digital landscape by leading the following initiatives, among many others:

- laying the groundwork, with provincial partner networks, for the first commercial Internet in Canada;
- incubating the Internet Registration Authority in Canada, now known as CIRA;
- supporting hundreds of Canadian businesses, educational and health organizations in their transition to digital models and processes via the Technology Development, Technology Diffusion Program; Technology Applications Development Program; and E-business, E-learning and E-health Programs;
- identifying gaps in research software and championing the development of powerful research software tools to accelerate discovery;
- working with global peers to align international research and education infrastructures to support globally collaborative research; and
- developing the grid certificate authority in Canada that provides secure access to data generated from the Large Hadron Collider and other advanced digital technologies.

CANARIE's activities serve to continually advance Canada's digital infrastructure for research, education and innovation so that Canadians are positioned to compete in the global knowledge economy. More detailed information on current activities may be found below.

Executive Summary

CANARIE's Contribution Agreement with Innovation, Science and Economic Development (ISED) Canada requires the organization to "provide to the Minister, by July 31 of each Fiscal Year, beginning in 2016, an Annual Report approved by the Board, in both official languages relating to the previous Fiscal Year." This report addresses those requirements.

Over the past year, CANARIE has executed on all eligible activities outlined in its 2016-17 Business Plan. These eligible activities align with CANARIE's core purpose: **the advancement of Canada's knowledge and innovation infrastructure**, and its mission: **to design and deliver digital infrastructure, and drive its adoption for research, education and innovation**. At a high level, through its programs, CANARIE works towards achieving these objectives by:

- overseeing the ongoing evolution of Canada's National Research and Education Network (NREN);
- championing the development of research software and collaboration tools; and
- providing users in the private sector with access to advanced technologies to accelerate their time to market.

Together, these activities align to deliver more integrated and accessible digital research infrastructure, tools and services. Beyond these activities, CANARIE also champions the evolution of Canada's digital research infrastructure, which is a critical lever driving social and economic gains that benefit all Canadians.

Network Evolution

As the primary role of the CANARIE network is to provide interprovincial and international connectivity for Canada's National Research and Education Network (NREN), CANARIE works closely with provincial and territorial network partners that build and operate regional networks in their province or territory to co-deliver services to the Canadian research and education community. Through a governance structure which is led by the NREN Governance Committee, this successful federal/provincial partnership manages the evolution of the NREN as a whole to ensure that Canada's research and education community can access nationally and globally distributed data, tools and colleagues.

CANARIE understands the impact of increasing amounts of digital data on research, education and innovation, and has evolved the national backbone network to ensure Canada's research and education community can continue to access and leverage these data to support world-class research. Data traffic grew at approximately 15% from FY16 to FY17. This growth is lower than the 10-year average annual growth rate of ~ 42%, but is within the minimum and maximum annual growth range over the same period (8.5% to 89%).

Mississauga became the first Canadian city to make eduroam available to its student population at public facilities

Given the foundational nature of the network to a wide range of research, education and innovation activities, CANARIE focuses on both its core network and the ongoing strategic evolution of Canada's NREN. Of particular note is the on-going execution of the NREN Strategic Plan, the first such plan created, and a significant milestone in the strong federal-provincial partnership that is the cornerstone of Canada's NREN.

CANARIE continues to represent Canada in the international advanced networking community, participating actively in the NREN CEO Forum; the Global Lambda Integrated Facility (GLIF), a global consortium working on technical advances to improve the capacity of fibre networks; and GLORIAD, a network of networks that implements a fibre-optic ring around the northern hemisphere, enabling active, daily collaboration on global scientific initiatives. CANARIE's participation in these communities ensures that Canada's digital research infrastructure evolves to enable Canada's research and education community to participate and lead globally collaborative research.

CANARIE supports mission-critical research at a range of government laboratories. As well, a CANARIE representative sits on Shared Services Canada (SSC)'s IT Infrastructure Roundtable to provide unbiased information and expertise to assist SSC in network and network-based services planning and execution. CANARIE is increasingly called upon to provide objective advice to government partners regarding new technology initiatives and opportunities for Canada.

Collaboration Tools

Under the Canadian Access Federation (CAF) service umbrella, CANARIE enables Canadian students, staff and faculty to securely access remote resources using only their username and password from their home institutions. This service enables seamless access to protected online content, and to campus Wi-Fi networks through *eduroam*. CANARIE continues to see

significant growth in the use of these services and to evolve the technical and administrative infrastructures to support Canada's increasingly mobile cohort of staff, students and faculty.

Use of the *eduroam* service continues to grow rapidly; the 118 million sign-ons to the service in 2015-16 increased to 170.8 million in 2016-17, an increase of 45%. CANARIE's CIO Advisory Committee plays a key role in guiding the evolution of these and other network services.

Research Software

Recognizing that software is essential infrastructure to support access to data and its computation, CANARIE has invested in research software tools since 2007. CANARIE's long-term vision is to develop a robust toolkit of reusable software services that are widely adopted by Canada's research community. Through its Research Software Program, CANARIE has spearheaded the development of 71 reusable software tools. In order to maximize the impact of these investments, these software tools are available to all researchers. Members of CANARIE's Research Advisory Committee and Software Technology Advisory Committees, which have representation that includes the private sector, ensure CANARIE's investments in software are directed towards the most useful software tools, and that these tools meet rigorous technical standards.

Private Sector Innovation

CANARIE enables users in the private sector to leverage its digital infrastructure to accelerate the commercialization process. The Digital Accelerator for Innovation and Research (DAIR) Program has supported almost 900 small and medium-sized enterprises (SMEs) as they test and develop a range of novel ICT products and services. The DAIR Program provides SMEs with an opportunity to benefit from the scale and agility of cloud resources (computing and storage resources that are located in distributed data centres). Deploying these advanced technologies provides businesses with an opportunity to test and develop innovative products without any capital expenditure, which both speeds time to market and reduces development costs. Further, the opportunity to deploy cloud technologies in early product development is a powerful demonstration of how these technologies can transform traditional business models, and serves to further incent businesses in adopting cloud technologies as part of their long-term business strategy.

Through partnerships with the National Research Council's (NRC) Industrial Research Assistance Program (IRAP), the Association of University Research Parks (AURP), and the Fundica Funding Roadshow, CANARIE continues to promote the use of DAIR and the transformative power of cloud technologies. A range of case studies, published on the CANARIE website, highlight these businesses' use of DAIR and the tangible competitive value delivered through the use of cloud infrastructures to the SME community.

To advance Canada's leadership in networking technology, CANARIE is a founding partner in the Centre of Excellence in Next Generation Networks (CENG). CENG is a consortium of industry, academic and research leaders who are pooling their expertise and equipment to enable SMEs to test new products at scale, with the goal of accelerating the commercialization of Canadian networking technologies in the global marketplace. CANARIE continues to provide the critical network infrastructure and connections to stakeholders in the private and public sectors that underpin CENG.

Partnerships and Community Engagement

CANARIE continues to engage with a broad range of stakeholders to ensure its activities align with changing community needs. CANARIE is a member of the Leadership Council for Digital

Research Infrastructure, including its executive committee; and is in regular contact with digital infrastructure partners and stakeholders, including the CFI, Compute Canada, the Council of Ontario Universities, Universities Canada, the U15, CUCCIO, Colleges and Institutes Canada, Genome Canada, and the granting councils.

CANARIE's role in the digital research infrastructure landscape continues to solidify through premier events such as the CANARIE National Summit, speaking at provincial, national and international events and conferences, through ongoing updates to its corporate website and with outreach/educational materials.

Subsequent to CANARIE's 2015 mandate renewal, CANARIE has been providing funding for Research Data Canada and its programs, enabling opportunities for greater integration of the elements of digital research infrastructure. RDC's Executive Director works with stakeholders to develop the policy frameworks and tools to enable reuse of research data resources. This initiative not only represents an opportunity to address a gap in Canada's digital research infrastructure, but also leverages and informs CANARIE's Research Software, Canadian Access Federation, and DAIR programs.

On behalf of the Board of Directors, CANARIE would like to thank the Minister and officials at Innovation, Science and Economic Development Canada, for their continued support and confidence in CANARIE. CANARIE looks forward to providing Canada's research, education and innovation communities in the public and private sectors with world-class digital research infrastructure, so that Canada can grow its innovation capacity and compete and win in the global digital economy.

2.0 Statement of Eligible Activities for 2016-17 and Report on the Extent to Which CANARIE Met the Expected Results

The overarching goal for CANARIE activities during its 2015 – 2020 mandate period is to strengthen Canada's digital research infrastructure. CANARIE's activities throughout the second year of its mandate aligned to this goal, and contributed to a greater integration and accessibility of digital research infrastructure, tools and services.

CANARIE's three eligible activities in the 2016-17 Business Plan are detailed below. A report on the extent to which each eligible activity was achieved is contained in the paragraphs following.

1. Network Operations

Evolve/extend Canada's world-leading collaboration network

In order to address the evolving needs of users in the research, education and innovation communities, CANARIE will enable a pan-Canadian collaboration capability through a world-leading high performance network and network-based services.

CANARIE Network:

Overview of the Network Evolution Strategy

To evolve and expand the CANARIE network in a flexible and cost-effective manner over the long-term, CANARIE's vision is to deploy fibre, where economical, from coast-to-coast across Canada. In high-use, high-growth network corridors, CANARIE has purchased fibre and therefore has the flexibility to add capacity and deploy transformative technologies at a considerably lower incremental cost. To further build out the network, CANARIE uses leased services from suppliers where the traffic demand does not warrant dedicated fibre, or when fibre acquisition is cost prohibitive.

Improved core nodes reliability

CANARIE completed two redundancy projects to increase reliability in both the western and eastern parts of the network.

In the west, CANARIE collaborated with BCNET, the provincial network for British Columbia, to build and share the redundant infrastructure. The new infrastructure included upgrades in three locations: Vancouver, Victoria and Seattle. The upgrade enhances the regional network infrastructure, supports CANARIE's international connectivity through the US, and offers route diversity in the case of network failure.

In the east, CANARIE added additional network links to build out network redundancy connecting all four Atlantic provinces. These new links are constructed in a ring structure so that traffic will reroute through the other side of the ring during network outages. The infrastructure was in place at the end of FY17. CANARIE is currently working with the provincial networks in the Atlantic provinces to migrate existing services.

The top five CANARIE network users in 2016-17 due largely to research using the Large Hadron Collider were: TRIUMF; University of Toronto; University of Victoria; McGill University; and Simon Fraser University

Network security monitoring and measurement system implemented

This security project will implement the ability to detect and mitigate Distributed Denial of Service (DDoS) attacks. This objective will carry forward into FY18.

Deployment of support tools accessible through the user portal

The user portal was launched in May 2016 with an *eduroam* reporting system for IT administrators at participating institutions. 56 portal users were added during FY17. CANARIE continued to improve *eduroam* reporting post-launch, including streamlining the change tracking processes to ensure users only receive relevant updates.

NREN Program:

Canada's National Research and Education Network (NREN) operates on a co-delivery model, as a partnership between CANARIE and provincial/territorial Regional Advanced Networks (RANs). CANARIE provides interprovincial and international connectivity, while the RANs provide connections to institutions within their jurisdictions. RAN data that travels out of a province or territory traverses CANARIE network links to RANs in other provinces or territories, or internationally via CANARIE links connecting Canada to the rest of the world.

The coherent technical and strategic evolution of the NREN as a whole is critical to ensure that Canadians from coast to coast to coast have a comparable user experience with the NREN. CANARIE's NREN Program provides funding for RANs to increase the capacity and reliability of existing equipment and infrastructure; to enable network management (tools and training); and to extend the reach of RAN networks to more institutions.

Launch second competitive call

The second competitive funding call for the NREN Program was completed in 2016-17. The call resulted in an additional seven approved projects across the country.

Extend capacity, redundancy, reliability through RAN networks

A total of thirteen projects had been completed by the RANs by the end of 2016-17, while 6 were still underway. \$3.65M of CANARIE funding has been committed to NREN projects since the beginning of the mandate.

Six projects were undertaken to upgrade equipment/infrastructure to ensure that the network stays current with respect to technology, and three (3) projects provided infrastructure expansion / extension. These projects will all improve connectivity and resilience on existing network corridors.

The second call for the NREN Program increased the number of projects focused on capacity upgrades to five.

Extend 100G reach outward from CANARIE

One project was funded that will result in the extension of the 100G reach outward from the CANARIE backbone. Other such projects are anticipated to be funded in subsequent calls.

Connect institutional facilities

Five projects were funded that will result in the addition of new colleges, universities, and teaching hospitals to the NREN.

***Strengthen the NREN partnerships; and
Collaboration on the NREN strategic plan to support the evolution of the NREN***

CANARIE continues to collaborate with provincial and territorial network partners to evolve Canada's National Research and Education Network (NREN). The strategic plan focuses on NREN Services, Organization and Relationships, and how the NREN can improve and expand in these areas to deliver maximum value to Canada's research and education community. It is important to note that this is the first strategic plan ever developed for the NREN, and is a testament to the commitment of the members of the NREN Governance Committee, who come from 13 organizations with different mandates, governance structures and funding models. These representatives are committed to the execution of the elements of the strategic plan and to devoting the necessary resources to continue to strengthen this national digital asset.

Other Achievements – Network:

Government of Canada

CANARIE continues to provide connectivity to 48 government departments and agencies, supporting research collaboration among government departments and with global research partners. CANARIE monitors these connections closely to ensure there is an appropriate match between requirements and infrastructure, ensuring high service levels at a reasonable cost. Renewal of these connections was evaluated and executed in 2016/17.

CANARIE is currently working with SSC as they build the Government of Canada Science Network (GCSN). The GCSN will consolidate government science network traffic and enable better monitoring of network anomalies and threats. In addition, the GCSN will allow SSC to grow its network capacity seamlessly. SSC started the implementation of the GCSN in FY17 and will complete the build in FY18.

International Partnerships – ANA 300G

In partnership with four of the world's leading research and education networks, CANARIE is a member of the ANA-300G (Advanced North Atlantic) project. ANA-300G provides the research and education community with a reliable, advanced connection between North America and Europe via three transatlantic 100 Gbit/s links; speeds that were previously not available via subsea cable systems.

While fibre cuts in subsea cable systems are rare, such occurrences result in weeks of downtime due to the complexity of repair processes and weather uncertainties. With three links across the Atlantic, ANA 300G removes any single point of failure, ensuring minimal risk of disruption for the research and education community.

International Partnerships – NREN CEO Forum

CANARIE continues to participate as a member of the Global NREN CEO Forum. This forum brings together the CEOs of 16 national research and education networks to collaborate on the global evolution of critical digital infrastructures and associated services.

International Partnerships – Global Lambda Integrated Facility

CANARIE represents Canada at the Global Lambda Integrated Facility (GLIF). This is an international consortium that leverages the existing networks amongst NRENs to develop and pilot next generation technologies (such as Science DMZ and Software Defined Networks) in order to maximize network throughput as link speeds increase.

International Partnerships – Global Network Architecture Technical Working Group

CANARIE has been actively involved in this Global Network Architecture (GNA) initiative with the goal of defining a reference architecture and creating a roadmap for both national and regional research and education networks to more seamlessly support research. Ultimately, this effort will establish a more capable, predictable, and resilient next-generation global connectivity for research and education. The GNA Technical Working Group delivered a set of documents in early 2017, and the group continues to define other documents relating to this common network architecture.

Joint Security Project

A Call for Participation was launched in 2016-17 for the Joint Security Project. The purpose of this security project, offered as a joint initiative with Innovation, Science, and Economic Development (ISED) Canada, is to facilitate the development of a community of institutional security specialists to increase institutional awareness of security issues and create a framework to enhance cybersecurity at institutions throughout the country.

A total of 39 Canadian colleges and universities are participating in the project. Participants will benefit from learning about new approaches to information security and interacting with top security leaders and researchers within the intrusion detection community. Training and informal collaboration sessions will strengthen cybersecurity knowledge for participants and their respective institutions. In addition, three platforms will be funded to develop and deploy security aggregation and visualization platforms to meet the needs of the Joint Security Project.

In the short term, the project will make institutions aware of network threats immediately and provide a better understanding of NREN and institutional network security issues. More importantly the project will create a national network security community, leveraging existing security communities that, beyond current security interactions, will collaboratively build and operate a shared monitoring infrastructure.

Facilitating New Technology Experiment – Data Transfer Node

CANARIE successfully supported Compute Canada in a technology trial to test the Data Transfer Node (DTN), a highly-tuned data transfer system for moving big data. The DTN demo involved a collaboration between multiple organizations including international partners in the US. The knowledge gained through the trial was used in the development of new Compute Canada infrastructure.

Network Services - Canadian Access Federation:

Overview of Strategy for Network Services

CANARIE works with stakeholder groups to identify demand for network services and collaborates with national and global partners to deliver them. Currently, CANARIE is the national operator of the Canadian Access Federation (CAF), which enables Canadian students, staff and faculty to access protected online content using their existing institutional credentials (i.e. home username and password) through its Federated Identity Management (FIM) service. Institutions participating in CAF also benefit from the *eduroam* service, which provides students, staff and faculty with secure access to the Wi-Fi network on the campus they are visiting, by using their home institution's credentials.

The first week back at school in September 2016 saw 600,000 logins to eduroam in a single day, a threefold increase from 2014

Increased adoption of CAF services

In 2016-17, participation in the Canadian Access Federation increased from 131 to 145 organizations. Participants continue to benefit from the *eduroam* service: more than half a million users were able to seamlessly log on to campus Wi-Fi networks in Canada and around the world using their home institution's credentials. In 2016-17, CANARIE supported over 170 million *eduroam* logins.

As identity management is crucial to security and asset management in a connected world, CANARIE continues to present the benefits of CAF at events, and has developed and published case studies highlighting identity management success stories.

Other achievements – Canadian Access Federation

Adapt services to evolving standards

CANARIE continues to manage the transition of Federated Identity Management (FIM) to the newest version of software that supports federated single sign-on. Among other capabilities, the new software allows a user to see what information about them is being shared with online service providers.

A CANARIE staff member acted as the Chair of the global *eduroam* Governance Committee between 2013 and early 2017. That committee is responsible for developing global standards and policies governing the use of *eduroam*, and CANARIE's leadership of this committee is a tangible demonstration of confidence in CANARIE's technical and strategic capabilities.

Increase ease of service deployment, operation, and use

CANARIE launched a new software interface for FIM users that allows them to more quickly sign on to services. Additionally, a working group between CANARIE and Canadian universities has developed a framework to manage how user information is shared with online service providers.

Expand identity services

CANARIE surveyed CAF users to identify opportunities for service expansion. The results of the survey will be used in the evolution of CAF services.

2. Technology Innovation:

Deploy Research Platform Infrastructure

In order to address gaps in research infrastructure and leverage existing investments in research “middleware” (software that provides services to software applications beyond those available from the operating system), CANARIE will support the creation of technologies to bring new collaboration capabilities not previously offered, to the research community. CANARIE will leverage previous investments in technology innovation projects and further evolve research software tools to enable increased access to data and tools and accelerate research outcomes.

Research Software Program:

Overview of Strategy For Research Platform Infrastructure (Research Software Program)

In 2016-17, CANARIE continued to support the development of software tools to enable research and accelerate time to discovery, by enabling efficient reuse of software. Call 1 was

used to identify groups of participants that work together to co-develop software. This approach ensured that common software was only developed once and, since multiple participants and users had input to the design process, the software could be reused with considerably less effort.

Continue to enhance and promote the research software portal at science.canarie.ca

The software portal at science.canarie.ca continued to evolve to meet the needs of the Canadian research software community. Significant new functionality included a mechanism to archive software that was no longer actively maintained by the original developers, as such software could still be of use to other projects. The science.canarie.ca landing page evolved to include additional program support material. Marketing materials promoting the advantages and features of the software portal were created for distribution at conferences and workshops.

Bird Studies Canada's Motus research portal, funded by CANARIE, will enable national and international research collaboration by managing, analyzing, exploring and visualizing bird movement data collected through a network of thousands of radio ID tags and hundreds of receiving stations.

Continue to expand awareness of the Research Software program within the Canadian Research and Education community

The 2016 edition of CANARIE's Research Software Developers' Workshop was expanded to include representatives from the CFI, Genome Canada, and Mozilla Science Lab, a non-profit with a Canadian presence and a mandate to promote open and accessible research. In the spring and autumn of 2016, CANARIE staff visited several research-intensive universities across Canada to increase awareness of the Research Software Program to researchers, and to receive feedback on the next call (Call 2a), which focused on platform reuse.

Support and monitor funded projects in the 2015 call

CANARIE continues to review the development of the six projects funded under the 2015 call (Call 1). Information is shared with each of the projects in an effort to develop best practices in the research software community.

Launch a call in order to consolidate around fewer, more re-useable platforms

After consultation with the community, Call 2a was launched in late 2016. This call focused on funding existing research software platforms to make them available to new researchers. The response was tremendous, with 70 notifications of intent to respond received which ultimately resulted in 34 full proposals being submitted for the competitive funding call.

Develop collaborative funding and awareness programs with other funders and providers of research software

As a result of discussions with the CFI, the call for proposals for the Cyberinfrastructure Initiative, Challenge 1, Competition 2 included a requirement that "applicants must consider opportunities to adapt and build on existing Canadian initiatives such as those previously funded by the CFI, CANARIE, the tri-agency or others".

The CANARIE Research Software team attended two discipline-specific conferences (computational biology and geoinformatics) to reach out to new communities of researchers.

Other achievements – Research Software

CANARIE staff attended the first ever Research Software Engineering conference, held in Manchester, England, and contributed to an international collaborative paper on the current state of research software around the world.

Research Data Management:

Overview of Strategy for Research Data Management

In response to consistent community feedback that identified the need to coordinate activities in research data management, CANARIE took action and provided funding to support Research Data Canada (RDC) in 2014. CANARIE was given the mandate to support RDC in its 2015 Contribution Agreement, and an Executive Director was hired in 2016.

RDC's overarching goal is to improve the management of research data in Canada so that it is broadly available to support knowledge creation and innovation.

Support provided to advance research data management solutions

RDC was one of the original partners that created the Open Researcher and Contributor ID (ORCID) Canada consortium (ORCID-CA) in 2016. ORCID-CA will facilitate better metrics for measuring the impact of research.

RDC's Executive Director is one of six participants on the Leadership Council for Digital Research Infrastructure (LCDRI) subgroup working on research data management. This group will provide input to the LCDRI which will be included in its report to ISED.

Additionally, RDC continues to work with both public and private organizations on the integration of best practices into Canadian research data management infrastructure. This outreach includes engaging broader stakeholder community via webinars and blog posts, public presentations, workshops, and working groups.

3. Private Sector Innovation

Stimulate ICT Innovation and Commercialization

In order to leverage CANARIE resources to stimulate commercialization, CANARIE delivers a cloud-based program, the Digital Accelerator for Innovation and Research (DAIR), that enables advanced ICT research and provides an opportunity for entrepreneurs to accelerate time-to-market.

Overview of Strategy for ICT Innovation and Commercialization

CANARIE seeks opportunities to leverage digital infrastructure and tools to maximize the use of transformative technologies and drive increased innovation and commercialization. CANARIE currently participates in two major initiatives to support ICT sector innovation and commercialization.

The first is CANARIE's DAIR program, which offers powerful cloud computing resources to small and medium-sized enterprises (SMEs) to accelerate their product development timelines and enable faster time to market. DAIR exposes users to the power of cloud technologies to transform traditional business models and provides these businesses with an opportunity to adopt these technologies as part of their long-term growth strategy. The second initiative is CANARIE's support for the Centre of Excellence in Next Generation Networks (CENG).

DAIR Program:

Continued increase in the total number of DAIR users

The aggregate number of DAIR users as of April 1, 2017 was 853, which is up from 648 from the prior year.

New features added to the DAIR cloud infrastructure

In order to ensure DAIR services are current and respond to ever-evolving user needs, CANARIE continued to invest in updates to the DAIR infrastructure. In 2016-17 improvements included upgraded storage hardware, new operating system choices, and the addition of Graphic Processing Unit (GPU) hardware capabilities, allowing companies with graphics- or processing-intensive needs to develop services and products for market.

DAIR user Sam Agie of Rebel Technologies says, "In addition to the cost savings, we have the confidence that we'll be able to easily move to a production cloud environment once we're ready to commercialize."

Content released to educate SMEs on the efficient use of cloud services

CANARIE developed a range of marketing material to educate users on the most efficient use of cloud services, and to demonstrate how users are realizing competitive benefits through their use of DAIR. CANARIE has developed and presented a comprehensive overview of cloud services and continued to present this through the Fundica Roadshow, which targets early-stage Canadian companies. CANARIE published several blog posts on cloud technologies, and created several case studies that highlight the use of DAIR by a broad cross-section of users.

To continue to raise the visibility of DAIR among small businesses and entrepreneurs, CANARIE continues to develop strong partnerships with the Funding Roadshow, the IRAP Concierge Program, the Association of University Research Parks, and a range of incubators across the country.

Centre of Excellence in Next Generation Networks (CENGN):

Centre of Excellence in Next Generation Networks

To support Canadian leadership in networking technologies, CANARIE is a founding partner in the Centre of Excellence in Next Generation Networks. CENGN is a consortium of industry (including: Juniper, Cisco, Alcatel-Lucent, BTI, EXFO, TELUS), academic (Algonquin College, McGill University, Université Laval, University of Alberta, among others), and research leaders who are pooling their expertise and equipment to lower the barrier to market entry for SMEs and researchers.

CENGN was awarded funding by NSERC's Centres of Excellence program in 2014 and created the governance structure and technical and staff infrastructure to take on projects beginning in mid-2015.

Connect CENGN facilities to the CANARIE network to support advanced technology research projects

CANARIE continues to play a key role in this initiative as it is the CANARIE network that connects all partners and provides the test-bed infrastructure for new product validation and testing.

3.0 Statement of Eligible Activities for 2017-18 and for the Foreseeable Future

In 2017-18, CANARIE will continue to align its activities towards the goal of strengthening Canada's digital research infrastructure. In 2017-18, CANARIE plans to continue its focus on its three eligible activities.

1. Network Evolution:

Evolve/extend Canada's world-leading collaboration network

In order to address the evolving needs of users in the research, education and innovation communities, CANARIE will enable a pan-Canadian collaboration capability through a world-leading high performance network and network-based services.

CANARIE Network:

Renewal or development of an alternative to the Western ROADM fibre

The Western "reconfigurable optical add-drop multiplexer" (ROADM) fibre lease agreement is coming to an end in the last quarter of FY18. CANARIE has been engaging with the fibre provider to negotiate and finalize renewal options.

Improved core node reliability

CANARIE identified two major network hubs in metro areas where a single point of failure could severely impact delivery of network services: Winnipeg and Toronto. Both network hubs connect links running east, west, north and south. Work was undertaken in 2016-17 to address this type of failure, the final solution will be deployed in the current fiscal year.

Implementation of network security monitoring and measurement system

This objective is carried forward from FY17. The aim of this security project is to detect and mitigate Distributed Denial of Service (DDoS) attacks. The engineering team will define the requirements and deployment plan.

Software-driven network service developed

CANARIE will continue to explore opportunities and technologies to deploy software-driven services on the CANARIE network.

Deployment of support tools accessible through the user portal

CANARIE continues to develop features for the network support portal. The first project slated for completion is a "network weather map" interface, which will provide real-time updates on network traffic flows. Subsequent features include event notification and correlation systems.

RFP launched to explore opportunities to increase connectivity to northern regions

With a lack in competition and availability of services, northern network access continues to be a challenging activity. CANARIE issued an RFP for services in Q4 FY17 with the goal of adding 10-fold capacity to existing services. A provider has been selected and negotiation of a service agreement is in process.

NREN Program:

Third competitive funding call issued to meet NREN requirements

A third Call is to be released in the summer of 2017. The EOI deadline for this Call is June 1st; notification to EOI submitters is scheduled for July 7th; full proposals are due on September 7th; and notifications to applicants will be sent on October 31st. The Call will solicit projects that will:

- Extend capacity, redundancy, and reliability through the RAN networks,
- Extend 100 Gbit/s reach outward from CANARIE, and
- Connect institutional facilities

in accordance with the objectives of the NREN program.

Strategic alignment of NREN partners on evolution of the NREN

Activities in support of the NREN strategic plan continue under the guidance of the NREN Governance Committee and work has been undertaken on key elements of the plan. NREN Governance Committee members are executive sponsors for key deliverables identified in the plan, and work is progressing on those specific elements.

Other initiatives – Network

Cloud Services

CANARIE has been approached by a number of government and private sector partners to discuss how to best take advantage of recent private sector investments in cloud technologies (data centres) in Canada. Cloud technologies provide users with significant scale and agility benefits, as users may increase or decrease their use of these resources based on their needs at any given point in time, without having to make significant capital investments in equipment. A pilot project has been underway for just over a year with the Communications Research Centre (CRC). This project is providing valuable insight on how best to leverage private sector cloud services.

Joint Security Project

CANARIE received approval from ISED for its Joint Security Project proposal early in FY17, and has been working with partners in support of this Project. The aim of the Joint Security Project is to strengthen overall NREN security in the short term, and better understand its potential vulnerabilities. The Project, comprised of 39 participants from across the country, will undertake its work during 2017-18, resulting in a report and recommendation to ISED by early in the 2018-19 fiscal year.

NREN CEO Forum

CANARIE's President and CEO continues to actively participate in the NREN CEO Forum, and this international group will next convene in Iceland in July 2017.

Montreal Open Exchange

In summer 2017, CANARIE will launch Canada's first Global Exchange Point, for research and education networks to connect. The Exchange will provide a direct connection from Canada to global research and education networks and their connected institutions, research facilities, researchers and collaborators, and provide added control over the jurisdiction of research data by allowing research institutions increased flexibility for interconnections through North America.

2. Technology Innovation

Deploy Research Platform Infrastructure

In order to address gaps in research infrastructure and leverage existing investments in research "middleware", CANARIE will create technologies to bring new collaboration capabilities not previously offered to the research community. CANARIE will leverage previous

investments in technology innovation programs and further evolve research software tools to enable increased access to data and tools and accelerate research outcomes.

Research Software Program:

Increase in visits to science.canarie.ca by 4,000 unique visits over FY17 levels

Science.canarie.ca is the online repository of reusable software tools that have been funded by CANARIE and that are available to all researchers. CANARIE will continue to promote the repository to the research software developer community in Canada.

Contracts in place and execution underway for all approved Call 2 platform contribution projects; and at least one additional research team adopting each of the platforms contributed in Call 2

CANARIE will have contracts in place and execution underway for all approved Call 2 platform contribution projects, with the goal of having at least one additional research team adopting each of the contributed platforms, by the end of FY18. Funding is dependent on the addition of at least one new research team.

Results of a Canada-wide survey of research software developers available to shape the ongoing evolution of the Research Software program

Results of CANARIE's inaugural survey of Canadian research software developers, carried out in partnership with the UK Software Sustainability Institute (SSI), will be released in summer 2017.

Research Data Management:

Research data management projects and initiatives that enhance Canadian reuse of research data

As Research Data Canada (RDC) is a stakeholder-led initiative, the ability for CANARIE to predict outputs is limited. However, RDC's 5 Standing Committees and 14 Working Groups are actively discussing best practices in research data management, including the development of public outputs and recommendations.

Additionally, RDC is partnering with Université de Montreal to plan and co-host the first Research Data Alliance (RDA) Plenary to be held in Canada, in September 2017.

Completion of a vision document describing Canada's research data management ecosystem, including gaps, opportunities and international partnerships

Work is ongoing on the development of a vision document to help define future projects for RDC and the community, with expected implementation by the end of FY18.

3. Private Sector Innovation:

Stimulate ICT Innovation and Commercialization

In order to leverage CANARIE resources to stimulate commercialization, CANARIE delivers a cloud-based program, the Digital Accelerator for Innovation and Research (DAIR), that enables advanced ICT research and provides an opportunity for entrepreneurs to accelerate time-to-market.

DAIR Program:

New features added to the DAIR cloud infrastructure

CANARIE continues to invest in new features to deliver a better user experience for DAIR users. Planned improvements include the introduction of a catalogue of open-source software packages within the DAIR environment. These software package will be available for automatic deployment, reducing the technical effort and time start-ups need to start building and testing their products on DAIR.

Content released to educate SMEs on efficient use of cloud services

CANARIE will continue to develop new case studies highlighting businesses' use of DAIR and how it contributes to their overall competitive positioning.

Centre of Excellence in Next Generation Networks (CENG):

Additional participants in CENG beyond the FY17 pilot will be able to leverage the CANARIE network for commercialization of new ICT products and services

There is a robust pipeline of new projects at CENG that will likely leverage the CANARIE network. CANARIE continues to work with partners at CENG to evolve the infrastructure to develop an enhanced level of capability.

CANARIE also continues to participate in a number of discussions with public and private sector stakeholders wishing to gain CANARIE's support for new network test-bed initiatives. This interest indicates the critical role of advanced networking in supporting a range of strategic technology research and development projects. CANARIE will continue to work with its stakeholder partners and the Government of Canada to ensure that its powerful network infrastructure is leveraged to support Canadian competitiveness in advanced technologies.

Over the next year, CANARIE will ensure that all activities that have been implemented to achieve these three eligible activities will be successfully completed in line with the terms and conditions of CANARIE's Contribution Agreement.

4.0 Statement of CANARIE's Investment Policies, Standards, and Procedures

CANARIE's investment strategy is specifically tailored to the duration and quality constraints in terms of investment options imposed by the Statement of Investment Policy and the Contribution Agreement with Innovation, Science and Economic Development Canada. These constraints, while deemed appropriate and necessary to meet the overall objectives of CANARIE, preclude a more active approach to investment management.

Rather than active investment management, the strategy adopted by CANARIE is "buy and hold", based on the following framework:

- Investment maturities will, wherever possible, match the forecasted cash requirements of CANARIE.

- The quantitative limits on investment holdings provide ample structural liquidity to meet the needs of CANARIE. It is appropriate, therefore, to hold less liquid types of approved investments. Value added will be achieved by moving out the “liquidity curve” when possible.
- At all times, CANARIE will hold investments deemed eligible under the Statement of Investment Policy (see Appendix 1). For greater clarity, the determination of eligibility shall be made at the time of purchase. CANARIE will not be obliged to dispose of investments which become ineligible after the date of purchase, but will favour (subject to market conditions) disposing of such securities should assets need to be liquidated. (Refer to the Liquidity policy (s.7) in the Statement of Investment Policy.)

Within this context, CANARIE’s official Statement of Investment Policy as adopted by the Board of Directors, and reviewed and approved in the year by the Audit & Investment Committee of the Board, is contained in Appendix 1.

5.0 Statement of Compensation

Directors on CANARIE’s Board, including officer positions such as Chair, Vice-Chair and Secretary/Treasurer, receive no compensation beyond reimbursement for any reasonable out-of-pocket expenses incurred while performing their duties or attending CANARIE meetings.

The President and CEO of the organization has a compensation package that is benchmarked regularly against external comparatives by an external consultant and overseen by the HR (Executive) Committee of the Board. All other staff positions at CANARIE are classified according to a structured system that assigns a salary range to each position. The system and staff salaries are regularly benchmarked against comparative organizations by an external consultant.

For the fiscal year ending March 31, 2017, salary ranges for all officers and employees of CANARIE whose total compensation remuneration paid exceeded \$100,000 (including any fee, allowance or other benefit) are presented below.

Officers

President and CEO
\$243,000 - \$431,000

Chief Financial Officer
Chief Technology Officer
Vice-President, Business Development
Vice-President, External Relations
\$143,800 - \$285,600

Employees

Chief Engineer
Director, Finance
Director, Research Software
Executive Director, Research Data Canada
\$107,100 - \$227,000

Program Manager, Cybersecurity
Senior Network Engineer
\$101,500 - \$181,400

IT Manager
Manager, Analytics
Manager, Software Development
Program Manager, Canadian Access Federation
Technology Architect, Canadian Access Federation
\$71,000 - \$142,100

6.0 List of Eligible Projects, the Funding Provided Detailed by Expenditure Type, and a Description of Progress Achieved to Date

6.1 National Research and Education Network Program (NREN)

The NREN program continues to support the advancement of Canada's National Research and Education Network (NREN). The program's key objective is to strengthen the impact of Canada's co-delivery model and enable aligned strategic evolution of the NREN based on national priorities. Program objectives are achieved through a variety of initiatives:

- Non-Directed, competitive funding enables provincial/territorial network partners to upgrade network infrastructure and extend provincial network connections;
- Directed funding ensures that the National Research and Education Network evolves in a consistent, coherent and strategic manner;
- Interconnection and Co-delivery funding ensures that provincial and territorial partners support co-delivery of the NREN and comply with the requirements of CANARIE's Interconnection Agreement; and
- Operating and Strengthening the NREN promotes the impact of Canada's co-delivery model.

In 2015-16 and 2016-17, \$220,000 and \$230,000, respectively, was paid to the RANs in funding for Interconnection and Co-delivery.

Table 6.1 details the projects that utilized Non-Directed NREN funds in the first two years of the mandate.

Table 6.1 NREN Program – Non-Directed Funding

RAN Partner	Project Commitment (000s)	Funding (000s)		
		2015-16	2016-17	Total
RISQ	\$1,431	-	\$456	\$456
ORION	\$539	-	\$539	\$539
BCNET	\$504	-	\$225	\$225

RAN Partner	Project Commitment (000s)	Funding (000s)		
		2015-16	2016-17	Total
NB	\$361	-	\$348	\$348
Cybera	\$329	\$109	\$89	\$198
SRNET	\$217	-	\$184	\$184
ACORN-NL	\$160	-	-	-
MRnet	\$108	-	\$108	\$108
Total	\$3,649	\$109	\$1,949	\$2,058

6.2 Research Software Program

The Research Software Program leverages the services developed under previous mandates to drive collaborative development of reusable software services and adaptation of existing research platforms for use across multiple research domains, providing researchers with the tools required to accelerate research.

The Research Software Program launched its first funding call of the current mandate in 2015-16. Table 6.2 details the projects that were approved for funding under that call.

Table 6.2 Research Software Program

Lead Contractor	Project Commitment (000s)	Funding (000s)
		2016-17
CRIM	\$600	\$325
Ocean Networks Canada	\$577	\$204
Bird Studies Canada	\$558	\$209
Ouranos	\$493	\$139
University of Calgary	\$376	\$149
University of Guelph	\$92	\$53
Total	\$2,697	\$1,079

6.3 Digital Accelerator for Innovation and Research (DAIR) Program

DAIR is an integrated virtual environment that leverages the CANARIE network to develop and test new ICT and other digital technologies. It combines advanced networking, cloud computing, and storage resources to create an environment to develop and test innovative ICT applications, protocols, and services; perform at-scale experimentation for deployment; and facilitate a faster time to market.

During the first year of this mandate, CANARIE committed \$1.5M in funding to partners to manage the DAIR resources and ensure their availability and maintenance for the 2015 – 2020 mandate.

Table 6.3 Digital Accelerator for Innovation and Research (DAIR) Program

Lead Contractor	Project Commitment (000s)	Funding (000s)		
		2015-16	2016-17	Total
Cybera	\$1,545	\$133	\$357	\$490
Total	\$1,545	\$133	\$357	\$490

7.0 Criteria Applied to Select Eligible Projects

The published criteria used to select the projects under the programs with active funding calls in 2016-17 are provided in Appendices 2-5.

8.0 Summary of the Results of Audits and Evaluations Carried Out During the Year

Financial Audit: CANARIE annually provides for a Financial Audit undertaken by independent auditors who are approved each year by CANARIE's membership and overseen by the Audit and Investment Committee of the Board. The results of this Audit are provided to the Minister as part of each year's Annual Report to the Minister. The Financial Audit for the 2016-17 Fiscal Year was completed in June 2017 by BDO Canada LLP, Chartered Professional Accountants.

Recipient Audits: In agreements with Eligible Ultimate Recipients for Eligible Projects, CANARIE is required to provide for the conduct of an audit of:

- (i) any Eligible Project where CANARIE's contribution exceeds \$1M,
 - (ii) any Eligible Project where CANARIE deems that an audit is appropriate, and
 - (iii) a representative sample of projects to which CANARIE has contributed less than \$1M,
- according to the terms and procedures set out in the Performance and Risk Framework and the Contribution Agreement.

CANARIE includes in its contracts with Eligible Ultimate Recipients a requirement for the conduct of an audit by an auditor selected by CANARIE for all funded projects, regardless of the amount of CANARIE funding received. This provides CANARIE with the ability to audit projects where warranted or deemed appropriate, and to perform representative sample audits. There were no recipient audits conducted in fiscal 2016-17.

Evaluations: There were no evaluations undertaken in the year.

Appendix 1: Statement of Investment Policy

Statement of Investment Policy

Purpose

The purpose of this document is to establish an investment policy best suited to meet the needs and objectives of CANARIE's investment portfolio. This document is specifically intended to meet the requirements of ss 4.3, 4.4, 4.7, 4.8, 4.9, 4.10, and 4.11 of the Contribution Agreement between CANARIE Inc. and Her Majesty in Right of Canada dated October 9th, 2015.

All aspects of this Policy are governed by the Prudent Person Principle (refer to s 4.1 of the Contribution Agreement) and the principal objective of investment decisions shall be the preservation of capital to meet future disbursement requirements.

Investment Policy

(1) Long-term return objectives and expectations:

The long term objectives of the portfolio are twofold: (a) to provide funds on an "as needed" basis to meet the disbursement needs of CANARIE and (b) to maximize the investment income earned by CANARIE, subject to the Investment Strategy and Investment Policy adopted by CANARIE.

(2) Ratings of Securities:

The deemed rating (the "Rating") of any Eligible Security will be established, at the time of CANARIE's acquisition of the Eligible Security.

Reference to the "issuer" shall include the unconditional guarantor, if applicable.

The rating category for Investment Policy purposes shall be based on the ratings of at least two of the following four rating agencies: Dominion Bond Rating Service (DBRS), Standard and Poors (S&P) Rating Services, Moody's Investors Service and Fitch Rating Ltd.

In the case of Commercial Paper and other short-term investments:

To be included in the AAA category, the security must have at least two of the following, where two are available:

- (i) R-1 (high) from DBRS
- (ii) A-1+ from S&P and the issuer's bonds are rated "AAA" by S&P
- (iii) P-1 from Moody's and the issuer's bonds are rated Aaa by Moody's
- (iv) F-1+ from Fitch and the issuer's bonds are rated AAA by Fitch

To be included in the AA category, the security must have at least two of the following, where two are available:

- (i) R-1 (middle) from DBRS
- (ii) A-1+ from S&P
- (iii) F-1+ from Fitch
- (iv) P-1 from Moody's and the issuer's bonds are rated Aa by Moody's

In the case of bonds and other longer term investments:

To be included in the AAA category, the security must have at least two of the following:

- (i) AAA from DBRS
- (ii) AAA from S&P
- (iii) AAA from Moody's
- (iv) AAA from Fitch

To be included in the AA category, the security must have at least two of the following:

- (i) AA from DBRS
- (ii) AA from S&P
- (iii) Aa from Moody's
- (iv) AA from Fitch

(3) Diversification policy of the investment portfolio, including quantitative limits on investments:

Throughout the life of CANARIE's portfolio, CANARIE's investments in the securities of **any one issuer (or two or more affiliated entities)** will be limited to an aggregate market value limit based on the Rating of the security:

Rating Security	<u>AA</u>	<u>AAA</u>
Government Securities	no limit	no limit
Provincial / Municipal Financing Authority	10% of portfolio	10% of portfolio
Municipal Securities	10% of portfolio	10% of portfolio
Other Eligible Securities	10% of portfolio	10% of portfolio

Throughout the life of CANARIE's portfolio, CANARIE's investment in the securities of **any one category** will be limited to an aggregate market value limit of the category, as set out below:

Rating Security	<u>AA</u>	<u>AAA</u>
Government Securities*	30% of portfolio (minimum Government Securities is 10% of the portfolio)	no limit
Provincial / Municipal Financing Authority	70% of portfolio **	same 70%
Municipal Securities	70% of portfolio**	same 70%
Other Eligible Securities	70% of portfolio**	80% of portfolio

* For greater certainty, the phrase "Government Securities" means all securities issued, guaranteed by, or that have the full faith and credit of the federal government or a provincial government.

** The 70% constraint applies to the aggregate of AA securities.

(4) Asset allocation strategy:

The portfolio will, at all times, be invested in Eligible Securities (refer to (5) below).

(5) Permitted investment instruments and trading activities:

CANARIE shall invest in Eligible Securities. Eligible Securities are defined as: bank certificates of deposit; banker's acceptances; treasury bills, commercial paper and other short-term securities, bonds and notes issued by the federal government, provincial governments, municipal governments and corporations; cash deposits in banks identified in Schedule I of the *Bank Act*; guaranteed investment certificates; and other fixed-income securities that carry the full faith and credit of the Government of Canada. For greater certainty, CANARIE shall not invest in derivatives, swaps, options or futures.

Any securities acquired shall have a Rating of at least AA.

All securities will be denominated in Canadian dollars.

The Investment Advisors/Managers, will have authorized power to recommend and execute all trades on behalf of CANARIE Inc. The Investment Advisors/Managers will notify CANARIE Inc. and include all details of all confirmations of trades.

The Board's Audit and Investment Committee will be advised of the transaction details by email or facsimile the same week that the transactions are authorized, or as soon as practical thereafter.

(6) Prohibited investment instruments and trading activities:

Prohibited investments consist of all investments not defined as permitted investment instruments.

(7) Liquidity policy:

- (a) The maturities and terms of investments shall match the profile of CANARIE's forecasted disbursements. In cases where the timing of disbursements is unknown, investments shall be held in securities with term to maturity of one year or less.
- (b) Should an unexpected disbursement or series of disbursements made by CANARIE reduce the total market value of the portfolio, CANARIE shall immediately take the steps necessary to comply with the requirements set by the diversification policy (refer to (3) above) within a period of 60 days from the date as of which CANARIE first failed to meet those requirements. Under no circumstances shall CANARIE materially fail to comply with the diversification requirements of section 3 for a period of more than 90 consecutive days.

(8) Risk management policies:

The purpose of CANARIE's investment portfolio is to earn investment income until such funds are needed to finance CANARIE objectives. The principal risks therefore are liquidity and capital preservation. Both risks, and steps taken to manage such risks, are specifically addressed in CANARIE's Statement of Investment Policy and Statement of Investment Strategy. In addition to

the constraints contained in these documents, certain processes are in place to further manage these risks:

- On a monthly basis the Investment Advisor/Manager receives reports from CANARIE management regarding upcoming short term cash requirements. This is compared to the upcoming maturity schedule with corrective action, if any, being initiated.
- On an annual basis the Investment Advisor/Manager receives a long term projection of CANARIE liquidity requirements. This is compared to the long term maturity schedule. Based on the comparison of the two, corrective action, if any, is taken. Note that corrective action in this instance may be taken over an extended time period.
- On a quarterly basis the Investment Advisor/Manager reviews the credit ratings of all holdings. This is intended to act as an early warning as to potential, upcoming capital impairment issues.
- On a quarterly basis (or more frequently if necessary) the Investment Advisor/Manager reports to the Investment Committee on portfolio matters. Such matters include diversification compliance and potential capital impairment situations and recommended corrective actions.

(9) Policy on the lending of cash or securities:

The lending of cash or securities is not permitted.

(10) Performance measurement and monitoring procedures:

Performance is measured first by the prime objective of safety of investment and, secondly, by the ability of the investment portfolio to have funds on hand to meet all expenditure requirements. After those considerations in importance comes performance measurement. This will be addressed in ongoing fashion in reporting on new investments and reinvestments in terms of their yield relative to the Canada Curve (the yield that would be achieved from a benchmark Government of Canada bond of similar duration). Less attention will be paid to annual comparisons with other bond managers, unless they operate under similar constraints.

(11) Review:

This Statement of Investment Policy shall be reviewed at least once a year.

Appendix 2: NREN Program Criteria

Projects approved for funding under the NREN, Non-Directed Investment Calls will be selected through a competitive process. All project proposals will be reviewed relative to the mandatory criteria and the scoring criteria. Evaluation of proposals relative to these criteria will constitute the basis for the decision whether or not a project is to receive CANARIE funding. Projects that fail to meet the criteria, or fail to meet such criteria to an acceptable degree, cannot be funded.

These are the criteria against which proposals to the NREN Program will be evaluated:

Mandatory Criteria:

1. Projects must strengthen the NREN's ability to deliver consistent, high quality access to infrastructure and services for Canadians engaged in research, innovation and education;
2. Projects must lead to infrastructure or results that will be ongoing after CANARIE funding terminates;
3. Projects must demonstrate an ability to meet any ongoing operational costs resulting from the project without the use of CANARIE funding (e.g. through membership fee revenue);
4. Projects must result in an operational service (e.g. projects involving acquisition of fibre must also include the lighting of that fibre);
5. Tail circuit projects must demonstrate a minimum of matching funds in the form of cash contributions equivalent to 50% of the total project cost;
6. The project must be based on a viable funding model;
7. The applicants must be capable of undertaking the project;
8. The project must be technically sound and methodologically feasible; and
9. CANARIE funding must be necessary to deliver the results of the project or to ensure the timeliness of the delivery.

Scoring Criteria:

1. The advanced nature of the applications and services enabled by the project;
2. The extent of user demand and/or number of users impacted;
3. The cost effectiveness of the proposal, and the degree of financial and other contributions on the part of the RAN and other stakeholders;
4. The project's compatibility with, and contribution to, CANARIE's network and to its other objectives; and
5. Identification of project risks which may impact project timeline (e.g. the number and scope of RAN projects in progress, permits required for rights of way, etc.)

Should CANARIE receive more eligible proposals than the funding allocation can support, projects that have a higher financial leverage factor will be favoured.

Appendix 3: Research Software Program Criteria

Project proposals will be reviewed relative to the mandatory criteria and the scoring criteria. Evaluation of proposals relative to these criteria will constitute the basis for the decision whether or not a project is to receive CANARIE funding. Projects that fail to meet the mandatory criteria, or fail to meet evaluative criteria to an acceptable degree, cannot be funded.

These are the criteria against which proposals will be evaluated:

Mandatory criteria:

1. The existing platform must make use of Canadian digital infrastructure (networking, compute, storage and/or sensors).
2. The proposed project must contribute to one or more of CANARIE's expected results:
 - (a) enhance opportunities for collaborative knowledge creation and innovation within Canada's research and education communities through the maintenance and development of the CANARIE network and related tools and services;
 - (b) expand the research and education community's access to and utilization of the CANARIE network and the availability of tools and programming that increase the effectiveness of its use; and
 - (c) enable the creation of innovative Information and Communications Technology (ICT) products and services and accelerate their commercialization in Canada.
3. Software modification or integration must be technologically and economically viable within the timeline of the program.
4. All funded work must be performed in Canada.
5. The Lead Contractor must be a Canadian university, college, corporation or other legally recognized entity.
6. No more than half of the membership and Board of Directors of the Lead Contractor can be composed of representatives or agents of the federal government.
7. The cost of special purpose equipment MUST not exceed 5% of the total of all eligible project costs. The total cost of sub-contractors and consultants fees MUST not exceed 10% of the total of all eligible Project costs. In-kind contributions must be at least 15% of total eligible project costs.
8. Software developed with CANARIE funding must be made available for other researchers to use at no cost, through the CANARIE Research Software Registry at: <https://science.canarie.ca> for a period of 3 years from the end of the maintenance and support funding period.

Scoring Criteria:

1. Extent to which the platform will support new research applications;
2. Extent to which the project will advance Canada's capabilities in Research Software development;
3. Degree to which the project deliverables will advance research in Canada;
4. Extent to which the project makes use of existing software;
5. Completeness of the proposed project plan;
6. Costs to users such as license fees or hosting fees; and
7. The existing platform's compute and storage allocation strategy to support new research teams.

Appendix 4: Joint Security Project Criteria

Project proposals will be reviewed relative to the mandatory criteria and the scoring criteria. Evaluation of proposals relative to these criteria will constitute the basis for the decision whether or not a project is to receive CANARIE funding. Projects that fail to meet the mandatory criteria, or fail to meet evaluative criteria to an acceptable degree, cannot be funded.

These are the criteria against which proposals will be evaluated:

Participant Selection Procedure

Non-Funded Participation: All eligible applicants who do not require funding will be selected to participate.

CANARIE-Funded Participation: Institutions applying for funding must meet the following mandatory criteria:

1. All funded work must be performed in Canada.
2. The institution must be a Canadian university, college, corporation or other legally-recognized entity that is connected to the National Research and Education Network (NREN).
3. The institution must **not** be a federal government institution (federal department, agency, or Crown Corporation, including their research facilities).
4. No more than half of the membership and Board of Directors of the institution can be composed of representatives or agents of the federal government.

Initial Selection: Based on highest FTE count:

- 15 universities
- 2 community colleges / CEGEPs
- 2 research facilities housing Canadian science instruments
- 2 teaching hospitals

Secondary Selection – Remaining Applications:

- The institution with FTE count at the median point
- The institution with FTE count immediately below the median point
- A minimum of four (4) additional institutions to provide maximum geographical diversity

Platform Selection Procedure

A data aggregation and visualization platform will be selected through a competitive process. All proposals must meet the following mandatory criteria:

1. The institution must be a Canadian university, college, corporation or other legally recognized entity that is connected to the National Research and Education Network (NREN).
2. All funded work must be performed in Canada.
3. The institution must not be a federal government institution (federal department, agency, or Crown Corporation, including their research facilities) agency.
4. No more than half of the membership and Board of Directors of the institution can be composed of representatives or agents of the federal government.

All eligible proposals will be evaluated and ranked against the following scoring criteria in order to determine which proposal will be funded:

1. Extent to which the platform aggregates data from multiple security related feeds from any Intrusion Detection System, including Bro.

2. Extent to which the platform analytics and querying capabilities are optimized for cyber threats, security, and high performance.
3. Extent to which the platform provides extensible visualization capabilities optimized for cyber threats.
4. Extent to which the platform is able to collect data and provide project participants with access to the aggregated data and visualizations.
5. Extent to which the platform could be developed or enhanced to provide different algorithms, tools, and analytics.

Appendix 5: Digital Accelerator for Innovation and Research (DAIR) Program Criteria

Technology organizations in both the commercial arena and the academic research community spend a large portion of their capital and people resources to build R&D environments that enable product design, prototyping, validation and demonstration. This is particularly true where the products or research involve large scale systems composed of many servers and many clients.

As services migrate to network-based services, the cost of building a suitable environment can consume 50 percent or more of an overall development budget. In an effort to speed time-to-market and reduce product development costs, CANARIE has augmented the existing network with computing and storage resources and additional network access technologies.

DAIR Users Selection Criteria:

User applications to the DAIR Program will be evaluated to ensure that the proposed products and projects are a good technical fit for DAIR, that there are meaningful benefits to the applicant and that the applicant is qualified and able to use the services.

1. The applicant must be an entrepreneur or small or medium sized company (SME < 500 employees).
2. The applicant must be capable of using the requested resources in the identified time frame.
3. The proposed project must be a technical fit for the capabilities being delivered by DAIR.
4. The benefits to the applicant must be meaningful in terms of reducing capital and people costs and accelerating time to market.

In the event that the number of qualified applications exceeds the capacity of the DAIR system, applicants will be selected on a first-come, first-served basis.

Appendix 6: Program Revenues Financial Summary – March 31, 2017

The following table presents CANARIE's program revenue projections by initiative for the 2015 – 2020 mandate compared to the approved budget.

	Projections	Budget <i>(in 000s)</i>	Variance
PROGRAM REVENUES			
Legacy – IEP	909	981	(72)
CAF Participation Fees	1,165	1,165	
DAIR User Fees	8	8	
TOTAL PROGRAM REVENUES	2,990	3,134	(72)
MATCHING FUNDS			
Research Software	178		178
NREN	5,046	4,497	549
DAIR	172	170	2
TOTAL MATCHING FUNDS	5,395	4,667	728
IN-KIND CONTRIBUTIONS			
Research Software	1,772	1,665	108
TOTAL IN-KIND CONTRIBUTIONS	1,772	1,665	108
TOTAL	10,158	9,466	764

Appendix 7: CANARIE Inc. Financial Statements – March 31, 2017

~ attached ~

CANARIE Inc.
Financial Statements
For the year ended March 31, 2017

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Independent Auditor's Report

To the members of CANARIE Inc.

We have audited the accompanying financial statements of CANARIE Inc., which comprise the statement of financial position as at March 31, 2017, and the statements of operations, changes in net assets and cash flows for the year then ended, and a summary of significant accounting policies and other explanatory information.

Management's Responsibility for the Financial Statements

Management is responsible for the preparation and fair presentation of these financial statements in accordance with Canadian accounting standards for not-for-profit organizations, and for such internal control as management determines is necessary to enable the preparation of financial statements that are free from material misstatement, whether due to fraud or error.

Auditor's Responsibility

Our responsibility is to express an opinion on these financial statements based on our audit. We conducted our audit in accordance with Canadian generally accepted auditing standards. Those standards require that we comply with ethical requirements and plan and perform the audit to obtain reasonable assurance about whether the financial statements are free from material misstatement.

An audit involves performing procedures to obtain audit evidence about the amounts and disclosures in the financial statements. The procedures selected depend on the auditor's judgment, including the assessment of the risks of material misstatement of the financial statements, whether due to fraud or error. In making those risk assessments, the auditor considers internal control relevant to the entity's preparation and fair presentation of the financial statements in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the entity's internal control. An audit also includes evaluating the appropriateness of accounting policies used and the reasonableness of accounting estimates made by management, as well as evaluating the overall presentation of the financial statements.

We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our audit opinion.



Opinion

In our opinion, the financial statements present fairly, in all material respects, the financial position of CANARIE Inc. as at March 31, 2017, and the results of its operations and its cash flows for the year then ended in accordance with Canadian accounting standards for not-for-profit organizations.

BDO Canada LLP

Chartered Professional Accountants, Licensed Public Accountants

Ottawa, Ontario
June 22, 2017

CANARIE Inc.
Statement of Financial Position

March 31 **2017** **2016**

Assets

Current

Cash	\$ 382,434	\$ 765,945
Short-term investments (Note 2)	9,973,940	7,257,014
Accounts receivable	317,929	305,058
Prepaid expenses and deposits (Note 3)	5,297,869	4,019,550
	<u>15,972,172</u>	<u>12,347,567</u>
Prepaid expenses and deposits (Note 3)	2,040,677	2,302,194
Tangible capital assets, assets under capital lease and intangible asset (Note 4)	<u>11,029,732</u>	<u>12,065,041</u>
	\$ 29,042,581	\$ 26,714,802

Liabilities and Net Assets

Current

Accounts payable and accrued liabilities (Note 5)	\$ 1,528,914	\$ 1,229,748
Deferred membership revenue	7,500	12,500
Deferred funding (Note 6)	6,494,519	3,238,250
Current portion of obligation under capital lease (Note 8)	205,290	196,732
	<u>8,236,223</u>	<u>4,677,230</u>
Deferred funding (Note 6)	2,004,176	2,265,694
Deferred capital funding (Note 7)	10,993,341	12,009,952
Obligation under capital lease (Note 8)	<u>1,353,644</u>	<u>1,558,934</u>
	<u>22,587,384</u>	<u>20,511,810</u>

Commitments (Note 9)

Net Assets

Unrestricted	501,858	544,762
Internally restricted royalty fund	2,317,729	2,299,398
Internally restricted for windup of operations	3,635,610	3,358,832
	<u>6,455,197</u>	<u>6,202,992</u>
	\$ 29,042,581	\$ 26,714,802

On behalf of the board:

Atkinson Middle Director

[Signature] Director

The notes are an integral part of these financial statements.

CANARIE Inc.
Statement of Changes in Net Assets

For the year ended March 31	Unrestricted	Internally Restricted Royalty Fund (Note 10)	Internally Restricted for Windup of Operations (Note 10)	2017	2016
Balance, beginning of the year	\$ 544,762	\$2,299,398	\$3,358,832	\$6,202,992	\$5,989,462
Membership	236,713	-	-	236,713	225,529
Investment income	4,343	18,331	26,778	49,452	46,922
Expenses	(33,960)	-	-	(33,960)	(58,921)
Excess of revenues over expenses	207,096	18,331	26,778	252,205	213,530
	751,858	2,317,729	3,385,610	6,455,197	6,202,992
Interfund transfers	(250,000)	-	250,000	-	-
Balance, end of the year	\$ 501,858	\$2,317,729	\$3,635,610	\$6,455,197	\$6,202,992

The notes are an integral part of these financial statements.

CANARIE Inc.
Statement of Operations

For the year ended March 31	2017	2016
Revenues		
Industry Canada / ISED funding	\$ 18,408,069	\$17,146,942
Membership	236,713	225,529
Investment income	49,452	46,922
	<hr/>	<hr/>
	18,694,234	17,419,393
Expenses (Schedule)		
Program	15,376,487	14,610,557
Operating	3,005,457	2,510,349
Corporate	33,960	58,921
Joint Security Project	26,125	26,036
	<hr/>	<hr/>
	18,442,029	17,205,863
Excess of revenues over expenses	<hr/>	<hr/>
	\$ 252,205	\$ 213,530

CANARIE Inc.
Schedule of Expenses

For the year ended March 31	Program	Operating	Corporate	Joint Security Project	2017 Total
Direct program	\$ 9,977,679	\$ -	\$ -	\$ -	\$ 9,977,679
Employee and consultants	2,751,906	2,024,116	(6,725)	24,172	4,793,469
Marketing and promotion	194,968	97,885	4,256	1,894	299,003
Travel	265,198	100,467	343	59	366,067
Rent	-	302,963	-	-	302,963
General office and supplies	20,310	142,326	12,893	-	175,529
Meetings and conferences	46,015	91,298	-	-	137,313
Equipment, software and maintenance	43,669	104,119	-	-	147,788
Professional fees	22,614	20,777	4,495	-	47,886
Interest on obligation under capital lease	79,274	-	-	-	79,274
	13,401,633	2,883,951	15,262	26,125	16,326,971
Plus: amortization	1,974,854	121,506	18,698	-	2,115,058
	\$15,376,487	\$ 3,005,457	\$ 33,960	\$ 26,125	\$18,442,029

CANARIE Inc.
Schedule of Expenses

For the year ended March 31	Program	Operating	Corporate	Joint Security Project	2016 Total
Direct program	\$ 9,148,912	\$ -	\$ -	\$ -	\$ 9,148,912
Employee and consultants	2,822,305	1,603,461	19,985	25,426	4,471,177
Marketing and promotion	273,452	65,630	17,679	-	356,761
Travel	175,989	68,352	130	610	245,081
Rent	-	321,274	-	-	321,274
General office and supplies	22,726	133,946	-	-	156,672
Meetings and conferences	21,560	58,614	-	-	80,174
Equipment, software and maintenance	32,869	71,612	-	-	104,481
Professional fees	103,275	35,175	2,541	-	140,991
Interest on obligation under capital lease	87,134	-	-	-	87,134
	12,688,222	2,358,064	40,335	26,036	15,112,657
Plus: amortization	1,922,335	152,285	18,586	-	2,093,206
	\$14,610,557	\$ 2,510,349	\$ 58,921	\$ 26,036	\$17,205,863

CANARIE Inc.
Statement of Cash Flows

For the year ended March 31	2017	2016
Cash flows from operating activities		
Industry Canada / ISED funding	\$ 20,000,000	\$ 15,000,000
Membership	231,713	238,029
Program - interest	76,489	41,472
Program - user fees	239,917	199,775
Investment income - Corporate	4,343	3,741
Investment income - Royalty Fund	18,331	17,864
Investment income - Windup of Operations	26,778	25,317
Program expenses	(14,120,484)	(15,015,116)
Operating expenses	(2,802,276)	(2,296,185)
Corporate expenses	(21,987)	(20,572)
Joint Security Project expenses	(26,125)	(26,036)
	<u>3,626,699</u>	<u>(1,831,711)</u>
Cash flows from investing activities		
Acquisition of tangible capital assets and intangible asset	(1,026,499)	(2,518,164)
Proceeds on disposal of tangible capital assets	1,020	155
(Increase) decrease in short-term investments	(2,716,926)	5,422,376
	<u>(3,742,405)</u>	<u>2,904,367</u>
Cash flows from financing activities		
Repayment of obligation and interest under capital lease	(267,805)	(535,611)
	<u>(267,805)</u>	<u>(535,611)</u>
Net (decrease) increase in cash	(383,511)	537,045
Cash, beginning of the year	765,945	228,900
Cash, end of the year	\$ 382,434	\$ 765,945

CANARIE Inc.
Notes to Financial Statements

March 31, 2017

1. Significant Accounting Policies

**Purpose of
Organization**

CANARIE Inc. was incorporated on March 5, 1993 as a non-profit organization without share capital under Part II of the Canadian Corporations Act. CANARIE Inc. was continued under section 211 of the Canada Not-for-profit Corporations Act on November 19, 2013. The objective of CANARIE Inc. is to support the development of the communications infrastructure for a knowledge-based Canada.

As a corporation constituted exclusively for the purpose of carrying on or promoting scientific research and experimental development, CANARIE Inc. is exempt from the payment of income taxes under Section 149(1)(J) of the Income Tax Act (Canada).

Basis of Accounting

The financial statements have been prepared in accordance with Canadian accounting standards for not-for-profit organizations.

Use of Estimates

The preparation of financial statements in accordance with Canadian accounting standards for not-for-profit organizations requires management to make estimates and assumptions that affect the reported amounts of assets and liabilities at the date of the financial statements, and the reported amounts of revenues and expenses during the reporting period. Actual results could differ from management's best estimates as additional information becomes available in the future. Areas of significant estimates include useful lives of tangible capital assets, assets under capital lease and intangible asset.

Deferred Funding

Deferred funding relates to (1) funding received, including interest earned on funding, user fees collected and other recovered eligible costs, in advance of the funding period; (2) funding received for future service; and (3) funding received with respect to the purchase of tangible capital assets, assets under capital lease and intangible asset.

When tangible capital assets, assets under capital lease and intangible asset are disposed, the proceeds increase the deferred funding balance and the net book value decreases the deferred funding balance related to tangible capital assets, assets under capital lease and intangible asset.

CANARIE Inc.
Notes to Financial Statements

March 31, 2017

1. Significant Accounting Policies (continued)

Revenue Recognition The organization follows the deferral method of accounting for contributions. Restricted contributions are recognized as revenue in the year in which the related expenses are incurred. Unrestricted contributions are recognized as revenue when received or receivable if the amount to be received can be reasonably estimated and collection is reasonably assured.

Funding related to tangible capital assets, assets under capital lease and intangible asset is deferred and recognized as revenue in the same year as the amortization expense of the related tangible capital assets, assets under capital lease and intangible asset.

Service contracts are recognized over the period of the services provided.

Membership fees are recognized over the period of membership.

Financial Instruments Measurement

The organization initially measures its financial assets and liabilities at fair value. The organization subsequently measures all its financial assets and liabilities at amortized cost, except for short-term investments which it chose to measure at fair value. Changes in fair value are recognized in the statement of operations.

Impairment

Financial assets measured at amortized cost are tested for impairment when there are indicators of impairment.

Transaction costs

The organization recognizes its transaction costs in the statement of operations in the year incurred for financial instruments measured at fair value. Financial instruments that are subsequently measured at amortized cost are adjusted by the transaction costs in the initial measurement of the asset or liability.

CANARIE Inc.
Notes to Financial Statements

March 31, 2017

1. Significant Accounting Policies (continued)

Tangible Capital Assets and Intangible Asset	<p>Tangible capital assets and intangible asset are stated at cost less accumulated amortization. Amortization is provided on the basis of their useful lives using the following methods and annual rates:</p> <table> <tr> <td>Computer equipment</td><td>3 years straight-line basis</td></tr> <tr> <td>Equipment</td><td>3 years straight-line basis</td></tr> <tr> <td>Leasehold improvements</td><td>over the term of the lease</td></tr> <tr> <td>Furniture</td><td>5 years straight-line basis</td></tr> <tr> <td>Network equipment</td><td>5 years straight-line basis</td></tr> <tr> <td>Computer software</td><td>2 years straight-line basis</td></tr> </table>	Computer equipment	3 years straight-line basis	Equipment	3 years straight-line basis	Leasehold improvements	over the term of the lease	Furniture	5 years straight-line basis	Network equipment	5 years straight-line basis	Computer software	2 years straight-line basis
Computer equipment	3 years straight-line basis												
Equipment	3 years straight-line basis												
Leasehold improvements	over the term of the lease												
Furniture	5 years straight-line basis												
Network equipment	5 years straight-line basis												
Computer software	2 years straight-line basis												
Impairment of Tangible Capital Assets and Intangible Asset	<p>When a tangible capital asset or intangible asset no longer has any long-term service potential to the organization, the excess of its net carrying amount over any residual value is recognized as an expense in the statement of operations.</p>												
Leases	<p>Leases are classified as capital or operating leases. A lease that transfers substantially all of the benefits and risks incidental to the ownership of property is classified as a capital lease. All other leases are accounted for as operating leases wherein rental payments are expensed as incurred.</p> <p>Assets under capital lease are stated at cost less accumulated amortization. They are amortized on a straight-line basis over the expected useful life of the asset to the organization, not to exceed twenty years, which currently corresponds to the term of the lease.</p>												
Contributed Services	<p>During the year, voluntary services (including donated time and travel of board and committee members) were provided. Because of the difficulty of determining their fair value, contributed services are not recognized in the financial statements.</p>												
Presentation of Expenses	<p>Program development, design and implementation activities are classified as program expenses. Activities for specific security initiatives in support of research and education are classified as Joint Security Project expenses. Activities which are not directly in support of Programs or security initiatives are classified as operating expenses. Activities not eligible for funding under the current contribution agreement are classified as either corporate or royalty fund expenses.</p>												

CANARIE Inc.
Notes to Financial Statements

March 31, 2017

2. Short-Term Investments

Short-term investments consist of Canadian government treasury bills with annual yields ranging from 0.40% to 0.63% and maturities ranging from May 2017 to June 2017, guaranteed investment certificates with annual yields ranging from 0.83% to 1.47% and maturities ranging from April 2017 to February 2018, and cash held in investment savings accounts with an annual yield of 0.75%.

3. Prepaid Expenses and Deposits

	<u>2017</u>	<u>2016</u>
Program prepayments and deposits	\$ 7,204,194	\$ 6,174,214
Operating prepayments	97,852	111,030
Rental deposit	<u>36,500</u>	<u>36,500</u>
Balance, end of the year	7,338,546	6,321,744
Current portion	<u>5,297,869</u>	<u>4,019,550</u>
Long-term portion	<u>\$ 2,040,677</u>	<u>\$ 2,302,194</u>

CANARIE Inc.
Notes to Financial Statements

March 31, 2017

4. Tangible Capital Assets, Assets under Capital Lease and Intangible Asset

	2017		2016	
	Cost	Accumulated Amortization	Cost	Accumulated Amortization
Computer equipment	\$ 468,033	\$ 282,749	\$ 346,351	\$ 262,853
Equipment	117,441	111,156	117,441	80,786
Leasehold improvements	464,519	413,234	464,519	392,035
Furniture	232,816	172,799	207,592	152,503
Network equipment	10,743,676	6,959,294	9,999,200	5,820,789
Fibre under capital lease	8,461,796	2,390,798	8,461,796	1,713,406
Fibre under capital lease under construction	865,703	-	865,703	-
Computer software	94,212	88,434	87,611	62,800
	\$21,448,196	\$10,418,464	\$20,550,213	\$ 8,485,172
Net book value		\$11,029,732		\$12,065,041

During the year, computer equipment with a cost of \$34,483 (2016 - \$8,155) and accumulated amortization of \$34,483 (2016 - \$8,155) was disposed and removed from the total cost and total accumulated amortization.

During the year, network equipment with a cost of \$147,283 (2016 - \$Nil) and accumulated amortization of \$147,283 (2016 - \$Nil) was disposed and removed from the total cost and total accumulated amortization.

Accounts payable and accrued liabilities include purchased tangible capital assets with a cost of \$64,012 (2016 - \$10,760).

CANARIE Inc.
Notes to Financial Statements

March 31, 2017

5. Accounts Payable and Accrued Liabilities

	<u>2017</u>	<u>2016</u>
Accounts payable and accrued liabilities	\$ 1,496,943	\$ 1,204,021
Government remittances payable	31,971	25,727
	<u>\$ 1,528,914</u>	<u>\$ 1,229,748</u>

CANARIE Inc.
Notes to Financial Statements

March 31, 2017

6. Deferred Funding

Pursuant to Funding Agreements signed on October 9, 2015, September 4, 2012, March 28, 2007, and March 28, 2002, the organization received funding of \$35,000,000, \$62,000,000, \$120,000,000 and \$110,000,000 respectively from Innovation, Science and Economic Development Canada ("ISED") (formerly known as Industry Canada) for the design, development, deployment, improvement and operations of the CANARIE network and programs.

In 2015, the organization was granted permission from Industry Canada / ISED to retain \$817,821 from an HST recovery to support the Joint Security Project. As of March 31, 2017, the total cumulative expenses for the Joint Security Project are \$52,161.

The balance of the funds has been reflected as follows:

	<u>2017</u>	<u>2016</u>
Balance, beginning of year	\$ 5,503,944	\$ 7,517,386
Industry Canada / ISED funding received	20,000,000	15,000,000
Program - user fees	302,858	262,054
Program - interest	76,489	41,472
Program - service contracts	6,862	
Direct program and operating expenses	(16,285,584)	(15,046,286)
Transfer to operating for the acquisition of tangible capital assets, assets under capital lease and intangible asset	(1,079,749)	(2,244,646)
Joint Security Project expenses	(26,125)	(26,036)
Balance, end of year	8,498,695	5,503,944
Current portion	6,494,519	3,238,250
Long-term portion	<u>\$ 2,004,176</u>	<u>\$ 2,265,694</u>

Deferred funding consists of the following amounts:

	<u>2017</u>	<u>2016</u>
Industry Canada / ISED funding	\$ 7,733,035	\$ 4,712,159
HST recovery	765,660	791,785
	<u>\$ 8,498,695</u>	<u>\$ 5,503,944</u>

CANARIE Inc.
Notes to Financial Statements

March 31, 2017

7. Deferred Capital Funding

Deferred capital contributions represent amounts funded by Industry Canada / ISED for the purchase of tangible capital assets, assets under capital lease and intangible asset. Deferred funding related to tangible capital assets, assets under capital lease and intangible asset is summarized below:

	<u>2017</u>	<u>2016</u>
Balance, beginning of year	\$12,009,952	\$11,839,926
Funding received related to the acquisition of tangible capital assets, assets under capital lease and intangible asset	1,079,749	2,244,646
Amortization of program and operating assets	<u>(2,096,360)</u>	<u>(2,074,620)</u>
Balance, end of year	<u>\$10,993,341</u>	<u>\$12,009,952</u>

8. Obligation Under Capital Lease

	<u>2017</u>	<u>2016</u>
Capital lease for indefeasible rights of use of fibre, 4.35%, due December 2024, payable by monthly instalments of \$23,317, principal and interest.	\$ 1,558,934	\$ 1,944,198
Less: advance payments made in the year	<u>-</u>	<u>188,532</u>
	1,558,934	1,755,666
Less: current portion	<u>205,290</u>	<u>196,732</u>
	<u>\$ 1,353,644</u>	<u>\$ 1,558,934</u>

Minimum lease payments required in the next years under the capital lease are as follows:

2018	\$ 267,805
2019	267,805
2020	267,805
2021	267,805
2022	267,805
Subsequently	<u>456,423</u>
	1,795,448
Less: interest included in minimum payments	<u>236,514</u>
	<u>\$ 1,558,934</u>

CANARIE Inc.
Notes to Financial Statements

March 31, 2017

9. Commitments

The organization is currently committed to a lease for its premise which expires on August 31, 2019. Future minimum annual lease payments under this operating lease (which includes base rent and the current charge for additional rent) for the premise are due as follows:

2018	\$ 338,286
2019	338,286
2020	<u>140,952</u>
	<u>\$ 817,524</u>

As at March 31, 2017, the organization had commitments of \$7,143,052 with respect to the Network and DAIR, Research Software and NREN programs.

10. Internally Restricted Net Assets

Royalty Fund

During the 2007/2008 fiscal year, Industry Canada granted CANARIE Inc. the authority to retain royalties collected after March 31, 2007 and to use these funds in a manner to be determined by CANARIE Inc. and its legal counsel. Annual allocations to the fund include investment income of \$18,331 (2016 - \$17,864). Disbursements from the fund represent payments to approved funded projects. The fund cannot be reallocated without the approval of the Board of Directors.

Windup of Operations

During the 1998 fiscal year, CANARIE Inc. established a fund for the eventual wind up of its operations or for the transition to a new mode of business. In either event, the fund will be used to pay operating expenses. The objective was to allocate to the fund an amount between 50% and 75% of the organization's annual operating budget. Management performs an annual review of the sufficiency of this fund and confirms that its objective is met. Annual allocations to the fund include investment income of \$26,778 (2016 - \$25,317). At March 31, 2017, the organization transferred \$250,000 from its unrestricted net assets to Windup of Operations to maintain the fund. The fund cannot be reallocated without the approval of the Board of Directors.

CANARIE Inc.
Notes to Financial Statements

March 31, 2017

11. Economic Dependence

On October 9, 2015, ISED entered into a contribution agreement with CANARIE Inc. to contribute funding totaling \$105,000,000. Of the total contribution, \$15,000,000 was received in fiscal 2016, and \$20,000,000 was received in fiscal 2017. The current contribution agreement will end on March 31, 2020. Should this funding not be continued or it cannot be replaced, the organization would not be able to continue its operations at the current level.

12. Financial Instruments

Interest rate risk

Interest rate risk is the risk that the fair value or future cash flows of a financial instrument will fluctuate because of changes in market interest rates. Fixed rate instruments subject the organization to a fair value risk while variable rate instruments subject it to a cash flow risk. The organization is exposed to this risk for its short-term investments. The risk associated with investments is reduced to a minimum since these assets are invested in short-term maturities.

13. Comparative Information

The comparative information has been reclassified where applicable to conform to the financial statement presentation used in the current year.