



C-CORE Awarded \$12 Million Contract from ESA

C-CORE has successfully negotiated a \$12 million contract with the European Space Agency (ESA) to run an international program, Polar View that will be operating in Canada and Europe. The Polar View is a major component of ESA's Global Monitoring for Environment and Security (GMES) program and part of a collaborative agreement between ESA and the Canadian Space Agency (CSA).

GMES is a decision-support system for the public and public policymakers, with the capability of acquiring, processing, interpreting and distributing information related to the environment, risk management and natural resources.

Polar View is a network of companies and institutes from Canada, Denmark, Finland, France, Germany, Italy, Norway, Sweden, and the UK that will provide satellite monitoring services of northern regions and the Antarctic.

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Charles Randell (Incoming President), Marc Garneau (Past President CSA), Monique Collette (President, ACOA) and John Knublely, (VP, ACOA)

New President and CEO for C-CORE

Charles Randell has been appointed President and CEO of C-CORE effective March 2006. Mr. Harvey Doerr, Chair, made the announcement on behalf of the Board of Directors of C-CORE. Mr. Doerr said "We are pleased to appoint Charles as the President of C-CORE and look forward to working with him to continue its success. C-CORE is a great organization and held in high regard by the industry for the value that it delivers".

Charles joined C-CORE over 20 years ago after working in industry and academia. He subsequently joined the management team in 1996 as Director of Remote Sensing, and then became

Vice-President in 2000. Charles has extensive experience in developing and managing innovative engineering programs, and has been active in strategic and business planning for the organization.

Charles is also a professional engineer with a strong background in remote sensing, radar systems and acoustics. He gained his degrees at Lakehead University and University of Victoria.

Ray Gosine, Dean of Engineering at Memorial University of Newfoundland is also pleased with the appointment "I have worked with Charles as a colleague for over ten years. I am delighted that he has been selected to lead C-CORE as he has an excellent understanding of engineering R&D, as well as the insight and track record of working with industry to ensure that C-CORE's direction addresses the needs of industry. Charles is very committed to involving our engineering students at Memorial University in C-CORE's industrial activities and I look forward to working with him on this partnership."

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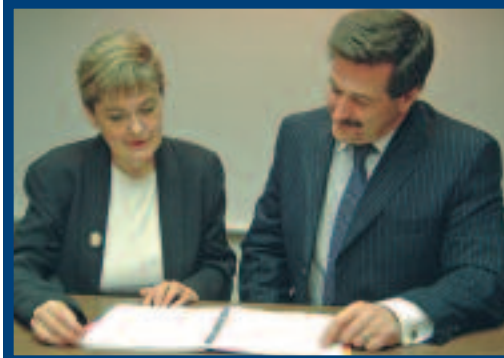
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C-CORE 30 Years Later and Beyond

This will be the last “vision” article that I will write for C-CORE. We are all excited with the appointment of Charles as President and CEO. I have known Charles for over 20 years and we will be working together over the next couple of months to ensure a smooth and seamless transition for our clients, stakeholders and staff.

This year, we carried out a comprehensive strategic planning review with the Board of Directors of C-CORE and our staff. We undertook an external benchmarking study to assist us in determining future directions. The report noted that C-CORE is a unique entity in Canada, that we have an aggressive private/public mission and that our increasing international revenue shows strong global competitiveness. It also noted that we excel at business development -- no surprise when most of our clients have always been a few thousand miles away.

The strategy confirms our direction to increase operational, specialized services based on the results of the research and development here at C-CORE. New positions will be created to support these service lines. Our ongoing R&D will incorporate new technologies into these services to ensure we stay at the leading edge. One of our lines of research in 1975 was remote sensing; it is great to see the commercial opportunities it offers for



Judith Whittick and Dr. Charles Randell.

us in the future, particularly through the Polar View consortium.

Ice was also one of our first research areas. Today, we are responding to our clients providing specialized advisory engineering services on project timelines. There are tremendous opportunities opening up in the Arctic, onshore and offshore, where C-CORE is well positioned with its expertise in ice and geotechnical engineering and our knowledge of the environment.

But of course, we love new horizons and the challenges they bring. It's what makes C-CORE an exciting place to work. Our work in mine automation, where we have established long-term relationships with Canadian partners, has brought additional opportunities in Australia with new partners. If only it was possible to be in these places in an “instant” and not spend so much time in airports and planes, but who knows in the next 30 years!

The team at C-CORE, under the leadership of Charles, will respond to many of the opportunities identified in our strategic planning. Charles has a vision of how C-CORE can grow well beyond what it is today and find new challenges to conquer. Since 1975, we have sustained growth and entered markets not envisioned at our beginning - a remarkable achievement. Charles will raise the bar yet again and create new horizons for the dynamic team here at C-CORE. So stay tuned, as I will be in my retirement.

C-CORE Awarded \$12 Million Contract from ESA

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This three year contract is to provide satellite monitoring services in a number of areas including:

- Ship and iceberg monitoring;
- High-resolution ice charts;
- Glacier monitoring;
- Lake and river ice monitoring;
- Snow monitoring; and
- Climate change indicators.

At a press conference in Halifax, CSA President Dr. Marc Garneau and ACOA President Monique Collette, speaking on behalf of The Honourable Joseph McGuire, congratulated C-CORE on being awarded this major European Space Agency contract in an area of national and international importance, and recognized C-CORE as an excellent example of the entrepreneurial spirit required to seize upon these opportunities. The contract was facilitated through the Canada-ESA Collaborative Arrangement in which CSA invests between \$20m and \$30m annually. Success in obtaining the Polar View contract can also be attributed in part to the contributions of the CSA and BRIDGES and the dedicated staff at C-CORE. As a member of ESA, Canada invests in niche areas where Canadian companies excel. ACOA is also supporting technology development at C-CORE including technologies that will be integrated into the Polar View and many other activities.

C-CORE Celebrates 30 Years

On November 24, 2005, staff and friends of C-CORE gathered at The Fairmont Newfoundland for a Gala Reception in commemoration of its 30th year anniversary.

Founded in 1975, the Centre for Cold Ocean Resources Engineering (C-CORE) was established on the campus of Memorial University of Newfoundland to conduct research and provide solutions that would contribute to the safe and economic development of the cold ocean environment in Canada. Under the former leadership of Jack Clark and now Judith Whittick, C-CORE has gained national and international recognition.

Over the past 30 years C-CORE has evolved, not always down the original path as had been envisioned, but nonetheless constantly focusing on operations in harsh environments. 2005 has seen C-CORE working in over 10 countries with gas transmission companies, space agencies and the offshore oil & gas industry. In Newfoundland and Labrador, work at C-CORE has significantly contributed to the design of the proposed gravity base system for the Hebron field, reducing iceberg loads that translate into savings of many millions of dollars.

The diversity of C-CORE's projects and clients are our strengths but key to our continued success are the people who work at C-CORE and those that work with C-CORE. Educating and training people, knowledgeable and competent to work in our diverse yet complementary areas of expertise, has underpinned our development over the past 30 years. Along the way, C-CORE sought individuals to join the entrepreneurial team and contribute to the growing community of highly qualified engineers and scientists in the Province; to that end over 300 highly qualified



Dr. Charles Randell (Incoming President), Dr. Jack Clark (Past President) and Judith Whittick (Outgoing President).

personnel and 900 students have gained industrial experience at C-CORE. Today, C-CORE has 60 staff members, mainly engineers, working together with a vibrant community of 40 students.

In recognition of our 30 years of providing innovative engineering solutions we gave our corporate image a make-over with a new logo, a new website and re-designed communications material. With our new image we are looking forward to the next 30 years of providing our clients with innovative engineering solutions.



Celebrating C-CORE's 30th Anniversary.

Iceberg Monitoring for the Tourism Industry

C-CORE, in collaboration with Hospitality Newfoundland and Labrador (HNL), is developing a web site to show the location of icebergs along the coast of Newfoundland and Labrador using satellite imagery. HNL has been awarded funding from the Atlantic Canada Opportunities Agency (ACOA) to develop this new web site with C-CORE as the technical lead.

A top priority of the Newfoundland and Labrador Tourism department is to increase tourism activity in the shoulder seasons (Spring and Fall). Visitors to the province are generally attracted to the nature viewing experience within Newfoundland and Labrador, with icebergs among the most asked about natural features. Creating a web site targeting local communities, visitors and

tourism operators, which shows iceberg populations in the spring season, could help lengthen the tourist season beyond the summer months.

The web site will use satellite technology to provide iceberg locations in and around the bays and inlets of the province. Satellite imagery captured from RADARSAT-1, a Canadian satellite, and ENVISAT, a European satellite, will be processed by C-CORE to extract iceberg location information. This information will then be displayed on a map of the province showing the visitor where they are most likely to view icebergs. The web site will also offer historical iceberg information to help visitors planning trips to the province.

In addition to current locations and historical information, the site will also

include educational information about icebergs and iceberg safety. This site will answer typical questions such as; 'Where do icebergs come from?' and 'What are the common shapes and sizes of icebergs?' The site will also provide information on satellite technology, educating the user about how icebergs are detected in satellite imagery.

Development of the web site is planned to be completed by the 2006 iceberg season. After the official launch, C-CORE and HNL will present a common place to answer the age-old question from tourists and locals, 'Where do we go to see the icebergs?'

C-CORE is an innovative engineering solutions provider based in St. John's, NL, Canada.

We publish *C-CORE News* twice a year for our partners, clients, and associates.

President & CEO
Judith Whittick

Vice-President
Dr. Charles Randell

Chief Financial Officer
Susan Kennedy

Directors
Dr. Peter Wojcik
Des Power
Dr. Ryan Phillips
Freeman Ralph

Senior Managers
Vince Morgan
Brian Delaney
Shawn Kenny

**Marketing and Business
Development Manager**
David Gullage
709-737-8354
info@c-core.ca
www.c-core.ca



Iceberg Outside 'The Narrows' - St. John's Harbour

Satellite Monitoring of Permafrost Instability

C-CORE has recently been awarded a contract with the European Space Agency to evaluate the capability of Earth Observation (EO) technology to identify, monitor and assess permafrost related geohazards.

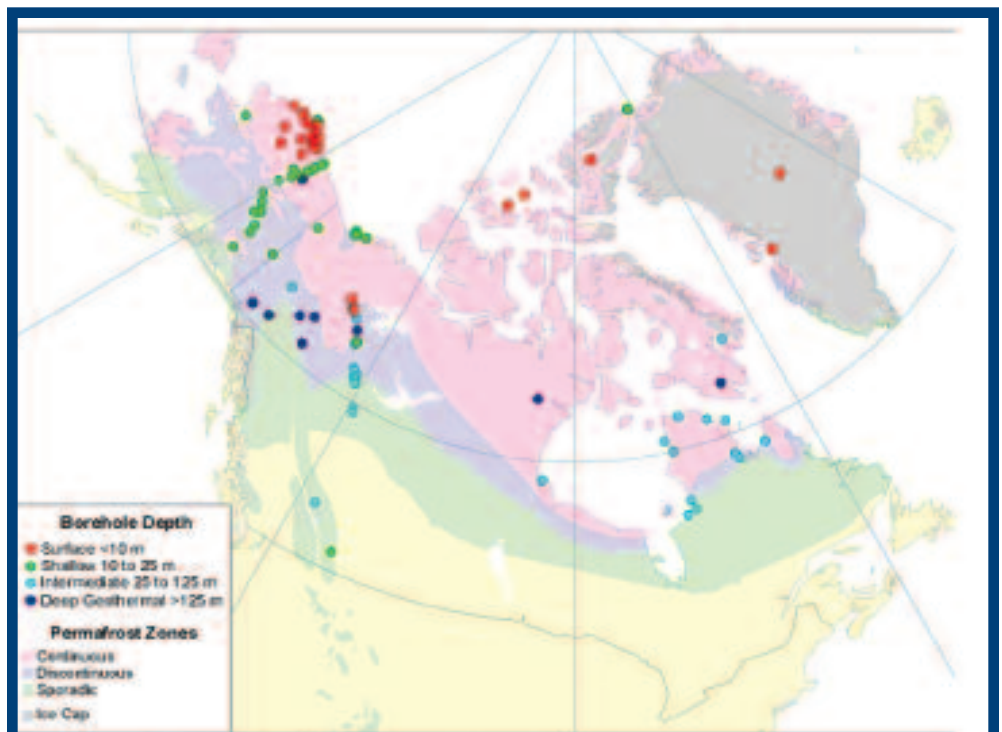
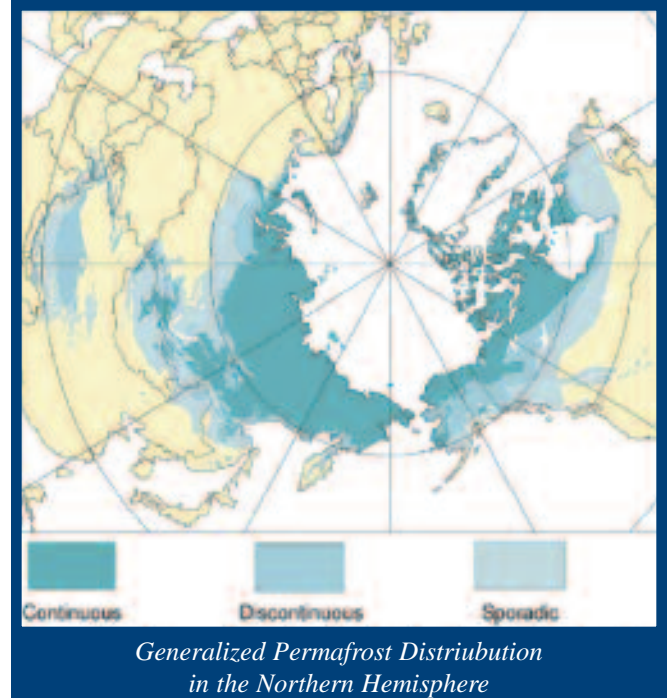
The investigations are a collaborative effort between C-CORE and JD Mollard and Associates, who specialize in the application of EO techniques and terrain mapping and analysis. The clients include the Yukon Geological Survey and TransCanada Pipelines Limited.

The end users require ground deformation and hazard maps to determine the existence of permafrost geohazards and to establish the spatial (i.e. extent and magnitude) and temporal (i.e. frequency and rate) characteristics of the instability mechanisms and ground movement geohazards. On this basis, potential monitoring programs, intervention requirements and operational response plans can be developed to mitigate hazards, potential impacts and risk exposure.

The regions of interest are remote, northern locations that cover linear and aerial transects with varied terrain features, environmental conditions and geotechnical characteristics. These aspects impose constraints on physical access, logistics, and economics for conducting conventional in-situ ground movement monitoring programs. Therefore, a service case has been devised to help determine how earth observation technology can contribute, as a complementary tool to existing practice, for monitoring permafrost instability in remote regions where traditional methods of gathering information is very expensive or constrained by environmental and terrain conditions. In this study, satellite data will be

integrated with traditional optical remote sensing, terrain analysis techniques and geotechnical engineering practice to map and monitor regions of potentially unstable permafrost. To validate the products, the study will be conducted over a time period and location in which permafrost instability is known to exist and in-situ measurement programs are currently being conducted.

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DIGGING DEEP - Expanding Local Offshore Capability

C-CORE has continued its close working relationship with Pro-Dive Scanmudring through 2005. Based initially on an assessment of the challenging site-specific conditions for a pipeline project offshore Norway, C-CORE was asked to develop a conceptual idea for a cutter head to increase the capabilities of their unique subsea excavator. This project involved extending the concept to design development of a new cutter head capable of excavating in geotechnical conditions encountered in the harsh offshore environment. It is envisaged that this new equipment will provide enhanced capability for excavating the seabed to provide protection of flowlines and subsea systems on the Grand Banks, offshore Newfoundland.

Pro-Dive Scanmudring is a joint venture between two specialist offshore contractors based in St. John's, Newfoundland and Labrador and Mandal, Norway. Scanmudring has built and operates a unique tracked excavator for working on the seabed around existing structures such as pipelines and platforms where traditional systems create the risk of impact and damage to facilities. The aim of this project was to increase the range of available tools that work with the existing base unit to provide improved capability. The Grand Banks was chosen as a target region due to its challenging soil conditions and difficulties encountered during previous development projects. The excavation unit has been specifically designed to deal with the hard soils and numerous boulders found in this area.

The combination of C-CORE's expertise in geotechnical engineering and intelligent systems allowed the team to provide the design development services to meet the client requirements. Rather than designing a system from scratch, existing land-based mining equipment was identified as providing a suitable base technology that can be transferred to the offshore environment. Through a process of supplier evaluation, and working closely with the technical department of the selected manufacturer, a modified cutting unit was designed, built and delivered to St. John's this past September.



Pro-Dive Scanmudring Sub Sea Excavator With New Cutting Unit

A trial was organized to demonstrate the system capability to local oil and gas operators who may be interested in this new and innovative capability. It was successful in providing potential clients the opportunity to see the equipment in action and to assess its capabilities with their offshore needs.

Satellite Monitoring of permafrost instability

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The study is under the Data User Element (www.esa.int/duel) component of the Earth Observation Envelope Programme of the European Space Agency. The main objective is to demonstrate an innovative EO-based information service and bridge the gap between research projects and sustainable provision of EO products to meet the operational needs of end users. This project was one of ten selected for award and shall be conducted over the next 18 months.

Congratulations on Bachelor of Technology

C-CORE congratulates Don Cameron on completion of a Bachelor of Technology Degree from The Marine Institute of Memorial University of Newfoundland in 2005. Don has completed this degree part time while working as one of C-CORE's centrifuge operators. His degree thesis entitled "Centrifuge Modeling for Earthquake Simulation at C-CORE's Geotechnical Engineering Centrifuge Facility" is to be used by the program as an example for new students. Don graduated from Cambrian College of Applied Arts and Technology in 1972 as a Geological Engineering Technologist. His career in Geology has taken him from Getty Mines Ltd. in Ontario in the 1970's, to the University of Waterloo and to Memorial University of Newfoundland in 1982. Don joined C-CORE in 1986 as a senior Geological Engineering Technologist. Since 1993 he has been in integral part of the Centrifuge Facility, responsible for operating and maintaining the centrifuge and assisting experimenters.



New Satellite Data Activist

C-CORE is pleased to welcome Grant Vivian to the Remote Sensing team. Grant has a diverse background in the field of Geomatics Engineering Technology. His work experience includes GPS dimensional control survey design in Boston, Massachusetts and GIS database design for the Department of Fisheries and Oceans in St. John's, Newfoundland and Labrador.



New Earth Observation Specialist

Julien Choisnard has been a Earth Observation Specialist at C-CORE since February 2005. Julien, who is originally from France, moved to Canada in 2001 where he received his Ph.D. at the University of Quebec's Energy, Materials and Telecommunications Centre at the Institut national de la recherche scientifique (INRS). He has a M.Sc. degree from Paul Sabatier University (Toulouse, France) and a M.Eng. degree from the Technical University of Grenoble (Grenoble, France). Julien's Ph.D. thesis involved work on the application of SAR satellite imagery to



the wind power resource estimation in coastal areas. At C-CORE, Julien will develop meteorological and oceanic applications of SAR satellite imagery and will focus on the feasibility of using radar satellite to enhance Search and Rescue

operation in the Northwest Atlantic. In addition, Julien is working with the Department of Fisheries and Oceans to develop satellite wind data sources that will be implemented into the Newfoundland Operational Ocean Forecasting System. Julien's activities involve wind retrieval techniques from SAR imagery, analysis of oceanic and meteorological features from these data, data blending and evaluation of offshore wind distribution.

Project Engineer

Pascal Milord is currently working as a Project Engineer with the Ice Engineering team at C-CORE. Pascal has a Bachelor of Mechanical Engineering Degree from Memorial University. He has worked in a variety of industries including ice



research and manufacturing and oil and gas. His background includes ice testing and analysis as well as iceberg tracking and management research in industry related projects. Pascal also has manufacturing and design experience as an Industrial Development Engineer working in the Faculty of Engineering in the Industrial Outreach Group and Manufacturing Technology Centre. This position involved handling many projects as well as supervising and working with small teams involving a wide range of clients. Working with industrial, manufacturing, entrepreneurial and other clients enhanced experience in project management, computer applications, and consulting engineering. In addition, extensive use of 3-D CAD, Rapid Prototyping, CNC machining and structural/materials testing facilities was required.

C-CORE Board Welcomes Max Ruelokke

C-CORE is please to welcome Mr. Ruelokke to its Board of Directors. Mr Ruelokke has 35 years work experience including 15 years in offshore support services, 2 years in offshore fabrication/shipbuilding, 4 years in engineering design construction and 14 years in government service including 4 years as a senior government executive.

Mr. Ruelokke's senior appointments have included President and CEO of Marystown Shipyard Limited, President and CEO of Bull Arm Site Corporation, General Manager of AOC Brown & Root Canada Ltd., and Deputy Minister of the Department of Industry, Trade and Technology. These positions have afforded him a comprehensive knowledge of both the offshore oil and gas industry and the capacity and capability of the Newfoundland and Labrador institutional and industrial communities. Currently Mr. Ruelokke is the General Manager of East Coast Canada's AMEC Oil and Gas.



Return to Russia

In 2004 I wrote about *A Russian Adventure* (C-CORE News, Volume 27, No 2). In that article I described my first trip to Russia.

More traveling adventure has followed. After the unsuccessful launch of the Foton M1 satellite constructed in 2002-2003, it was agreed between the European Space Agency and the Russian State Rocket and Space Scientific Production Center (TsSKB-Progress) that a second satellite (Foton M2) would be built along with replacement scientific experiments.



Foton Satellite

These experiments were constructed in Canada and Europe. C-CORE reconstructed the electronics control module for the Soret Coefficient of Crude Oil experiment. C-CORE's personnel had to travel to a variety of places to perform all of the tests required before finally putting the experiment back on the satellite again.

Myself and software expert Jason Mills traveled to Naples, Italy in the summer of 2004 to test the telemetry interface built by an Italian company. This was an interesting experience: the Italian cuisine is excellent and the Italian motorists are a phenomenon to behold! The Italians have developed an entire alternative set of driving rules apparently based on chaos theory!

After Naples, we traveled to Holland and Belgium to the headquarters of ESA and the office of their prime contractor. Brussels was very nice, with its ancient beers and great chocolate, and Noordwijk in Holland is quiet and beautiful, at least when its not raining sideways and blowing a gale.

In the winter of 2005, I went to Samara Russia to install our control electronics on the satellite. The winters are quite cold there, routinely -30°C. Russian winter hobbies include cross-country skiing, ice fishing on the Vulga River and drinking Italian style coffee which is slowly catching on with the locals. Walking

on the frozen Vulga is a must for the few Europeans that come through there.

After the frozen Russian landscape I traveled to the Baikonour Cosmodrome in Russian-controlled Kazakhstan. In the desert steppes in May it was already +30°C. Luckily it doesn't get really hot until later in the summer. The landscape is bleak in the desert and the old launch pads stand out as monoliths of bygone accomplishments. It was from here that Russia's pioneering space work took place, including Yuri Gagarin's first orbit of the Earth on 12 April 1961.



Pre-flight testing of Foton in Kazakhstan.

Our experiment launched successfully at 12:00 UTC 31 May 2005. By that time I was north of the Arctic Circle at the ESRANGE facility in Kiruna Sweden. We monitored the flight of the satellite from there and dined on the very popular local cuisine of Reindeer. Sweden reminded me a lot Canada, with the long tracks of forest and courteous people.

The satellite returned to Earth intact, landing in the Kazakhstan desert on June 15th. After a long mission, with disappointments for some experiments but many more successes, the Foton M2 team proved itself a remarkable collection of engineers and scientists. I look forward to working with them again, for Foton M3, scheduled for launch from Kazakhstan in September 2007.

До свидания!

(Dos' vidanya, Russian for Goodbye)
Stephen.

Stephen Churchill is C-CORE's Team Lead for Electronic Systems, and project manager for the SCCO microgravity experiments

If undelivered, return to:



Captain Robert A. Bartlett Building
Morrisey Road
St. John's, NL
Canada A1B 3X5

