



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.*

This year, CANARIE celebrates its 25th anniversary. 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 25-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 2017-18 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, education and innovation communities 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 FY17 to FY18. This growth is lower than the 10-year average annual growth rate, but inline with the previous year's growth rate.

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 and the Global Lambda Integrated Facility (GLIF), a global consortium working on technical advances to improve the capacity of fibre networks. 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 170.8 million inter-institutional sign-ons to the service in 2016-17 increased to 224.6 million in 2017-18, an increase of 31.5%.

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, and is now supporting the onboarding of new researchers onto existing research software tools. In order to maximize the impact of these investments, these software tools are available to all researchers.

CANARIE's most recent funding calls have supported the modification and maintenance of existing research software platforms in order to meet the needs of new research teams.

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.

Research Data Management

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 that 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.

Most recently, CANARIE launched a Research Data Management program, to fund the development of national data management tools and software. Launched in 2017-18, a community consultation identified gaps in the Canadian research data management ecosystem. The results of the consultation, reviewed by the CANARIE Research Data Management Advisory Committee, identified priorities for the funding call launched in May 2018

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 over 1,000 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), NRC's Concierge Service, Startup Canada , 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 (CENGn). CENGn 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 CENGn.

Partnerships and Community Engagement

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

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 2017-18 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 third 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 2017-18 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 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 long term use of 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.

Increase capacity, redundancy, and reliability

2017-18 saw the completion of a number of key projects, including: the completion of the Atlantic fibre system build in March 2018, which offers the flexibility of adding services and capacity to the region; the renewal of the Western “reconfigurable optical add-drop multiplexer” (ROADM) segment; and added redundancy in both the Winnipeg metro area and in the Atlantic regions.

The top five CANARIE network users in 2017-18 were: TRIUMF; WestGrid; McGill University; University of British Columbia; and University of Toronto

CANARIE also increased the capacity 10 fold to the Yukon and Northwest Territories, bringing it to 100Mbps. The added capacity allows CANARIE to extend more of its services to these two regions.

Continue to enhance network security and monitoring tools

In 2017-18, CANARIE replaced outdated perfSONAR servers to maintain the network monitoring infrastructure. In combination with the NREN perfSONAR initiative, network operators now have a better view of the performance of the NREN.

Security remains critical to the operation of the CANARIE Network and the National Research and Education Network (NREN). In 2017-18 CANARIE investigated technologies that would promote Distributed Denial of Service (DDoS) detection on the NREN core network, and is working with global NRENs on testing different DDoS mitigation solutions.

CANARIE is working with its NREN partners on the deployment of a dedicated Security Information and Event Management (SIEM) system for the NREN core infrastructure. This will increase network security monitoring and will boost CANARIE's incident response mitigation capabilities.

Continue to enhance user access to support tools

CANARIE continues to improve the support offered via the *eduroam* reporting system to IT administrators at participating institutions. Ten (10) new portal users were added during FY18.

Trial software-driven network services

CANARIE has begun collaborating with international partners in experimenting with software applications to control network equipment. The collaboration will continue in 2018-19.

Other Achievements – Network:

Government of Canada

CANARIE is working with Shared Services Canada (SSC) on building the Government of Canada Science Network (GCSN). One federal science laboratory was migrated to GCSN in 2017-18, and SSC plans to complete the migration of all connected federal laboratories by the end of 2018-19.

International Partnerships – MOXY

In May, 2017, CANARIE announced the launch of Canada's first Global Exchange Point for research and education (R&E): MOXY. Located in Montreal, with additional operational support from NORDUnet (an international NREN partner that supports the Nordic countries), MOXY provides ultra-high-speed connectivity for the R&E community in Canada and internationally. CANARIE also added a new 100G connection from MOXY to the Starlight Global Exchange Point (in Chicago) to support international research activities.

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 17 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's President is Co-Chair of 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

CANARIE has been actively involved in the 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 more capable, predictable, cost-effective and resilient next-generation global connectivity for research and education. The work of the GNA Technical Working Group is well

advanced, and CANARIE is now co-executive sponsor for the GNA, and co-Chairs the GNA Policy and Strategy Working Group which works to define fair use of the global connections, cost sharing, and the like.

Joint Security Project

The Joint Security Project, which launched in 2016-17, continued throughout 2017-18. The purpose of this security project, offered as a joint initiative with Innovation, Science, and Economic Development (ISED) Canada, and in which 39 Canadian colleges and universities are participating, 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.

Participating institutions agreed to deploy a security monitoring tool, Bro, on their institutional network, and to share the information collected. A full day workshop for participants took place in June, 2017, and the program is due to wrap up early in 2018-19. A summary report of lessons learned and possible next steps is being prepared for submission to ISED.

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.

A 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.

Third competitive funding call issued to meet NREN requirements

The third and final call of the Non-Directed (competitive) funding component of the NREN Program was launched via a ranked Expression of Interest which closed on June 1, 2017. Eligible projects were then invited to submit full proposals by September 7, 2017. Nine projects from across the NREN were selected for funding in this mandate's final round of competitive funding.

Increased reliability and capacity on network segments shared by RANs

\$5.98M of CANARIE funding has been committed to NREN projects since the beginning of the mandate. Funding from both the Non-Directed funding and the Interconnection and Co-delivery components of the NREN Program continues to support increased reliability and capacity on network segments shared by RANs.

Strategic alignment of NREN partners on 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 the NREN.

Development and launch of priority projects in security and identity management

CANARIE launched the first security project identified for the NREN Directed Funding Program, the procurement and deployment of a SIEM (Security Information and Event Management) solution. The project provides a common point across the NREN to develop a cohesive cybersecurity strategy which includes the development of expertise and common security solutions throughout the country. The project will provide real-time analysis of security alerts generated by applications and network hardware. Hence, it will provide visibility into cybersecurity threats on the network and provide the NREN with a strong basis to evolve the security strategy for the NREN.

Other Achievements – NREN Program:

perfSONAR Deployment

CANARIE also supported the deployment of perfSONAR network measurement tool kits across the NREN. This project uses internationally recognized and deployed technology to continually monitor performance within the NREN as well as the performance of Canada's international connectivity.

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 2017 saw nearly 1,100,000 inter-institutional logins to eduroam in a single day, a 83% increase from the previous year

Increased adoption of CAF services

In 2017-18, participation in the Canadian Access Federation increased from 145 to 157 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 2017-18, CANARIE supported over 224.6 million *eduroam* inter-institutional logins.

On May 1, 2017, Mississauga became the first Canadian city to make *eduroam* available in its public facilities (libraries, arenas, etc.). This allows seamless secure Internet connectivity for students, staff and faculty in public locations.

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.

Increase ease of service deployment, operation, and use

CANARIE continues to evolve its support tools for its Federated Identity Management (FIM) service. In 2017-18, the CAF team, in collaboration with their international partners, released a tool kit to augment existing Active Directory Federation Services (ADFS) Identity Provider installations. The ADFS tool kit reduces the installation and configuration time for CAF services to a matter of minutes and offers techniques to manage trust in a scalable fashion for sites that are using this technology.

CAF enabled support for the Research and Scholarship (R&S) entity category in the 2017-18 fiscal year. This category allows CAF participants that use the Federated Identity Management (FIM) service to allow their faculty and researchers to instantly access participating research collaboration services, by releasing a standard set of attributes to all R&S designated Service Providers (SPs). This not only provides convenience and ease of collaboration for faculty and researchers, but also supports the efficient use of institutional IT time and resources.

Adapt services to evolving standards

A CANARIE staff member was appointed as the Chair of the Community Architecture Committee for Trust and Identity (CACTI) in mid 2017 and continues to serve as the Chair. CACTI is a group sponsored by CANARIE's peer, Internet2, that has international membership providing a unique global perspective on trust and identity topics that impact R&E to the Internet2 ecosystem (10x the size of Canada's) and globally. This committee is responsible for developing and fostering international standards, practices, and advancing trust and identity technologies and services. CANARIE's leadership of this committee is a tangible demonstration of confidence in CANARIE's technical and strategic capabilities among the global trust and identity community.

Expand identity services

CANARIE explored a number of opportunities to expand its current service offering in order to further support the mission of enabling identity and access management solutions for Canadian research and education institutions. The CAF FIM service was a key enabler in the collaboration between eCampusOntario, Ontario's Ministry of Advanced Education and Skills Development (MAESD) and Lynda.com. More than one million college students, staff, and faculty members will have access to online Lynda.com courses through secure, federated login using the CAF FIM service.

The 2018-19 fiscal year will see further exploration of opportunities which include collaborations with international and domestic partners to provide secure guest Wi-Fi service to eduroam enabled institutions, and to offer enhanced ID verification using the CAF FIM service.

2. Technology Innovation:

Research Software Program:

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

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 to accelerate research outcomes.

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

CANARIE continues to maintain and promote the software portal at science.canarie.ca in order to encourage the reuse of existing research software tools.

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

CANARIE carried out the first-ever survey of research software developers in Canada, in order to improve our understanding of the community, and to help inform the development of future efforts.

Additionally, the 2017 edition of CANARIE's Research Software Developers' Workshop was held in Montreal in May, 2017. Based on the success of the Workshop, this event is being expanded into a Conference in 2018.

Support and monitor funded projects in Calls 1 and 2a

CANARIE continues to review the development of the six projects funded under the 2015 call (Call 1) and the five projects funded under the 2017 call (Call 2a) [defined as Call 2 in the 2017-18 Annual Business Plan].

Define and Launch Call 2b based on Call 2a

Call 2b [Defined as Call 3 in the 2017-18 Annual Business Plan] was launched on December 4th, 2017, and closed on March 12th, 2018. Under this competitive call, \$4.5M in funding will be distributed to Research Software Platform development teams to modify and maintain an existing platform in order to meet the needs of at least one new research team. Successful applicants were notified in April, 2018.

Continue collaborative funding and awareness efforts with other funders and providers of research software, including international providers

CANARIE continues to work both domestically and internationally on research software efforts. CANARIE produced a white paper on Research Software that was created collaboratively with the Canadian Foundation for Innovation, and a CANARIE staff member represented Canada at the inaugural International Research Software Leadership Workshop in London, UK, in January 2018.

Other achievements – Research Software

CANARIE began work on two supporting initiatives beyond the activities included in its 2017-18 Business Plan: the development of a Reusable Platform, in order to assist Canadian researchers to get the software they need to support their research as efficiently as possible; and planning for a Local Support pilot which would fund local teams in four institutions to provide on-campus support for research software tools.

The Local Support pilot is intended to demonstrate that further reduction of duplication and accelerated discovery is possible by providing training for researchers, training for software developers, cataloguing pre-existing software available at an institution, recommending the reuse of existing software, and fostering a culture of software sustainability.

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. 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. CANARIE was given the mandate to support RDC in its 2015 Contribution Agreement, and an Executive Director was hired in 2016.

Members of the community presented the need for the development of software tools to bridge gaps in the Research Data Management ecosystem. As a result, CANARIE launched a separate Research Data Management (RDM) program in 2017-18. The program is using a two-step approach: a community consultation on the need for tools, followed by a planned call for proposals to develop the highest priority tools.

Community coordination in support of policy creation, national standards, infrastructure and tools

RDC continues to provide community coordination through its activities and working committees. In September, 2017, RDC hosted the Canadian National Data Services Framework Summit, that brought together a broad stakeholder community to discuss the opportunities and challenges of building National Data Services in support of research data stewardship in Canada. The Summit produced high-level requirements for national data services, and led to the development of a 12-month work plan for RDC's National Data Services Framework Working Group, including an inventory of connections between Canadian and international initiatives.

National engagement activities designed to facilitate the development and deployment of national data services that benefit all publicly-funded research organizations

In support of a planned funding call in 2018-19, CANARIE launched a community consultation to identify research data management gaps and priority areas for software component and tool development. The feedback from this consultation will enable CANARIE to focus its funding on the areas of highest priority as identified by the community. The consultation applied the globally-accepted FAIR Principles, where data is Findable, Accessible, Interoperable and Reusable, as a key framework for the consultation.

Communication with international data infrastructure providers to work towards Canadian research data infrastructure that is compatible with international approaches

RDC co-hosted the 10th Research Data Alliance (RDA) Plenary in Montreal, in September 2017. RDA has over 6,600 members from 135 countries and works to "accelerate the growth of a cohesive data community that integrates contributors across domain, research, national, geographical and generational boundaries" [<https://www.rd-alliance.org/about-rda>]. This was the first Plenary hosted in Canada. Following the RDA Plenary, RDC hosted a National Data Services Summit which focussed on aligning the elements required to develop a national RDM infrastructure.

Other achievements – Research Data Management

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

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

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.

DAIR Program:

*DAIR user Jonathan Ferrier of Emcarta says:
“DAIR provided a fast, stable, secure, scalable, modular, and realistic testbed for us to develop, test and break our services.”*

Overview of Strategy For DAIR

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 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.

Operate the cloud platform

The aggregate number of DAIR users as of April 1, 2018 was 1080, which is up from 853 from the prior year. This number is ahead of the projection made in CANARIE's 2017-18 Annual Business Plan of having 1050 users by the end of 2017-18.

Enhance technical capabilities of the DAIR cloud infrastructure with features to help users reduce time to market

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 2017-18 improvements included software solution packages to further accelerate SMEs' time to market, and upgrades to the OpenStack platform, volume storage and new operating system choices for SMEs creating cloud instances.

Create and publish educational content related to 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, and other events such as OpenStack Days Ottawa.

CANARIE developed a series of short YouTube videos to educate SMEs on the efficient and secure use of cloud including relevant topics including DAIR Overview, Apache Setup, Security

Best Practices, CloudTracker, Linux & Windows Patching, and Volume Migration. The videos received 229 views during FY18.

Other achievements – DAIR

CANARIE carried out community consultations in 2017-18, in order to inform the next generation of the DAIR program. Trials of a new DAIR program offering are expected to take place in 2018-19 and 2019-20.

Centre of Excellence in Next Generation Networks (CENGN):

Overview of Strategy For CENGN

CANARIE is a founding partner in the Centre of Excellence in Next Generation Networks (CENGN), which is a consortium of industry (including: Juniper, Cisco, Nokia EXFO, TELUS), academic, 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 the Networks of Centres of Excellence program in 2014 and created the governance structure and technical and staff infrastructure to take on projects beginning in mid-2015.

Network connectivity and related support for CENGN test bed initiative

CANARIE continues to play a key role in this initiative as CANARIE network resources are made available to support test-bed infrastructure for new product validation and testing.

3.0 Statement of Eligible Activities for 2018-19 and for the Foreseeable Future

In 2018-19, CANARIE will continue to align its activities towards the goal of strengthening Canada's digital research infrastructure. In 2018-19, CANARIE plans to continue its focus on its three eligible activities.

1. Network Evolution:

CANARIE Network:

Deployment of additional network capacity to meet the growing traffic need

CANARIE will continue to improve the capacity, redundancy and resiliency of the CANARIE network, in order to meet the needs of Canada's research, education, and innovation communities.

Improvement of network security monitoring and measurement system

CANARIE will continue to work with the RANs on the NREN SIEM Deployment Project, to improve the security of both the CANARIE Network and the NREN. The project is expected to be completed in FY20.

Deployment of the Software Networking Pilot

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, in order to improve support for users.

Other initiatives – Network

Joint Security Project

CANARIE will wrap up the Joint Security Project, designed to strengthen the overall security of NREN-connected institutions in the short term, and to better understand potential vulnerabilities, by the end of the first quarter of FY19. A report and recommendations will be submitted to ISED in Q2 of FY19.

Cloud Services

CANARIE continues to work with 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.

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 July 2018. This meeting will cover, among other things, work on the continued evolution of global research and education network infrastructures.

NREN Program:

Execution of projects funded under Call 3

CANARIE will have contracts in place and execution underway for all approved NREN Call 3 projects, by the end of FY19.

Strategic alignment of NREN partners on the evolution of the NREN and the development and launch of projects to enhance security

CANARIE will continue to work with the RANs on the NREN SIEM Deployment Project. The project is expected to be completed in FY20.

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.

Network Services – Canadian Access Federation:

Increased adoption of CAF services, and; Increase awareness and adoption

CANARIE will continue to promote the benefits of the Canadian Access Federation – both *eduroam* and Federated Identity Management – to the research and education community.

Adapt services to evolving standards

CANARIE will trial an *eduroam* Guest Access pilot, to reduce the burden on IT administrators who provide guest access to institutional Wi-Fi networks.

Expand identity services

CANARIE will continue to investigate opportunities to extend the reach and expand the benefit of the CAF identity services, including with the private sector.

2. Technology Innovation

Research Software Program:

Maintain visits to science.canarie.ca consistent with FY18 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 2b platform contribution projects

CANARIE will have contracts in place and execution underway for all approved Call 2b platform contribution projects, with the goal of having at least one additional research team adopting each of the contributed platforms by the end of FY19. Funding is dependent on the addition of at least one new research team.

Execution of projects funded under Call 2a

CANARIE will continue execution for all approved Call 2a platform contribution projects. Funding for each project remains dependent on the addition of at least one new research team.

Financial audits of projects funded under Call 1

CANARIE will carry out financial audits of all approved Call 1 projects, before the end of FY19.

Research Data Management:

Contracts in place and execution underway for all approved projects of the Research Data Management competitive call

CANARIE will have contracts in place and execution underway for all approved research data management projects, by the end of FY19.

3. Private Sector Innovation:

DAIR Program:

Continued increase in the total number of DAIR users to 1211 by the end of FY19

CANARIE will continue to promote the DAIR program, and the benefits of cloud computing to Canadian SMEs.

New features added to the DAIR cloud infrastructure

CANARIE will launch a pilot for an extension to the DAIR program, which will encourage and support the adoption of emerging ICT technologies, such as Blockchain and machine learning, by Canadian SMEs.

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 (CENGN):

Additional participants in CENGN will be able to leverage the CANARIE network to support advanced testing and demonstration of new ICT products and services

There continues to be a robust pipeline of new projects at CENGN that will likely leverage the CANARIE network. CANARIE continues to work with partners at CENGN 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, 2018, 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
\$313,400 - \$407,400

Chief Financial Officer
Chief Technology Officer
Vice-President, Business Development
Vice-President, External Relations
\$175,500 - \$290,500

Employees

Chief Engineer
Director, Finance
Director, Research Software
Executive Director, Research Data Canada
NREN Coordination Manager
Senior Director, Technology Innovation
\$138,400 - \$230,800

Director, Communications
Manager, Cybersecurity
Senior Network Engineer
\$109,700 - \$184,500

IT Manager

Manager, Analytics
 Manager, Software Development
 Program Manager, Canadian Access Federation
 Network Engineer
 Software Developers
 Technology Architect, Canadian Access Federation
 \$102,300 - \$138,500

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 2017-18, \$106,978 was paid to the RANs in funding for the perfSONAR initiative.

In 2017-18, \$220,000 was paid to the RANs in funding for Interconnection and Co-delivery.

Table 6.1 details the RAN partners that utilized Non-Directed NREN funds in the first three years of the mandate.

Table 6.1 NREN Program – Non-Directed Funding

RAN Partner	Project Commitment (000s)	Funding (000s)			Total
		2015-16	2016-17	2017-18	
RISQ	\$1,431	-	\$456	\$367	\$823
MRnet	\$1,045	-	\$108	-	\$108
BCNET	\$1,026	-	\$225	\$748	\$973
SRNET	\$825	-	\$184	\$500	\$684
ORION	\$539	-	\$539	-	\$539
NB	\$489	-	\$348	\$14	\$362
Cybera	\$466	\$109	\$89	\$120	\$318
ACORN-NL	\$160	-	-	-	-
Total	\$5,981	\$109	\$1,949	\$1,749	\$3,807

6.2 Joint Security Project

The Joint Security Project, strengthens the overall security of NREN-connected institutions in the short term, and helps better understand potential vulnerabilities, by facilitating the development of a community of institutional security specialists to increase institutional awareness of security issues. CANARIE launched a call for proposals for institutions to deploy their existing security aggregation and visualization platform to meet the needs of the Joint Security Project. Table 6.2 details the platforms that were approved for funding under that call.

In 2017-18, \$556,340 was paid for equipment, training and travel to support the Joint Security Project.

In 2017-18, \$255,000 was paid to funded institutions to support the Joint Security Project.

Joint Security Project costs were funded through an HST refund of \$817,821 received in 2015. Costs in excess of this amount were funded through ISSED.

Table 6.2 Joint Security Project

Lead Contractor	Project Commitment (000s)	Funding (000s) 2017-18
University of Waterloo	\$113	\$113
Concordia University	\$103	\$103
McMaster University	\$85	\$49
Total	\$301	\$265

6.3 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 6.3 details the projects that were approved for funding under that call.

Table 6.3 Research Software Program – Call 1

Lead Contractor	Project Commitment (000s)	Funding (000s)		
		2016-17	2017-18	Total
CRIM	\$600	\$325	\$275	\$600
Ocean Networks Canada	\$577	\$204	\$251	\$455
Bird Studies Canada	\$558	\$209	\$282	\$491
Ouranos	\$493	\$139	\$355	\$494

University of Calgary	\$376	\$149	\$225	\$374
University of Guelph	\$92	\$53	\$39	\$92
Total	\$2,696	\$1,079	\$1,427	\$2,506

The Research Software Program launched its second funding call of the current mandate in 2017-18. Table 6.3a details the projects that were approved for funding under that call.

Table 6.3a Research Software Program – Call 2a

Lead Contractor	Project Commitment (000s)	Funding (000s) 2017-18
University of British Columbia	\$488	\$176
University of Guelph	\$456	\$139
University of Waterloo	\$440	\$106
Queen's University	\$430	\$133
University of Waterloo	\$292	\$76
Total	\$2,106	\$630

6.4 Digital Accelerator for Innovation and Research (DAIR) Program

DAIR is an integrated virtual environment that leverages the CANARIE network to enable SMEs 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 6.4 Digital Accelerator for Innovation and Research (DAIR) Program

Lead Contractor	Project Commitment (000s)	Funding (000s)			
		2015-16	2016-17	2017-18	Total
Cybera	\$1,545	\$133	\$357	\$349	\$839
Total	\$1,545	\$133	\$357	\$349	\$839

7.0 Criteria Applied to Select Eligible Projects

The published criteria used to select the projects under the programs with active funding calls in 2017-18 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 2017-18 Fiscal Year was completed in June 2018 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 2017-18. Audits are scheduled starting in Q1 of 2018-19.

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, 2018

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

	Projections	Budget (in 000s)	Variance
PROGRAM REVENUES			
Legacy – IEP	828	981	(153)
CAF Participation Fees	1,252	1,165	87
DAIR User Fees	7	8	(1)
TOTAL PROGRAM REVENUES	2,087	2,154	(67)
MATCHING FUNDS			
Research Software	178		178
NREN	5,380	4,497	883
DAIR	170	170	
TOTAL MATCHING FUNDS	5,550	4,667	883
IN-KIND CONTRIBUTIONS			
Research Software	2,127	1,665	462
TOTAL IN-KIND CONTRIBUTIONS	2,127	1,665	462
TOTAL	9,941	8,486	1,456

Appendix 7: CANARIE Inc. Financial Statements – March 31, 2018

~ attached ~

CANARIE Inc.
Financial Statements
For the year ended March 31, 2018

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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, 2018, 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, 2018, 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 21, 2018

CANARIE Inc.
Statement of Financial Position

March 31 **2018** **2017**

Assets

Current

Cash	\$ 954,602	\$ 382,434
Investments (Note 2)	9,756,142	9,973,940
Accounts and other receivable	539,702	317,929
Prepaid expenses and deposits (Note 3)	5,148,348	5,297,869
	<u>16,398,794</u>	<u>15,972,172</u>

Investments (Note 2)	391,144	-
Prepaid expenses and deposits (Note 3)	3,846,726	2,040,677
Tangible capital assets, assets under capital lease and intangible asset (Note 4)	<u>12,520,318</u>	<u>11,029,732</u>
	<u>\$ 33,156,982</u>	<u>\$ 29,042,581</u>

Liabilities and Net Assets

Current

Accounts payable and accrued liabilities (Note 5)	\$ 2,109,333	\$ 1,528,914
Deferred membership revenue	7,500	7,500
Deferred funding (Note 6)	4,759,642	6,494,519
Current portion of obligation under capital lease (Note 8)	<u>214,812</u>	<u>205,290</u>
	<u>7,091,287</u>	<u>8,236,223</u>

Deferred funding (Note 6)	4,025,302	2,004,176
Deferred capital funding (Note 7)	12,643,080	10,993,341
Obligation under capital lease (Note 8)	<u>2,714,753</u>	<u>1,353,644</u>
	<u>26,474,422</u>	<u>22,587,384</u>

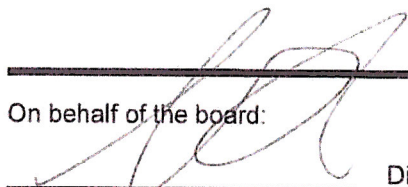
Commitments (Note 9)

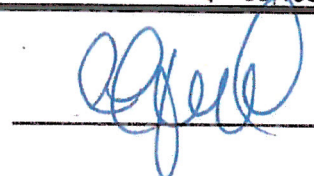
Net Assets

Unrestricted	418,699	501,858
Internally restricted royalty fund	2,341,291	2,317,729
Internally restricted for windup of operations	<u>3,922,570</u>	<u>3,635,610</u>
	<u>6,682,560</u>	<u>6,455,197</u>

\$ 33,156,982 \$ 29,042,581

On behalf of the board:

 Director

 Director

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)	2018	2017
Balance, beginning of the year	\$ 501,858	\$2,317,729	\$3,635,610	\$6,455,197	\$6,202,992
Membership	263,204	-	-	263,204	236,713
Investment income	5,102	23,562	36,960	65,624	49,452
Expenses	(101,465)	-	-	(101,465)	(33,960)
Excess of revenues over expenses	166,841	23,562	36,960	227,363	252,205
	668,699	2,341,291	3,672,570	6,682,560	6,455,197
Interfund transfers	(250,000)	-	250,000	-	-
Balance, end of the year	\$ 418,699	\$2,341,291	\$3,922,570	\$6,682,560	\$6,455,197

The notes are an integral part of these financial statements.

CANARIE Inc.
Statement of Operations

For the year ended March 31	2018	2017
Revenues		
Industry Canada / ISED funding	\$ 21,022,664	\$18,408,069
Membership	263,204	236,713
Investment income	65,624	49,452
	<hr/>	<hr/>
	21,351,492	18,694,234
Expenses (Schedule)		
Program	16,701,358	15,376,487
Operating	3,185,493	3,005,457
Corporate	101,465	33,960
Joint Security Project	1,135,813	26,125
	<hr/>	<hr/>
	21,124,129	18,442,029
Excess of revenues over expenses	<hr/>	<hr/>
	\$ 227,363	\$ 252,205

CANARIE Inc.
Schedule of Expenses

For the year ended March 31	Program	Operating	Corporate	Joint Security Project	2018 Total
Direct program	\$10,863,731	\$ -	\$ -	\$ 1,027,520	\$11,891,251
Employee and consultants	3,089,897	2,245,218	19,555	103,947	5,458,617
Marketing and promotion	242,054	88,274	51,115	1,882	383,325
Travel	203,087	73,527	-	2,407	279,021
Rent	-	337,177	-	-	337,177
General office and supplies	31,381	141,195	11,143	-	183,719
Meetings and conferences	33,210	53,582	-	-	86,792
Equipment, software and maintenance	51,093	104,415	-	57	155,565
Professional fees	-	27,662	954	-	28,616
Interest on obligation under capital lease	71,073	-	-	-	71,073
	14,585,526	3,071,050	82,767	1,135,813	18,875,156
Plus: amortization	2,115,832	114,443	18,698	-	2,248,973
	\$16,701,358	\$ 3,185,493	\$ 101,465	\$ 1,135,813	\$21,124,129

CANARIE Inc.
Schedule of Expenses

For the year ended March 31	Program	Operating	Corporate	Joint Security Project	2017 Total
Direct program	\$10,021,608	\$ -	\$ -	\$ -	\$10,021,608
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	237,316	100,467	343	59	338,185
Rent	-	302,963	-	-	302,963
General office and supplies	20,310	142,326	12,893	-	175,529
Meetings and conferences	29,968	91,298	-	-	121,266
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.
Statement of Cash Flows

For the year ended March 31

2018

2017

Cash flows from operating activities

Industry Canada / ISED funding	\$ 22,300,000	\$ 20,000,000
Membership	263,204	231,713
Program - interest	125,679	76,489
Program - user fees	248,992	239,917
Investment income - Corporate	5,102	4,343
Investment income - Royalty Fund	23,562	18,331
Investment income - Windup of Operations	36,960	26,778
Program expenses	(15,290,165)	(14,120,484)
Operating expenses	(3,272,782)	(2,802,276)
Corporate expenses	(63,211)	(21,987)
Joint Security Project expenses	(1,135,813)	(26,125)
	<u>3,241,528</u>	<u>3,626,699</u>

Cash flows from investing activities

Acquisition of tangible capital assets and intangible asset	(2,227,083)	(1,026,499)
Proceeds on disposal of tangible capital assets	150	1,020
Purchase of investments	(25,190,016)	(19,116,926)
Proceeds from disposal of investments	25,016,670	16,400,000
	<u>(2,400,279)</u>	<u>(3,742,405)</u>

Cash flows from financing activities

Repayment of obligation and interest under capital lease	(269,081)	(267,805)
--	-----------	-----------

Net increase (decrease) in cash 572,168 (383,511)

Cash, beginning of the year 382,434 765,945

Cash, end of the year \$ 954,602 \$ 382,434

CANARIE Inc.
Notes to Financial Statements

March 31, 2018

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, 2018

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, 2018

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, 2018

2. Investments

Investments consist of Canadian government treasury bills with annual yields ranging from 0.66% to 0.82% and maturities ranging from May 2018 to June 2018, short-term provincial government coupon bonds with annual yields ranging from 0.80% to 1.44% and maturities ranging from April 2018 to December 2018, short-term guaranteed investment certificates with annual yields ranging from 1.05% to 2.02% and maturities ranging from April 2018 to January 2019, and cash held in investment savings accounts with an annual yield of 1.10%.

Investments include a long-term provincial government coupon bond with a fair market value of \$391,144, with an annual yield of 1.80% and maturing June 2019.

3. Prepaid Expenses and Deposits

	<u>2018</u>	2017
Program prepayments and deposits	\$ 8,837,032	\$ 7,204,194
Operating prepayments	121,542	97,852
Rental deposit	<u>36,500</u>	<u>36,500</u>
Balance, end of the year	8,995,074	7,338,546
Current portion	<u>5,148,348</u>	<u>5,297,869</u>
Long-term portion	<u>\$ 3,846,726</u>	<u>\$ 2,040,677</u>

CANARIE Inc.
Notes to Financial Statements

March 31, 2018

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

	2018		2017	
	Cost	Accumulated Amortization	Cost	Accumulated Amortization
Computer equipment	\$ 504,312	\$ 356,820	\$ 468,033	\$ 282,749
Equipment	132,345	120,753	117,441	111,156
Leasehold improvements	464,519	434,433	464,519	413,234
Furniture	232,816	196,542	232,816	172,799
Network equipment	11,166,618	8,366,775	10,743,676	6,959,294
Fibre under capital lease	12,576,540	3,086,535	8,461,796	2,390,798
Fibre under capital lease under construction	-	-	865,703	-
Computer software	101,089	96,063	94,212	88,434
	\$25,178,239	\$12,657,921	\$21,448,196	\$10,418,464
Net book value		\$12,520,318		\$11,029,732

During the year, computer equipment with a cost of \$9,516 (2017 - \$34,483) and accumulated amortization of \$9,516 (2017 - \$34,483) was disposed and removed from the total cost and total accumulated amortization.

During the year, network equipment with a cost of \$Nil (2017 - \$147,283) and accumulated amortization of \$Nil (2017 - \$147,283) 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 \$Nil (2017 - \$64,012).

During the year, the organization acquired fibre under capital leases with a cost of \$3,232,189, with a total of \$1,559,637 being financed through the obligation under capital lease.

CANARIE Inc.
Notes to Financial Statements

March 31, 2018

5. Accounts Payable and Accrued Liabilities

	<u>2018</u>	<u>2017</u>
Accounts payable and accrued liabilities	\$ 2,069,198	\$ 1,496,943
Government remittances payable	40,135	31,971
	<u>\$ 2,109,333</u>	<u>\$ 1,528,914</u>

CANARIE Inc.
Notes to Financial Statements

March 31, 2018

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 \$57,300,000, \$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, 2018, the total cumulative expenses for the Joint Security Project are \$1,187,974. The excess of the total cumulative expenses for the Joint Security Project were funded through ISED funding.

The balance of the funds has been reflected as follows:

	<u>2018</u>	<u>2017</u>
Balance, beginning of year	\$ 8,498,695	\$ 5,503,944
Industry Canada / ISED funding received	22,300,000	20,000,000
Program - user fees	340,293	302,858
Program - interest	125,679	76,489
Program - service contracts	192,680	6,862
Direct program and operating expenses	(17,656,576)	(16,285,584)
Transfer to operating for the acquisition of tangible capital assets, assets under capital lease and intangible asset	(3,880,014)	(1,079,749)
Joint Security Project expenses	(1,135,813)	(26,125)
Balance, end of year	8,784,944	8,498,695
Current portion	4,759,642	6,494,519
Long-term portion	<u>\$ 4,025,302</u>	<u>\$ 2,004,176</u>

Deferred funding consists of the following amounts:

	<u>2018</u>	<u>2017</u>
Industry Canada / ISED funding	\$ 8,784,944	\$ 7,733,035
HST recovery	-	765,660
	<u>\$ 8,784,944</u>	<u>\$ 8,498,695</u>

CANARIE Inc.
Notes to Financial Statements

March 31, 2018

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>2018</u>	<u>2017</u>
Balance, beginning of year	\$10,993,341	\$12,009,952
Funding received related to the acquisition of tangible capital assets, assets under capital lease and intangible asset	3,880,014	1,079,749
Amortization of program and operating assets	<u>(2,230,275)</u>	<u>(2,096,360)</u>
Balance, end of year	<u>\$12,643,080</u>	<u>\$10,993,341</u>

CANARIE Inc.
Notes to Financial Statements

March 31, 2018

8. Obligation Under Capital Lease

	<u>2018</u>	<u>2017</u>
Capital lease for infeasible rights of use of fibre, 4.35%, due December 2024, payable by monthly installments of \$22,423, principal and interest.	\$ 1,369,928	\$ 1,558,934
Capital lease for infeasible rights of use of fibre, 3.50%, due April 2020, payable by one installment of \$1,672,553, principal and interest	1,559,637	-
	<u>2,929,565</u>	<u>1,558,934</u>
Less: current portion	214,812	205,290
	<u>\$ 2,714,753</u>	<u>\$ 1,353,644</u>

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

2019	\$ 269,081
2020	269,081
2021	1,941,632
2022	269,081
2023	269,081
Subsequently	<u>201,810</u>
	3,219,766
Less: interest included in minimum payments	<u>290,201</u>
	<u>\$ 2,929,565</u>

CANARIE Inc.
Notes to Financial Statements

March 31, 2018

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:

2019	\$ 334,265
2020	<u>139,277</u>
	<u>\$ 473,542</u>

As at March 31, 2018, the organization had commitments of \$7,572,133 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 \$23,562 (2017 - \$18,331). 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 \$36,960 (2017 - \$26,778). At March 31, 2018, 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, 2018

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, \$20,000,000 was received in fiscal 2017 and \$22,300,000 was received in fiscal 2018. 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.