



LASSONDE



UNIVERSITÉ LAVAL



uOttawa



CIDCO

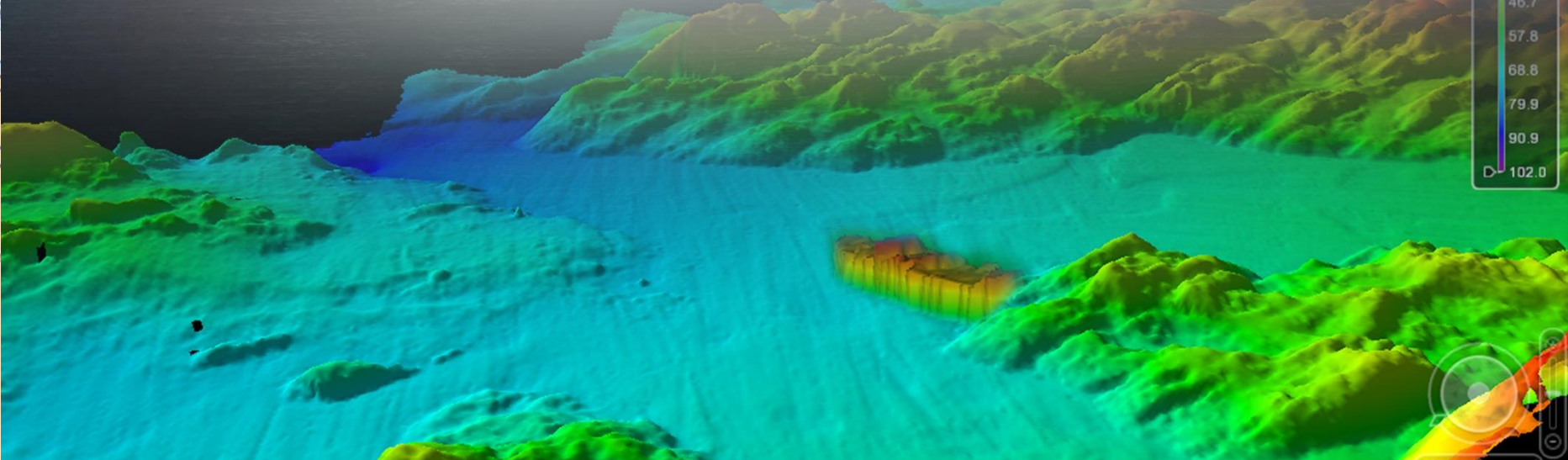
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COMREN

CANADIAN OCEAN MAPPING RESEARCH EDUCATION NETWORK



Mission of the Network

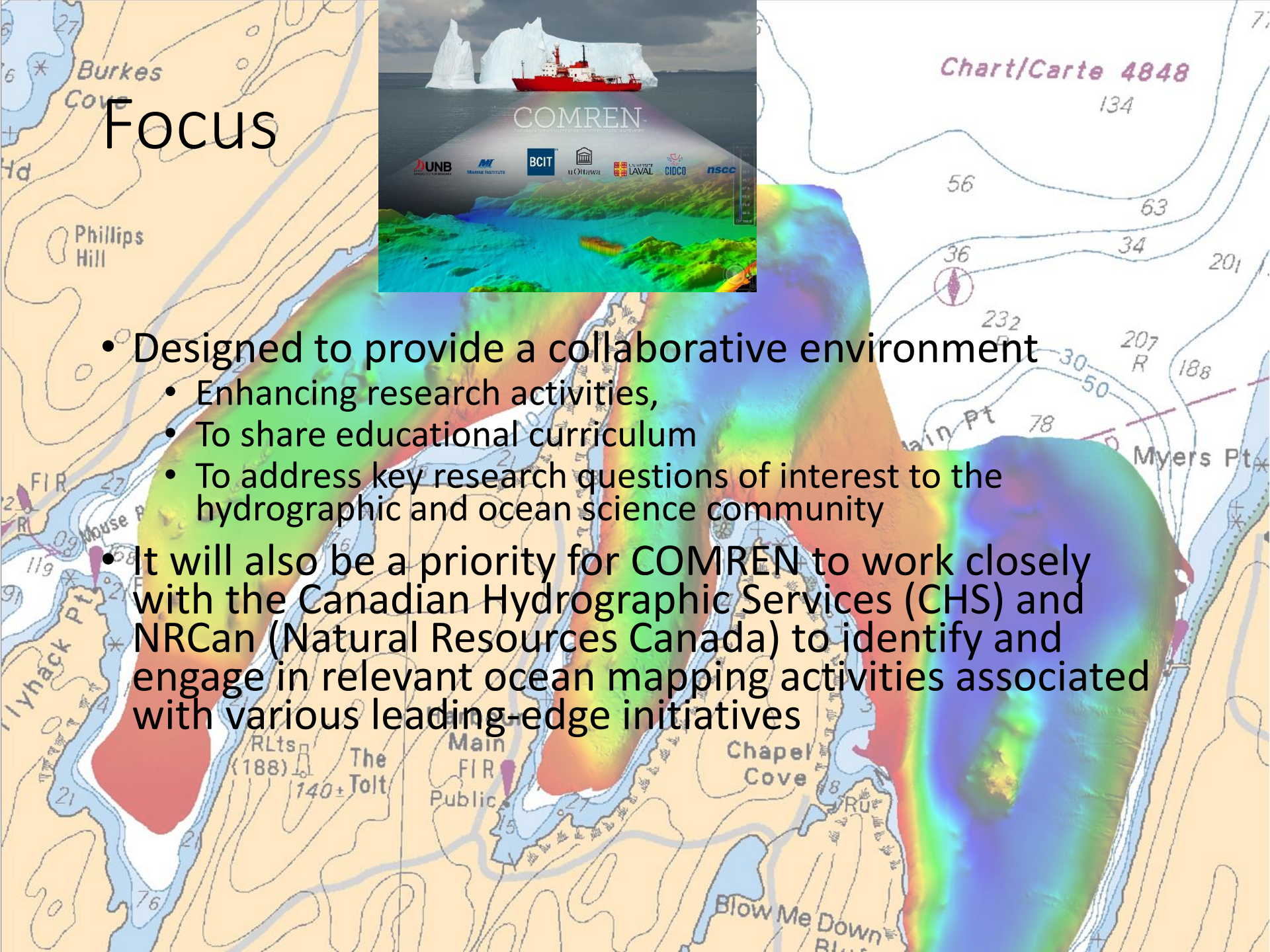
- The purpose of the COMREN is to
 - Develop research activities,
 - Achieve technology transfer to the Industry,
 - Develop and run educational programs,
 - in liaison with government agencies, increase Canada's capacity in research and education in Ocean Mapping.
- This includes opportunities for High Qualified Personnel (HQP) to develop their capacity in, and specialized knowledge of, ocean mapping.



Focus

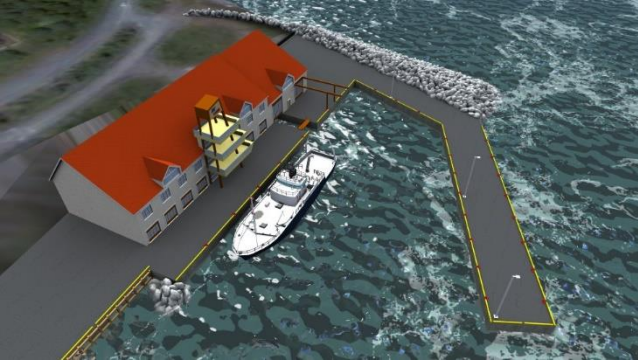


- Designed to provide a collaborative environment
 - Enhancing research activities,
 - To share educational curriculum
 - To address key research questions of interest to the hydrographic and ocean science community
- It will also be a priority for COMREN to work closely with the Canadian Hydrographic Services (CHS) and NRCan (Natural Resources Canada) to identify and engage in relevant ocean mapping activities associated with various leading-edge initiatives



Who are the members of COMREN and what are their capabilities?





Fisheries and Marine Institute of Memorial University

School of Ocean Technology



Research Interest

- Ocean Mapping
- Fisheries Acoustic
- GIS
- Remote Sensing
- Geodesy
- Big Data

Education

- Diploma (Ocean Mapping)/Bachelor of Technology IHO/FIG Cat B recognized.
- Master of Technology Management Eng.
- Graduate Diploma in Ocean Mapping Under development

Equipment

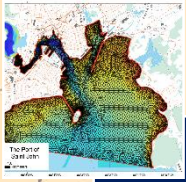
- MV Enquisitor
- Multibeam sonar – Kongsberg EM710
- Sub-bottom profiler – Knudsen 4 channel CHIRP
- Sidescan sonar – Klein 3000 (100/500kHz)
- Scanning LIDAR – Dynascan M250
- Moving Vessel Profiler – Rolls Royce MVP200
- Deck equipment:
 - Oceanographic winch (1,000kg pull)

University of New Brunswick

Department of Geodesy and Geomatics Engineering

Ocean Mapping Group

Ian Church



Research

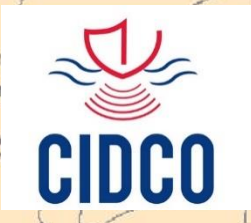
- Ocean Mapping
- Numerical Hydrodynamic Modelling Applications
- GNSS
- GIS
- Remote Sensing
- Geodesy
- Big Data

Educational Capacity

- Bachelor of Science in Geomatics Eng.
- Bachelor of Geomatics
- Master of Eng.
- Master of Science in Eng.
- Doctor of Philosophy

Equipment

- CSL Heron
- EM710
- Mesotech M3
- EM3002
- 2 x MVP30
- Applanix POSMv
- Coda F185
- GNSS Systems
- Trimble TX5 3D Laser Scanner



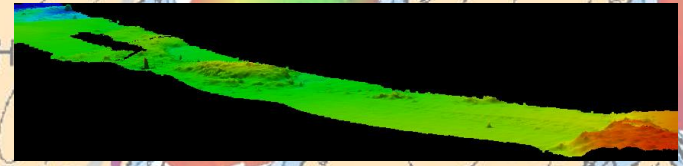
Centre Interdisciplinaire pour le Développement de la Cartographie des Océans, Rimouski, Québec

CIDCO is a non for profit organization which activity is devoted to Research, Education and Technology Transfert.

Research topics and expertise:

- Advanced MBES data processing
- Automatic calibration of MBES and mobile LiDAR systems
- Automatic methods for MBES QA/QC and performance analysis
- Autonomous Survey systems
- Special works in Hydrography

CIDCO Course in **Hydrographic surveying**: IHO recognized Category B course, partially in e-learning



CIDCO

FIG/DIC/ICA International Board on Standards of Competence for Hydrographic Surveyors and Nautical Cartographers - IFRSC

CERTIFICATE OF RECOGNITION

BCIT – School of Construction & Environment – Geomatics Department

The BCIT logo consists of the letters "BCIT" in a bold, white, sans-serif font, centered within a dark blue square. The square has a small "TM" trademark symbol in the top right corner.

BCIT™

Educational Capacity

Geomatics Department is geared towards preparing students for entry into Land Surveying Profession

Diploma (2yrs) in Geomatics Engineering Technology (50 students per cohort)

Degree (+2yrs) (w/ prior diploma) in Geomatics - Bachelor of Technology (20 students per cohort)

Aligned with CBEPS Curriculum (Canadian Board of Examiners for Professional Surveyors)

upon graduation students attain 11/13 CBEPS "Certificates of Completion", allowing them to articulate as an LST

Hydrographic Equipment (in storage sigh)

We currently do not have a institute vessel (engine failed in 2014)

Knudsen 320BP Dual Frequency Single Echo-Sounder

Imagenex Sportscan SideScan Sonar

Valeport Tide Gauge

ODOM DigiBar SVP

Educations Site Licenses of

CARIS HIPS/SIPS - LOTS

Terrascan LiDAR Tools - TSCAN/TMODEL software (BathyLiDAR compatible or Vessel Mounted Lidar)

Nova Scotia Community College



Applied Research

Research Capacity - Two research groups at NSCC with a focus on ocean mapping:

Applied Oceans Research Group (AORG): Dr. Craig Brown, NSERC Industrial Research Chair in Integrated Ocean Mapping Technologies

- Offshore mapping using integrated approaches and tools
- Multibeam sonar – bathymetry, backscatter and water column collection and analysis
- Ground-truthing technologies – technology development (e.g. sensors and platforms)
- Autonomous platforms (ASVs/AUVs)
- Geological, Benthic Habitat and Fisheries Resource Mapping: development and testing of GIS tools and methods

Applied Oceans Research Group (AGRG): Dr. Tim Webster, Research Scientist

- Coastal Mapping
- Bathymetric LIDAR, areal imagery, shallow subtidal (multibeam)
- Coastal oceanography
- Various applications of technologies for coastal zone mapping.
- UAVs

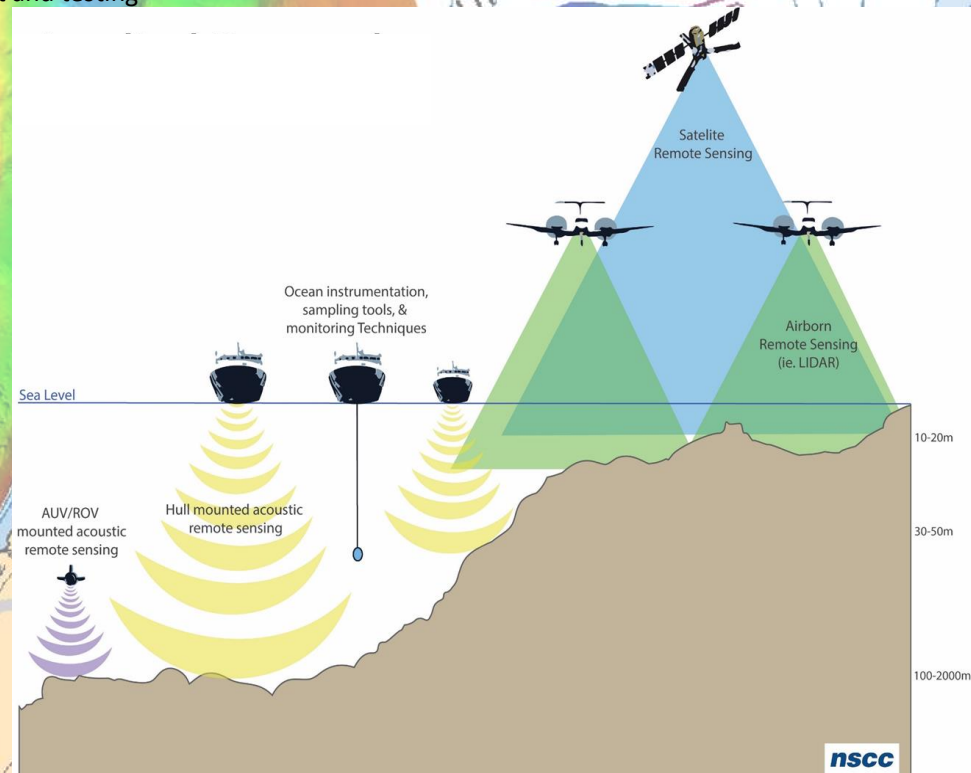
Educational Capacity :

Certificates, Diplomas and Advanced Diplomas in numerous related fields: e.g

- Marine Geomatics
- Remote Sensing
- Ocean Technology
- GIS
- MSc Applied Geomatics (joint with Acadia University)

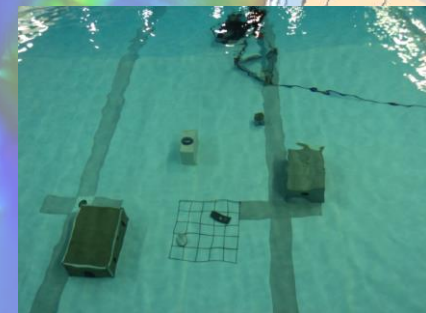
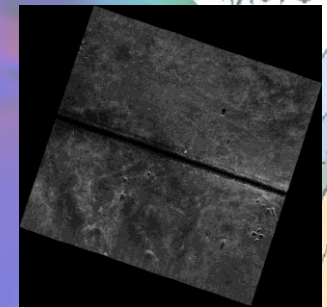
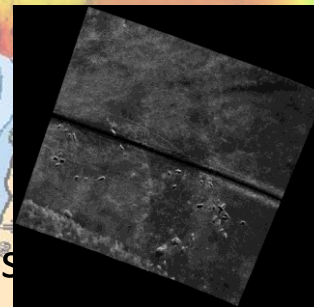
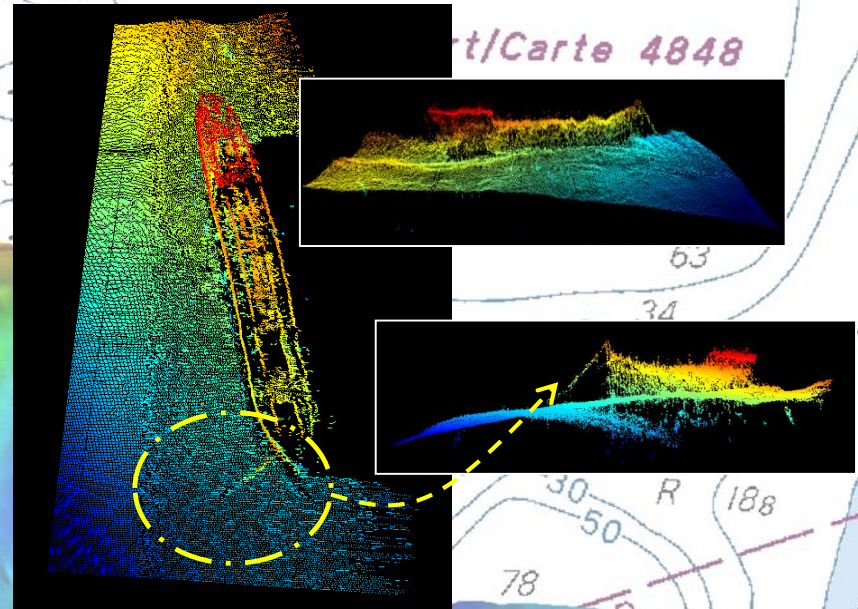
Equipment:

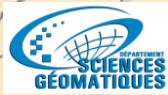
- Multibeam echosounder
- Sidescan sonar
- Bathymetric LIDAR
- AUV
- Sidescan sonar
- 4K underwater video system
- ADCP
- etc...



LiDAR / Multibeam /
Sidescan sonar /
Acoustic camera

- Sonar image matching & change detection
- Seabed mapping and classification
- 2D / 3D mosaic
- Multibeam and sonar image data fusion
- 3D reconstruction of underwater scenes
- Automatic calibration and performance analysis
- Hydrographic sounding based on autonomous (surface & underwater) vehicles
- Educational training in hydrography and marine geomatics





- Research capacity: 3 professors in geomatics sciences + 1 professor in geography + 2 teaching & research assistants
- Educational capacity: 2 undergraduate programs (Land surveyor and Geomatics engineer) providing the main knowledge and competencies with respect to Category A certification in hydrography + M.Sc. + Ph.D.

Equipment:

Metrology lab: Laser interferometer and calibration bench + Leica TS06 Total stations (13) + Leica Sprinter levels (13) + Topcon AT-B4 levels (15)

GPS lab: Trimble R8 GNSS receivers (6)

Trimble TX5 LiDAR scanner + Qimera software + ...

Marine Geoscience lab: Kongsberg Munin AUV (summer 2017) + Multibeam sonar (Kongsberg EM2040c, EM302, Odom ES3, Reson 8101) + Subsurface profiler + Sidescan sonar Klein 3000 + GeoAcoustic GeoSwath + Magnetometer + Core drill

Department of Geography, University of Ottawa.



uOttawa

Expertise primarily in Satellite-Derived Bathymetry, mapping and monitoring Canadian Arctic glaciers.

BSc, MSc, PhD...

Four CFI labs with computing and field equipment (Anders Knudby, Luke Copland, Jackie Dawson, Michale Sawada) directly useful for ocean mapping.

Several other ancillary CFI labs with additional equipment.

Equipment
single-beam sounder, several drones,
hyperspectral imaging sensor.

Access to a privately owned Cessna 172 based in Ottawa.

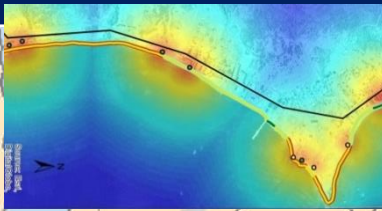
York University



Department of Earth & Space Science & Engineering Geomatics Engineering / Geomatics Science

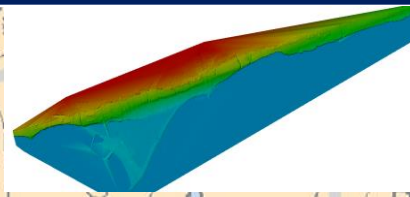
Research Interests

- Positioning / Navigation
- Unmanned Aerial / Surface Vehicles / Marine Systems
- Geodesy / Gravity / Satellite Altimetry
- Remote Sensing / GIS
- Marine Infrastructures
- Dense 3D Surface Reconstruction
- Data Analytics / Visualization
- Coastal Risk Mapping



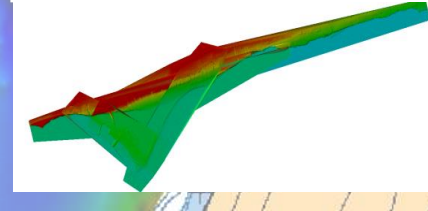
Educational Capacity

- BEng (Geomatics Eng.)
- BSc (Geomatics Sci.)
- MSc (Earth & Space Sci.)
- PhD (Earth & Space Sci.)
- Certificate GIS & Remote Sensing
- CEAB Engineering Accreditation
- Association of Ontario Land Surveyors Accreditation
- Esri Canada GIS Centre of Excellence



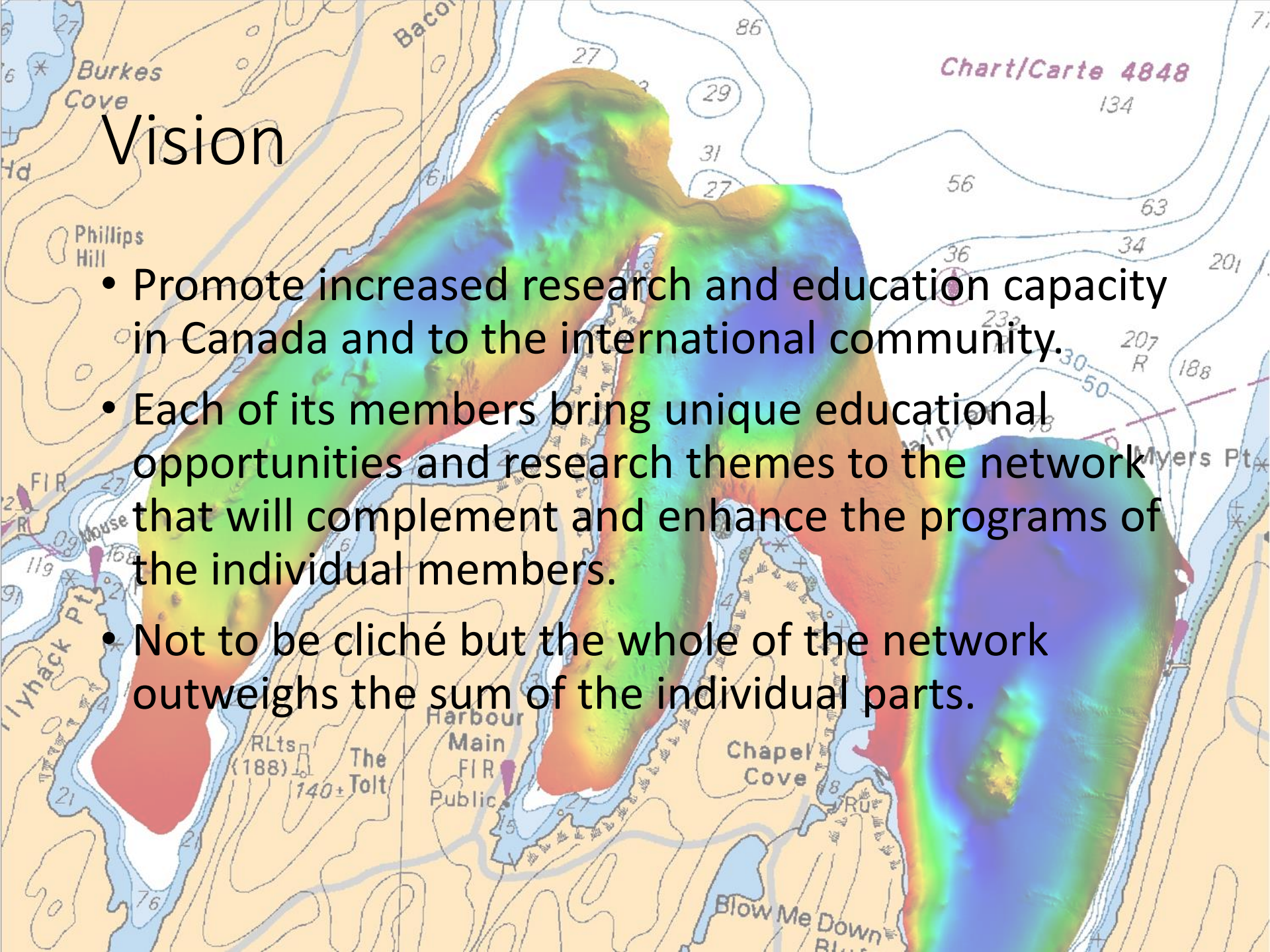
Equipment

- GNSS receivers
- GNSS simulator
- Geodetic equipment
- Autopilots
- UAVs
- CARIS HIPS and SIPS
- ArcGIS
- ERDAS Imagine
- PCI Geomatica
- Terrasolid



Vision

- Promote increased research and education capacity in Canada and to the international community.
- Each of its members bring unique educational opportunities and research themes to the network that will complement and enhance the programs of the individual members.
- Not to be cliché but the whole of the network outweighs the sum of the individual parts.



SHALLOW SURVEY 2018

OCTOBER 1-3 | ST. JOHN'S, NL
DELTA HOTEL AND CONFERENCE CENTRE

Paul M Brett
Head School of Ocean Technology
Fisheries and Marine Institute of Memorial University
St. Johns NL
Canada
Paul.Brett@mi.mun.ca

