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Institute for Information Technology

The National Research Council in New Brunswick

7 October 2008

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Senior Researcher

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NRC Goals

Our Vision:

To be valued as the world's best national organization for research and innovation

Strategic Outcome:

To provide integrated science and technology solutions in areas of critical importance to Canada

Goal 1:

To contribute to the global competitiveness of Canadian industry in key sectors and to the economic viability of communities

- Industry Sectors
- Community Innovation

Goal 2:

To make significant contributions to Canada's priorities – areas critical to Canada's future

- Environment
- Health & Wellness
- Sustainable Energy

Goal 3:

To strengthen Canada's innovation system

- Mandated Activities
- National Facilities

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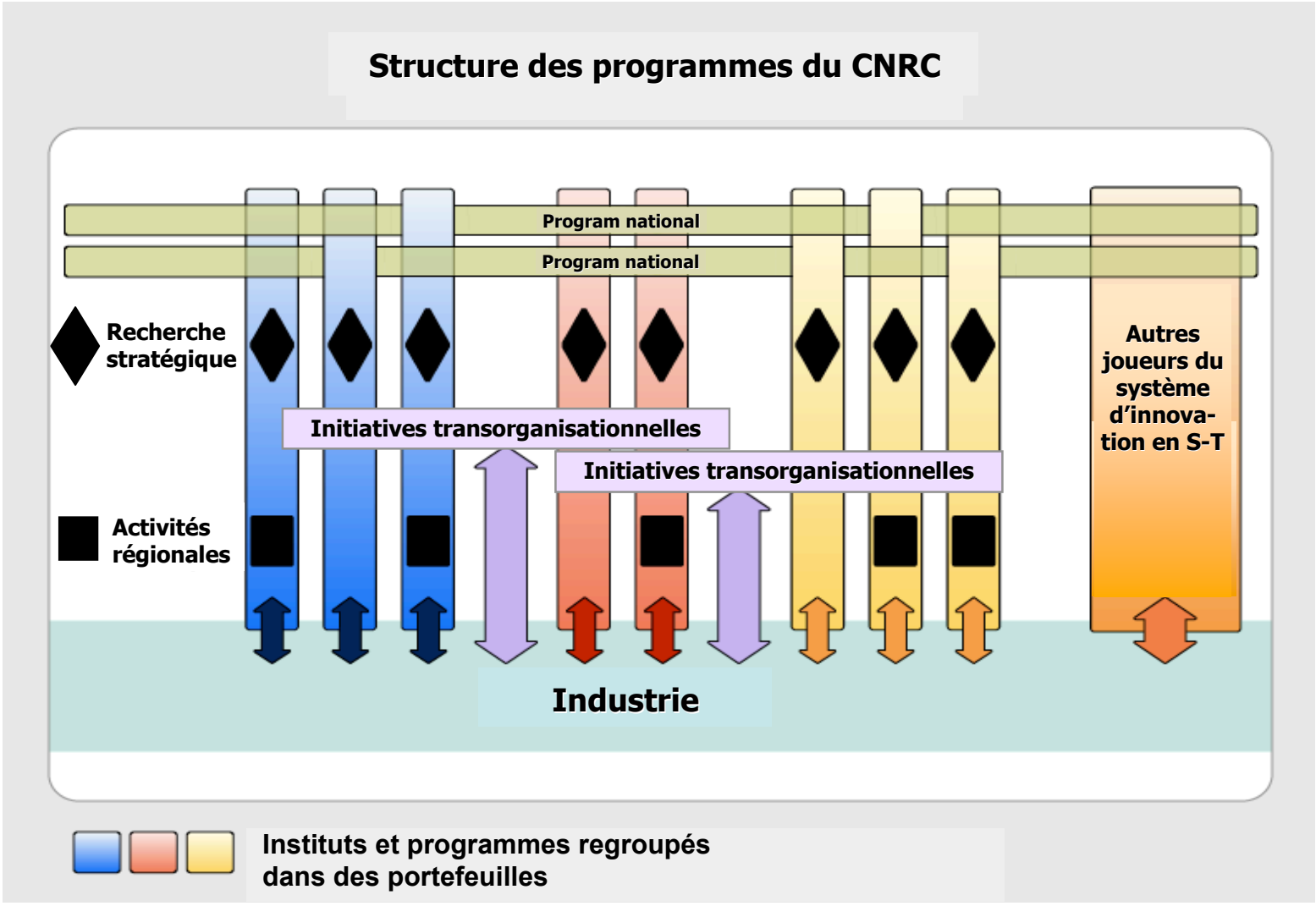
Structure des programmes du CNRC



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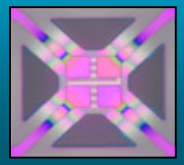
Neuf secteurs clés

Aérospatiale

Instruments électroniques



Agriculture

Critères de sélection

- **Importance pour l'économie canadienne**
- **Dépendant de la recherche**
- **Secteurs dans lesquels le CNRC peut apporter une contribution importante**

Information et communication

Automobile

Construction

Produits chimiques

Bio-pharmaceutique

Fabrication et matériaux

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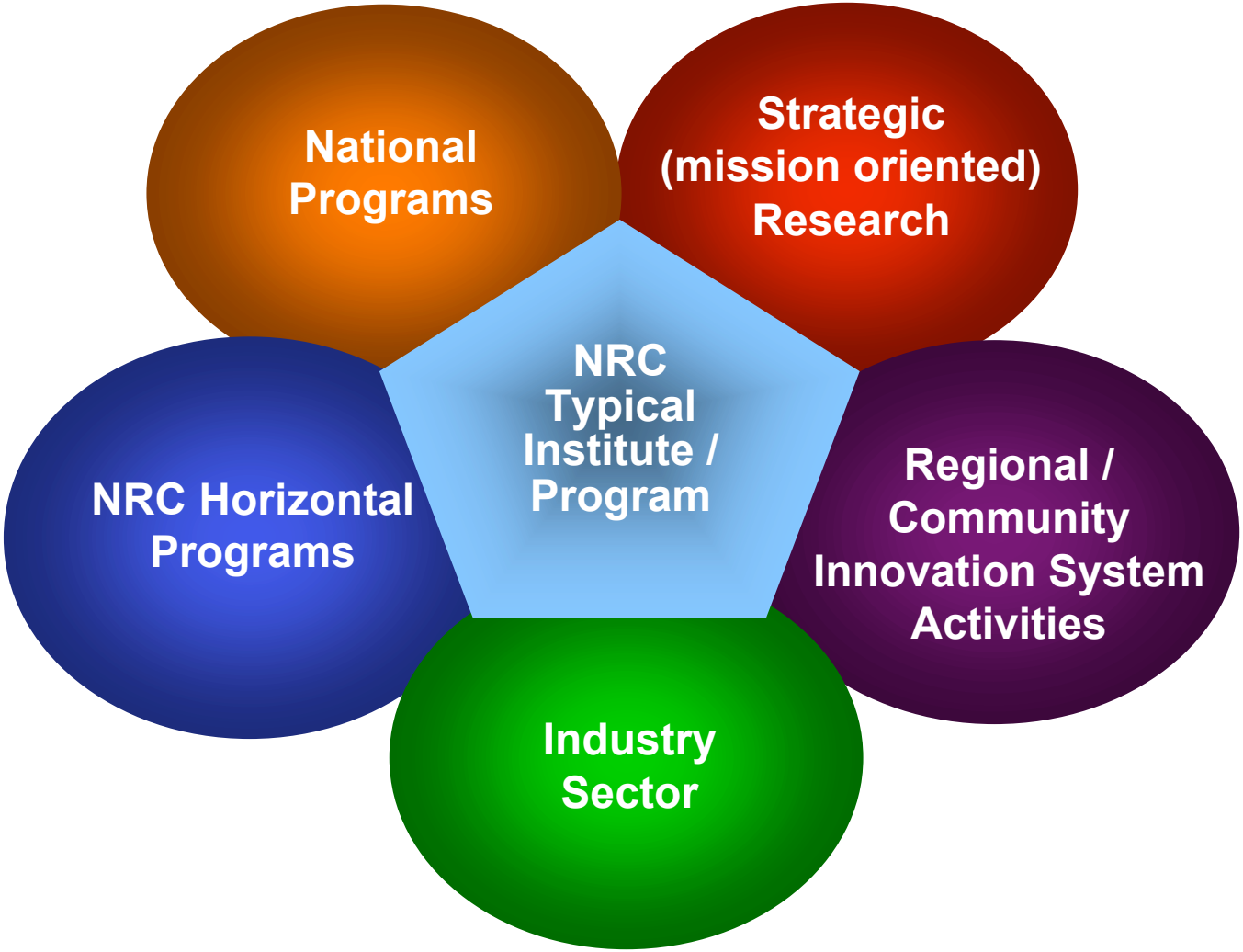
NRC Institute / Program Structure



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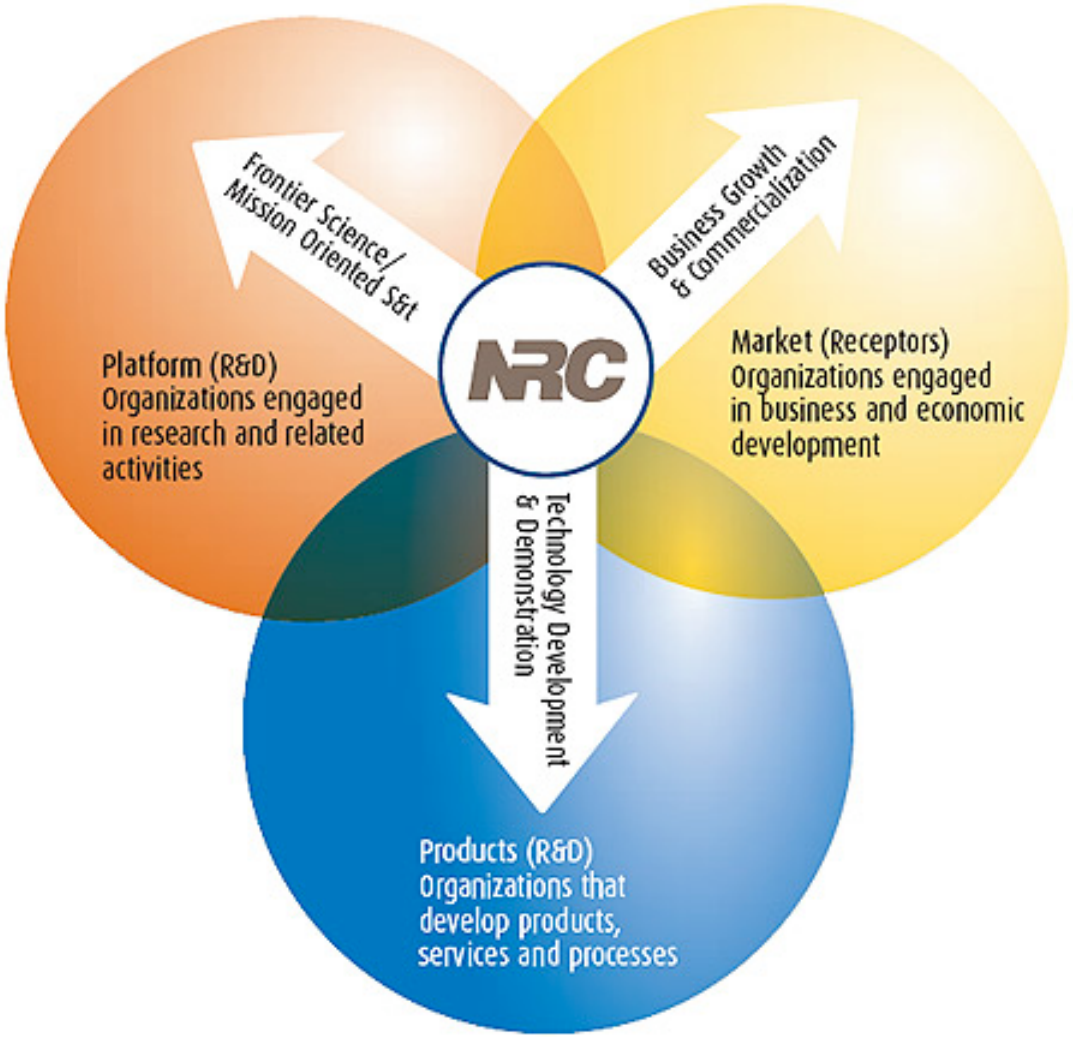
Putting Science to Work

NRC's collaborative activities help create market solutions that sustain our quality of life and contribute to the competitiveness of Canadian industry.



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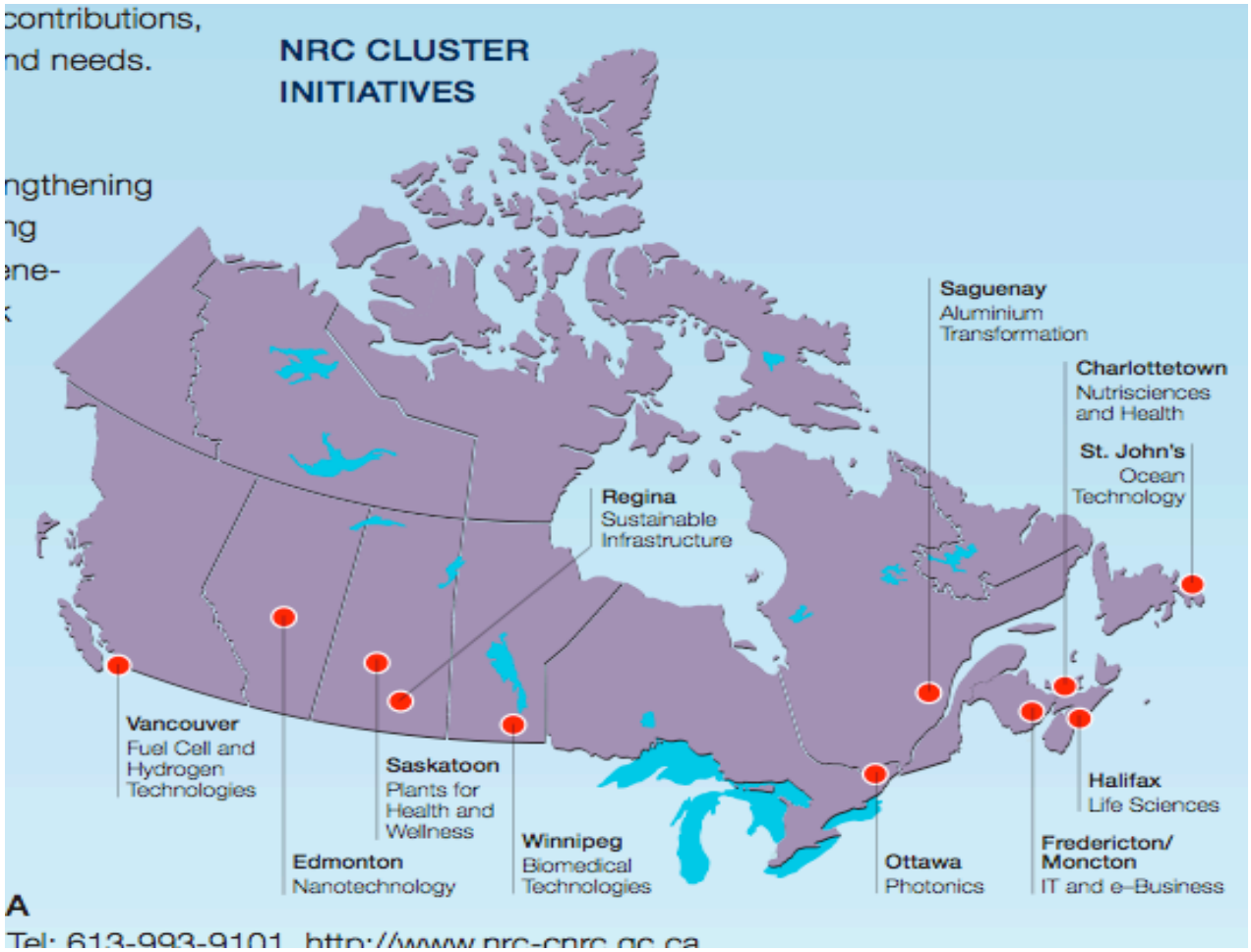
NRC Clusters



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NB Cluster: Information Tchnology

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NRC-IIT's presence in Canada

Over 276 Highly Qualified Personnel*
Located in 3 Provinces, four cities and co-located with 3 universities
Engaged in 2 cluster strategies

58% of our budget is dedicated to the 2 Cluster strategies**

e-Business Cluster
(New Brunswick)

UNB UNIVERSITY OF NEW BRUNSWICK

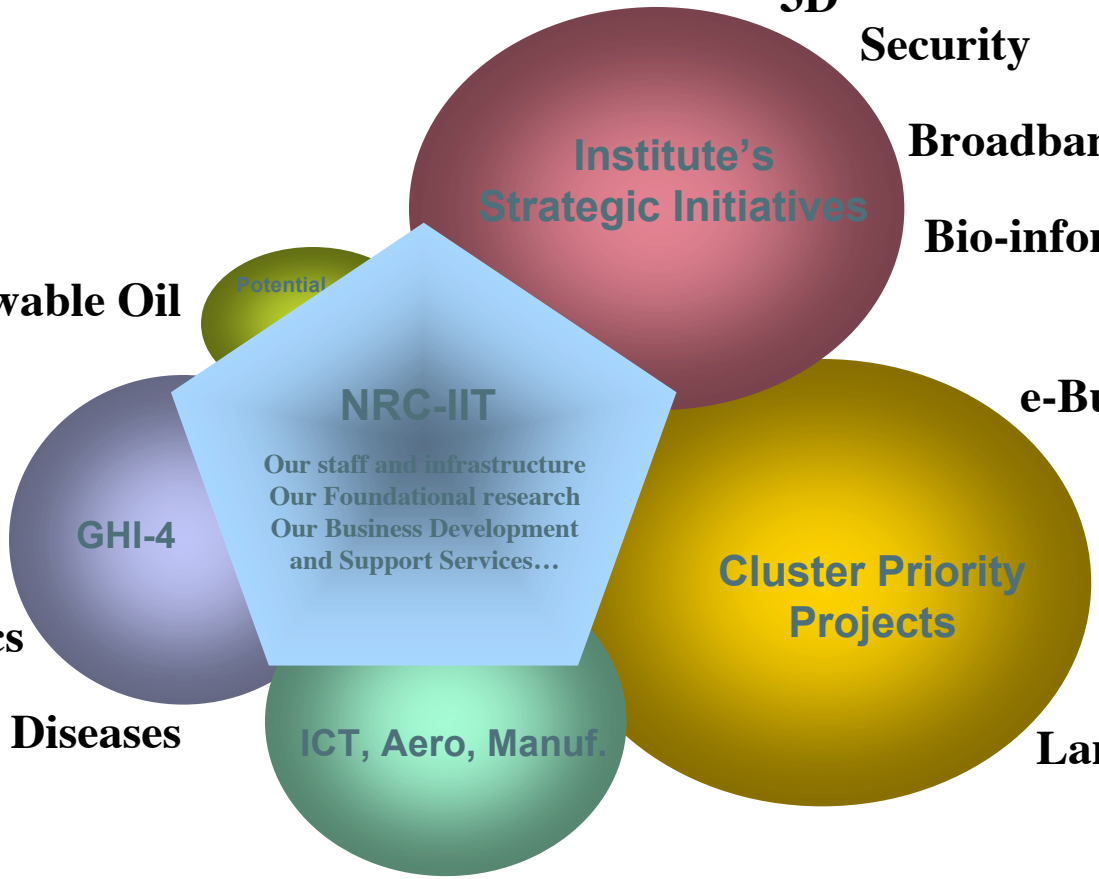
UNIVERSITÉ DE MONCTON
EDMUNDSTON MONCTON SHIPPAGAN

Language Technologies Cluster
(Québec)

Université du Québec en Outaouais

IT Research
(Ontario)

NRC-IIT Structure /Programs



3D

Security

Broadband

Bio-informatics

Brassica Seed Biorenewable Oil

e-Business

-Health
-Security
-Training

Surgical Oncology

Cancer Genomics

Grafts for Cerebrovascular Diseases

Language

-Translation
-Authoring
-Content Mgt

Digital Human Modeling

Integration and interoperability in Health and Wireless

Text Mining of Medical Records

Integrate different modes of interaction (speech, gesture, keyboard, stylus)

NB Cluster Highlights

2000 NRC announces New Brunswick site for e-business cluster
2001 NRC convenes Moncton roundtable to establish research agenda for New Brunswick initiative
2003 Official opening of NRC Fredericton labs
2004 $11 million NB/PEI research grid unveiled
2004 NRC opens its industry partnership facility in Fredericton
2007 NRC's RACOFI technology underlies Bell Canada's new independent music site, indiscover.net
2007 Desire2Learn announces opening of Moncton office
2007 NRC wins Gold Award of Excellence in Innovation at Canadian Information Productivity Awards

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@ NRC-IIT? efficient learning and training

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LCT Research

Broad R&D areas

Two main research foci

- Technologies to reduce development time for creating “learning resources”
  - How do we create better learning resources more efficiently?
  - i.e. development process improvements
- Technologies (and resources) to enhance learning outcomes
  - What is needed to make learning more efficient?
  - i.e. making content clear, usable and engaging

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SynergiC^3

A collaborative effort with industry and academia

- A software framework
  - "eLearning productivity enhancement framework" to allow collaboration and consistent development
- A collaborative effort
  - D2L: Expertise in LCMS, LMS, Commercialization
  - U de M: Expertise in "learning content" creation process
  - NRC: Several R&D areas
    - DDRM, MD extraction, Learning Design, Weak Workflows, …
  - ACOA: AIF financing ($3M for a $5.5M project)
- Some drivers
  - D2L: Market demands, commercialisation channels
  - Complementary expertise –> Common goal, Varied objectives

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SynergiC^3

Research scope and elements

- Scope
  - DDRM
    - Distributed Digital Rights Management
  - MDX
    - Automated Metadata eXtraction
  - LD | ID Accelerators
    - Learning | Instructional Design Accelerators
  - WWF | PA
    - Weak WorkFlows | Product Accelerators
- Out of Scope (examples)
  - Distributed LOR Network (DLORN)
  - Work Opportunity Billboard

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LCT Research

Other initiatives

- IRET | LCT (Immersive Reflexive Engagement Trainer: DnD)
  - Combat training for soldiers for urban operations
    - currently done in live outside simulations
  - LCT role
    - Interactive learning technologies for combat training simulation
      - Multiple laser tracking functionality, Cognitive modeling for system design, HCI, User-centered design
- CEALT
  - Center of Excellence in Advanced Learning and Technologies
    - “intended to provide leadership and facilitate strategic partnerships to leverage funding for advanced learning technologies R&D, facilitate knowledge transfer, build research capacity and foster innovation in advanced learning”

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@ NRC-IIT? efficient interactions

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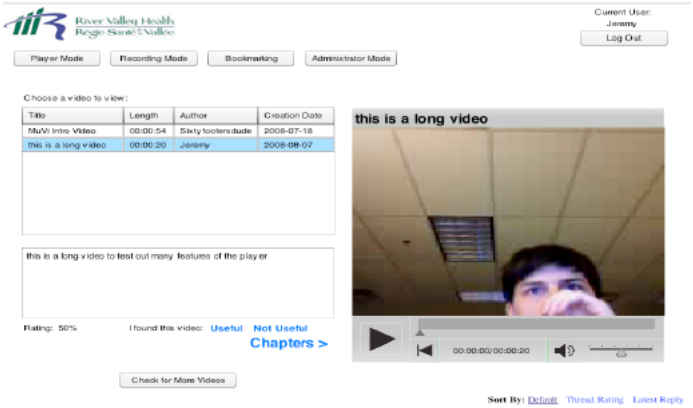
Technologies for remote collaboration

- BVC-SI (Broadband Visual Communications Strategic Initiative)
  - Research activities in Fredericton, Moncton and Ottawa linked by 3-site co-laboratory
  - Rich visual interaction technologies (video) for distributed health and learning organizations

- Peer-Generated Video: *creating innovative tools for remote interaction*
  - Remote collaboration and information sharing by video in distributed health organizations
  - Rich video content created by peers for peers, promotes interactive learning among distant locations



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Technologies for remote collaboration

- BVCam (Broadband Virtual Camera): *computer cluster for remote video recording using H.323 telecommunications protocol*
  - Recording multiple videoconferences and video clips using existing network infrastructure
  - Successfully implemented for collaborative learning in Virtual Classroom project linking high-school students real-time in 6 locations, 4 time zones across Canada
- VideoCom (northern, remote, rural, Aboriginal communities): *identifying innovation for improved communication*
  - Empirical and participatory research with remote and northern communities using video communications
  - Identifying innovative use of technology for remote collaboration, social and sustainable development of remote and northern communities

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Technologies for remote collaboration

- Social Analysis of Broadband Visual Communication: *improving technologies for remote collaboration*
  - Research for more efficient multi-site videoconferences for health administrators in rural and remote communities
  - Analysis of ICT for mental health services to clients in remote locations across Atlantic region
  - Video tool for disseminating best practices for multi-site videoconferencing in rural and remote locations (community health clinics, rural hospitals)

Download useful NRC-IIT publication:
Good Practice Guidelines for Participatory Multi-Site Videoconferencing
http://iit-iti.nrc-cnrc.gc.ca/publications/nrc-49869_e.html

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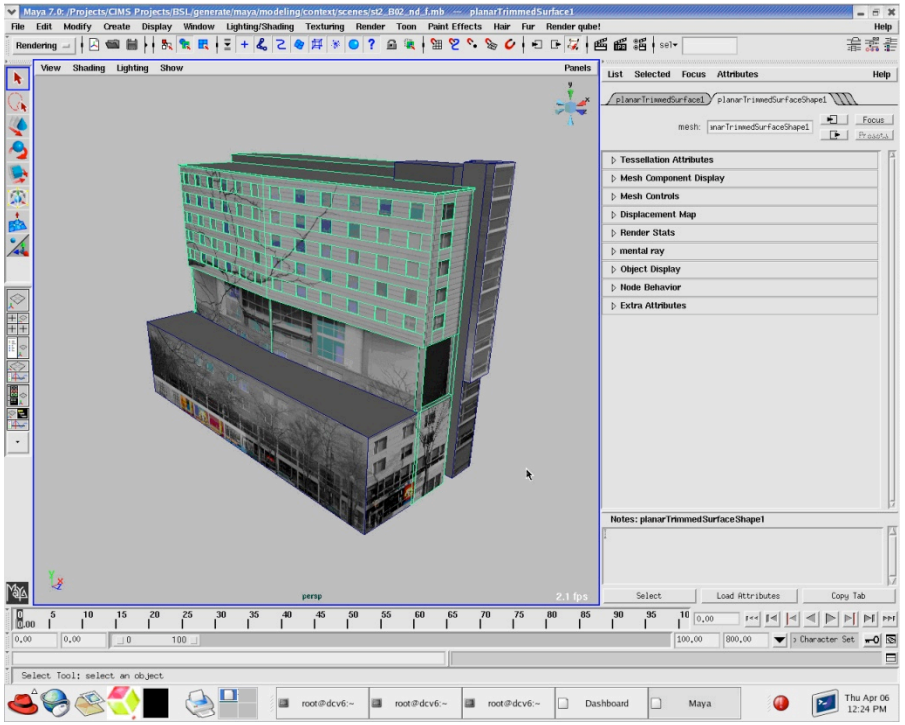
@ NRC-IIT? efficient software systems



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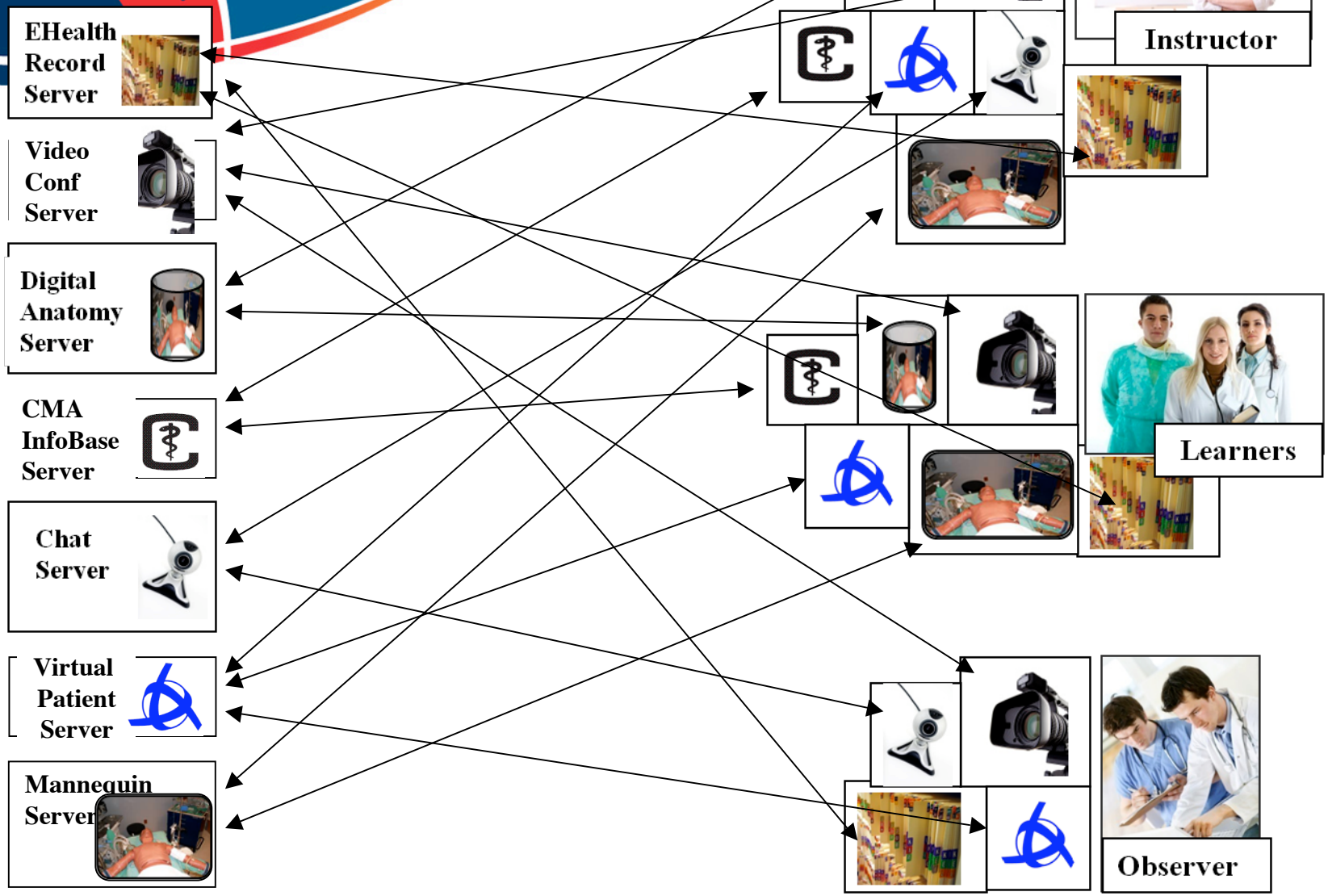
Health Services Virtual Organization (HSVO) - Mission

- A sustainable research platform for experimental development of shared ICT-based health services
- **a focused collection of functioning services supporting**
  - patient treatment planning
  - team & individual preparedness
    - in the operating room,
    - emergency room,
    - general practice clinics,
    - patients' bedsides
- **a growing Virtual Organization**
  - **utilizes and contributes to expansion of the platform and services.**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EHealth Record Server
Video Conf Server
Digital Anatomy Server
CMA InfoBase Server
Chat Server
Virtual Patient Server
Manneguin Server
Instructor
Learners
Observer

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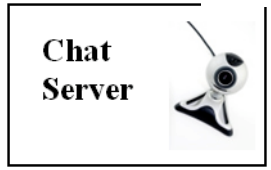
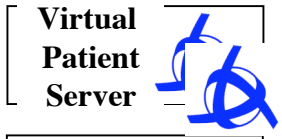
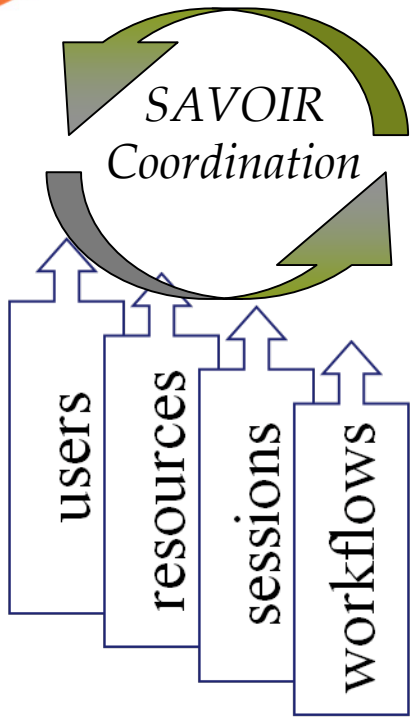
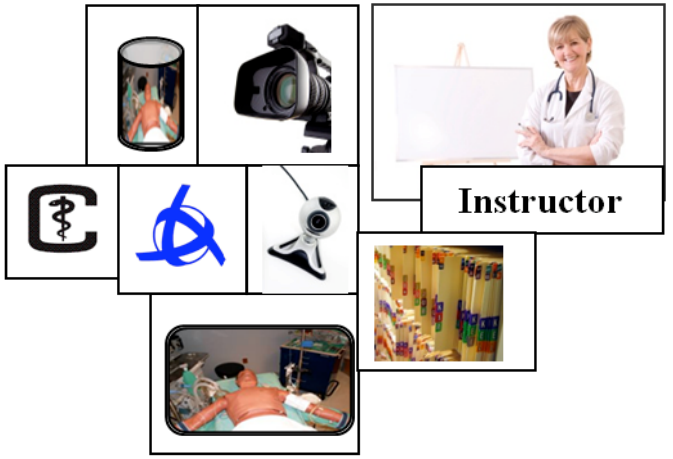






- **Authenticates users**
  Permissions
- **Invokes resources**
  Policies
- **Sessions**
  Scripts, scheduled
- **Workflows**
  Monitor, failback



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Mannequin control environment

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Our Results

- The user selects resources and people, then presses go
  - Integrating legacy systems
  - Wrap tools as services
  - User can create, share and install new services on demand
  - Solved!
- An optical network is just another resource
  - Lightpaths from CRC: dedicated wavelength
    - multi Gbps, no jitter
  - Solved!
- 2007 ORION Discovery award (Eucalyptus)
- Canarie
  - CIIP Project ($1.2M completed 2006)
  - NEP Project ($2M Sept 2008-Aug 2010)

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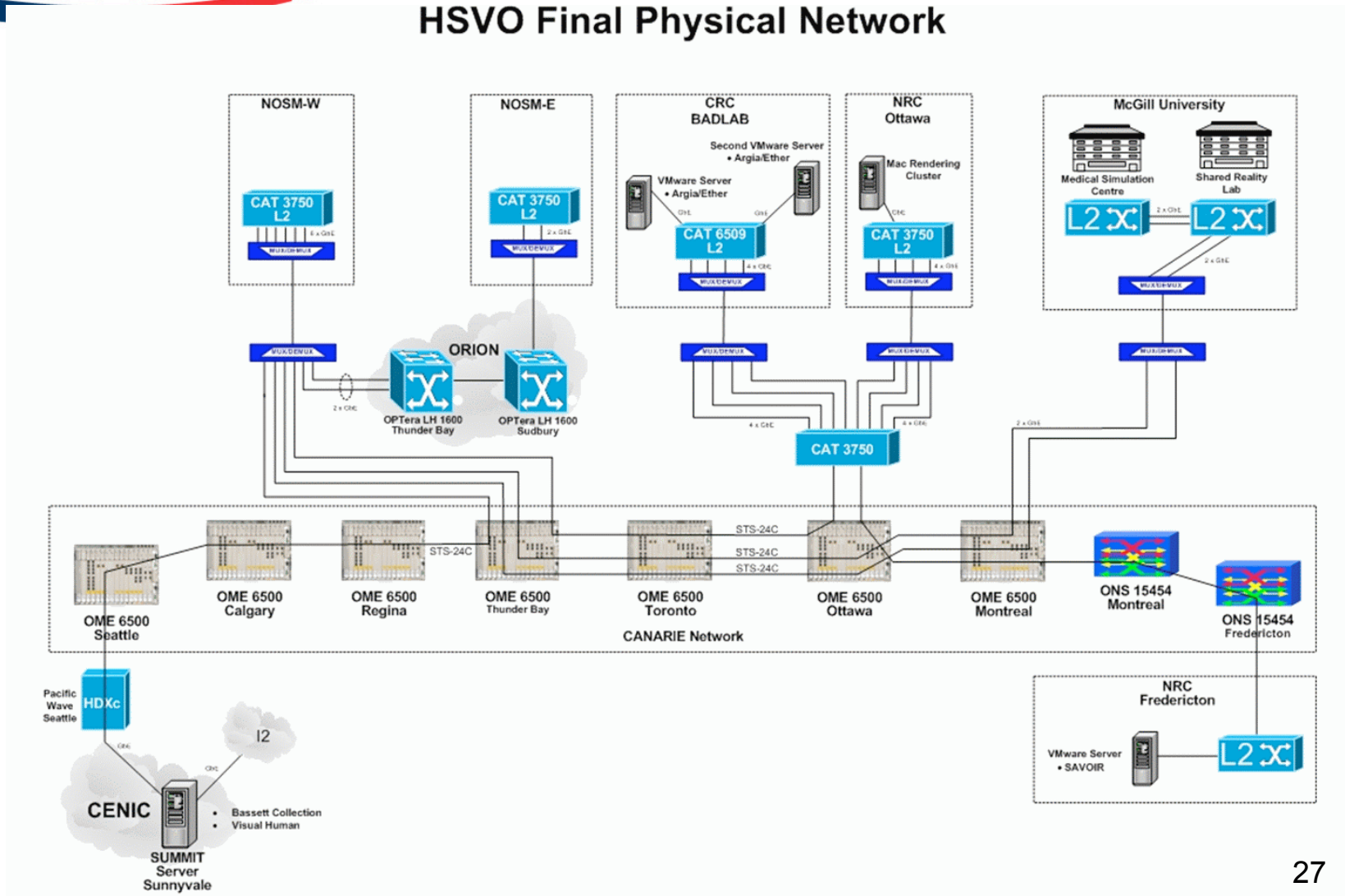
HSVO Network



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HSVO Impacts

- Health Services Virtual Organization
  - Rich media changes how we do medical training and consultations
    - Virtual patients, standard data images, 3-D data sets, mannequins
  - Virtual cadaveric dissection reduces the need for donations
    - Camera arrays so each participant can control own zoom/pan/tilt
  - Medical training and services delivered to remote centers
    - high definition, jitter free media
  - Forming Virtual organizations with multidisciplinary talents
    - Members can share own resources back to the community

"Intelligent" SOA allows the team to more freely participate in creative activity. Given this emerging paradigm of work, we must also re-think the fundamental nature of participation.

-- Michael Jemtrud, Eucalyptus project, 2007


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