

## INTERNATIONAL RESOURCE COORDINATION: *A CISTI PERSPECTIVE*

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### Abstract

As Canada's scientific and technical "information powerhouse," CISTI has been able to contribute significantly to the development of Canada's knowledge-based economy. CISTI has built on this reputation, sharing its resources and information services internationally. CISTI's scientific and technical information services were developed and supported within Canada, and have been benchmarked for implementation by similar organizations in other countries. This paper will provide appropriate examples of CISTI's role in the Canadian resource-sharing environment, outlining key players, the role of government, and some challenges and opportunities.

### Introduction

No organization can stand alone and be self-sufficient, particularly in fulfilling its information needs. As costs soar and budgets tighten, resource coordination is a natural phenomenon. Even before current economic challenges, cooperation and coordination has been part of the library world. As librarians and information professionals, our success is measured by our personal ability to help others. This character trait is key to our service profession.

Canada and CISTI (Canada Institute for Scientific and Technical Information) have built a reputation of resource coordination and sharing. Our culture of sharing exists before and after our role as a national organization, which implies a leadership role within Canada and an exchange role with CISTI-like organizations in other countries. This paper will describe the culture and underlying principles that have guided CISTI to achieve, develop and support resource coordination activities. CISTI-specific examples are used to illustrate these differing roles.

### CISTI

CISTI has been building its collection since 1924 and today stands as a comprehensive information source in the area of science, technology and medicine (STM). As the library of the National Research Council (NRC) of Canada, CISTI is the information source for Canada's premier national Research and Development (R&D) agency. CISTI houses leading-edge facilities, which are available to more than just the scientists and researchers of the NRC. In addition, CISTI has the mandate as the "national science library" of Canada. Finally, a third aspect of CISTI's identity is that of a publisher – in fact, CISTI is Canada's largest S & T publisher.

CISTI serves a wide client base in Canada, the United States, and many other countries. Clients include both end-users and intermediaries such as libraries. To facilitate access to this extensive STM information, CISTI's Document Delivery Service fills more than 4,000 requests a day from

clients all over the world. Investment in technology and workflow re-engineering practices ensures that 9 out of 10 orders are processed in less than 24 hours. CISTI Source, a database that provides “current awareness” access to the CISTI collection and other disciplines, either by table of contents or key word access, has integrated online ordering through CISTI Document Delivery. As a publisher, NRC Research Press is responsible for publishing 15 peer-reviewed journals plus monographs, conference proceedings and other allied publications.

To meet its mandate as information provider and publisher, CISTI is guided by its mission, “as part of NRC, to support the research and innovation communities by managing and disseminating high value STM information products and related services.” In fact, CISTI has a legislated mandate, from the Canadian government, to provide STM information to the Canadian scientific community in support of innovation.

CISTI is an information hub in the knowledge-based economy. This “knowledge infrastructure” is supported through the dissemination and use of STM information from fundamental science (researchers) to applied research (innovators). In addition, CISTI is a critical element in the national STM knowledge infrastructure. As an innovative web-based STM information service provider, CISTI has had a strong web presence since 1995. CISTI is identified as a key component of NRC’s support to the national innovation system. CISTI products for innovation include supporting industry through competitive technical intelligence, technology roadmapping, and technology forecasting. CISTI can truly be called an information powerhouse.

#### Role of government

Recent government initiatives involve a re-investment in R&D to ensure Canada is counted as one of the top 5 R&D nations by 2010. NRC’s Vision to 2006, recently released, reaffirms NRC’s commitment to be “recognized globally as a leader in the development of an innovative, knowledge-based economy for Canada.” The new technologies and business opportunities created will be the measure of success for these initiatives. The Government of Canada’s belief is that a strong innovation system is the key to economic growth and improved quality of life for Canadians.

#### Culture / Environment for resource coordination

The culture or environment necessary to achieve NRC’s Vision is also relevant for CISTI and in particular to our approach to resource coordination. Before I describe CISTI-specific examples, it is important to understand the terminology used to describe this culture or environment. The entrepreneurial culture encourages technology transfer or the spin-off of new research-based enterprises from NRC laboratories, as well as support to industry. CISTI’s innovative success is based on our “e-communication” model as applied to CISTI products and services. Integration is a key to successful resource coordination and CISTI has achieved this in various areas: within the public sector, and between the public sector and the academic institutions, as well as between international and national organizations. Partnerships between private industry and public or government institutions are another fundamental of resource coordination. To maximize the success of R&D initiatives, support is directed to technology clusters or cross-disciplinary fields in areas identified as major challenges in this new century, such as industrial competitiveness and productivity, security, global climate change, energy efficiency, a clean environment and a cost-effective, quality health system. In addition, NRC will pursue research in emerging fields

such as photonics, genomics, bio-informatics, and nanotechnology. CISTI, as the leading information resource for scientists, supports these initiatives and research.

CISTI supports public sector and academic research (integration)

CISTI's support for government research begins within our parent organization, NRC. To assist the researchers and scientists of the NRC, CISTI launched the NRC Virtual Library in 1997, which provides desktop access to library services including e-journals and databases. NRC Information Centers or NICs are located in NRC research facilities across the country to serve regional research communities. Other government research departments are served through a strategic alliance of Federal Science and Technology Libraries, which has a mandate to coordinate and eliminate duplication of resources, particularly in areas of collection development and centralized information services. CISTI entered into a special partnership with the Canadian Agricultural Library (CAL), in order to benefit from CISTI's infrastructure, particularly in Document Delivery. Both CISTI and CAL clients benefit from having access to a broader collection base.

Agreements with university library consortia for document delivery from the CISTI collection have resulted in volume discounts and efficient and consistent service levels for the universities. This example of coordination follows the "just in time versus just in case" practice of collection management. Editorial offices for NRC Research Press journals are located in universities across Canada. The support to journal editors and the peer review process ensures the dissemination of scientific and technical information, which is a cornerstone for R&D success.

Health information libraries support began in 1970, when CISTI was identified as Canada's national coordinator, as part of the National Library of Medicine's (United States) National Network of Libraries for Health. CISTI ensures access to MEDLARS, a real-time information system in the field of medicine. Although PubMed, the successor to MEDLARS, is now free on the Internet, CISTI continues to provide support training for DOCLINE (the ILL functionality of PubMed) to health libraries in academic, hospital or medical clinics across Canada. To ensure a liaison with these key stakeholders, CISTI established a Health Science Information Committee. In addition, CISTI works with Health Canada (Federal Department of Health) to develop a Canadian Health Information Network.

CISTI supports Canadian industry (entrepreneurial)

CISTI has close to 6,500 clients from Canadian industry, including Canada's largest R&D enterprises, as identified in Report on Business Magazine (July 1999). Outreach to small and medium enterprises (SMEs) through collaboration with the Industrial Research Assistance Program (IRAP) provides technology advice and innovation support. As previously mentioned, CISTI recently began development on a new series of "Products for Innovation" that will enhance information services to industry. CISTI assisted the Canadian Photonics Consortium to engage in a Photonics Technology Road Map process, designed to provide a vision for the future in this field and to identify opportunities for Canadian firms.

Science & e-communication: a new reality (innovative)

Information delivery has changed. Users are no longer dependent on traditional libraries. Alternative ways to access information mean that the information is often available 24/7 at

individual desktops. Examples include pre-print servers and e-Print archives, such as that found at the Los Alamos National Laboratory. In addition, Portals, Aggregators and Virtual Libraries provide entry points to information and functionality to manage as well as organise it.

The NRC Virtual Library is a CISTI service to NRC, facilitated through an Intranet-based Virtual Library. This technology has completed the transition from paper to desktop access to full text. Today, the NRC Virtual Library contains the full text of approximately 3,500 eJournals and 500 eBooks, which are licensed for NRC use. In addition, many databases in the NRC Virtual Library have links to full text documents. The “Recommended Resources” is a sci-tech portal of free resources and is publicly available on CISTI’s external web-site.

Typically, some of the information available electronically is fee-based and licensed to specific organizations. For example the NRC Virtual Library or the Canadian National Site Licensing Project is funded by the Canadian Foundation for Innovation to provide Canadian universities with national site licenses to access e-journals from specific publishers. Other information is made available without charge through publishers or because one or more groups have paid fees so that it can reach a wider readership. Through an agreement between the CISTI’s publishing arm and the Depository Services Program (DSP) of the Canadian government, Canadians now have free online access to the 15 scientific and technical journals published by the NRC Research Press.

#### e-Infostructure initiative

Potential loss of access to these web-based virtual resources is a crucial challenge to Canada’s information sovereignty. CISTI’s e-Infostructure initiative aims to preserve NRC’s long term access to the world’s scientific literature while creating an effective storehouse of electronic STM information at NRC. Once the infrastructure is in place, it could be made available under partnership agreements to other organizations or to create a federal digital sci-tech library. The e-infostructure consists of four main components: a network of servers, a data storage facility, advanced software, and a team of CISTI information specialists. With the establishment of the main e-infostructure server in St. John’s Newfoundland, other development / backup servers located elsewhere will be linked together via CA\*net3. The capacity of this data storage facility will be sufficient to store all STM electronic information worldwide.

#### CISTI e-Business

Currently, CISTI has a strong web presence with an interactive web-site and direct access to information services, such as a searchable library catalogue and current awareness tool, both with integrated document delivery ordering functionality. CISTI registration is also interactive from our web-site, as well as access to some online scientific journals. To fully implement a “one-stop shop”, CISTI is implementing e-business capabilities, which will migrate the CISTI web-site and associated services from a product-centric to a customer-centric model, which will include: “pay-per-view” for e-journals, instant online registration for new users to enable immediate document ordering, and access to billing information.

#### Resource Sharing: CISTI examples

The most common form of resource coordination is “Resource-sharing,” which generally refers to cooperative activities between libraries designed to maximize service while minimizing costs.

In practical terms, it is associated with obtaining documents not held in one's own collection, which covers the spectrum from informal exchange agreements, through interlibrary loan, to commercial document supply services. CISTI, a recognized leader in interlibrary loan and document supply activities both in Canada and internationally, is also a key player in resource-sharing in Canada. CISTI and the National Library of Canada (NLC) have different and complementary roles in Canadian resource-sharing. The NLC has a central role in the development of policy and standards. For example, it has taken the leading role in the evolution and adoption of the ISO ILL Protocol worldwide. NLC has also created a Resource Sharing Review Working Group, of which CISTI is a member. This is a forum to tackle obstacles to resource sharing and encourages regional and consortium activities.

CISTI has taken a much more pragmatic role, exploiting technology in order to further the goals of resource-sharing in Canada. CISTI has been automating its activities for over thirty years. In the early 1960's, the first computer-based Union List of Scientific Serials in Canadian Libraries was produced using punched cards. This annual publication, CISTI's earliest contribution to resource sharing in Canada, became a staple in Canadian libraries, and the database formed CISTI's contribution to the National Library's Union Catalogue and to Romulus, a CD-ROM product. To leapfrog over other CISTI automation successes to the present day, the IntelliDoc system is the enabler for many of CISTI's resource-sharing activities, and represents the automation of the entire Document Delivery Service at CISTI (MacKeigan and Katz, 1995). Key tasks performed by IntelliDoc begin with order tracking throughout the entire process. Other tasks include electronic document ordering an automated call numbering routine, which automatically matches incoming orders against the CISTI catalogue to obtain the LC call number, the CISTI shelf location. Scanning workstations enable delivery options by fax, Ariel or courier delivery of hard copy. Finally, MIS functions provide copyright tracking, invoicing and statistical reports.

CISTI Source, another resource-sharing system, is a comprehensive, cost effective, fully integrated current awareness and document delivery service. This citation database includes article level access to CISTI's catalogue plus other disciplines, dating back to 1993. Document ordering requires fewer keystrokes. Searching and alerting by key word or table of contents provides current awareness functionality. Links to full-text facilitates "portal" functionality to an institution's e-resources. Institutional subscribers can customize the CISTI Source interface, and tailor the document-ordering features to meet end-user unmediated ordering requirements such as: local holdings blocking, limiting the dollar value of orders, or permitting only a certain service level of transactions.

The ISO ILL Protocol (defined by ISO standards 10160 and 10161-1), a major tool that facilitates resource-sharing via the Internet, has been implemented at CISTI. The National Library of Canada has taken a leading role in implementing, promoting and supporting the protocol for many years (Shuh, 1998). CISTI joined IPIG, an international group committed to the implementation of the protocol.

Consortia, particularly amongst university libraries, are formed to help them achieve economies of scale in document ordering, site licensing and other library services. CISTI works with all the regional university consortia in Canada to meet each consortium's unique needs. CISTI's

systems are delivered on platforms that are easily adaptable to meet these unique needs, from mediated ordering to end-user unmediated ordering and delivery.

CISTI is an active participant in OCLC, an international utility that supports collection management and resource sharing worldwide, and is de facto the world's largest library consortium. At the core of all of its integrated services is WorldCat, the OCLC online catalogue, containing records contributed by libraries of all types from around the world. OCLC Interlibrary Loan lets libraries borrow and lend through an online network of participating libraries, and the OCLC ILL Fee Management (IFM) service helps libraries significantly reduce administrative costs by tracking and reconciling ILL charges for both loans and copies, through their OCLC bills. CISTI's catalogue is loaded in the OCLC catalogue, and CISTI is the largest document supplier (supplier code CAI) in the OCLC network as well as the largest-volume IFM lender. CISTI's use and support of IFM has encouraged its adoption by other libraries worldwide.

### Challenges and Opportunities

To continue CISTI's resource coordination and resource sharing role, CISTI must extend and assure access to STM information, both print & electronic, for Canadians and outside Canada. Improvement to resource sharing systems and content acquisition from content providers will maximize use of these resources and protect Canadian information sovereignty. Consortia negotiations with content providers should reduce costs for STM libraries. The challenge is to sustain and grow CISTI's collection, a national STM information resource that provides university libraries with access to journals they do not carry, whether they have cancelled them or never held them. Barriers, such as rising costs of journals and other publications and integrating new formats such as full-text journals and e-books, have to be overcome. Through exploitation of new functionality such as e-commerce for pay-per-view access, new linking search software, desktop delivery and dynamic linking, users will be able to access their desired documents more efficiently and with more flexibility than available currently. With the inundation of information available via the Internet, users will appreciate validated information selected by information specialists. To eliminate delays in the publication process and to enhance scientific communication, it is necessary to adopt electronic peer review and publication systems.

To support innovation in Canada, one needs to support the move from Canada's traditional resource-based economy to a knowledge-based economy. To foster innovation, CISTI must provide more competitive technical intelligence, technology roadmapping, and technology forecasting in order to support better decision making and strategic planning for organizations, including government, companies, and particular SMEs. By developing collaborations and alliances, one has the resources to ensure that innovation is recognized globally in order to further benefit Canadian industry, which can then be shared by other nations.

CISTI is well placed to bridge the innovation gap. CISTI's role in the innovation system is that of a "knowledge agent", bringing the latest information from around the world to Canadian researchers and innovators. The term "knowledge agent" represents CISTI's new direction. CISTI must create new products and services that respond to the changing needs of researchers and innovators. CISTI must be present when and where a researcher or innovator needs us,

whether in person, via the web, or at their workplace. Through resource coordination facilitated by partnerships and alliances, CISTI can meet and conquer these challenges.

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