The sponsors of the
Union for Compact Accelerator-driven Neutron Sources (UCANS11)
Meeting.

Canadian Nuclear Laboratories

Laboratoires Nucléaires Canadiens

What's Next for Canada's National Nuclear Laboratory?

For almost 80 years, Canada's national nuclear laboratory has been home to new and exciting breakthroughs in nuclear science and technology. This work has had profound impacts on people all over the world – from the way homes and businesses are powered, to the technologies used to fight cancer.

Operated by Canadian Nuclear Laboratories (CNL) and under the direction of Atomic Energy of Canada Limited (AECL) since 2014, this national asset has been building on its history of innovation with a plan that charts its path forward for the next decade. Known as Vision 2030, this plan encompasses all new programs and projects - like building the next generation of clean nuclear and hydrogen energy solutions, developing new and better targeted cancer treatments, and continuing to lead the world in environmental remediation - that focus on CNL's competitive advantages, seek to grow its commercial business, and position the company as a sustainable, thriving business into the future.

Through programs like the Canadian Nuclear Research Initiative, CNL is making the expansive capabilities of a national nuclear laboratory available to help technology vendors bridge concept to reality in achieving innovation and radiopharmaceutical companies advance ground-breaking cancer treatments; the New Nuclear Emerging Technologies (N2ET) program is supporting promising nuclear applications as they move towards deployment; and its Academic Partnership Program is enriching the learning opportunities available at universities across the country, helping build the workforce needed tomorrow, today.

CNL is also advancing innovative work to develop new neutron sources for Canada, ranging from research reactors to compact accelerator-based neutron sources (CANS). By leveraging advanced experimental and simulation tools, such as Monte Carlo for neutronics and shielding design, advanced materials and fuel research and development, as well as thermal-hydraulics analysis, CNL is laying the groundwork for neutron sources that support a wide range of research and development activities. Alongside strong partnerships with universities, these initiatives will empower breakthroughs across fields and industries enhancing Canada's position in the worldwide scientific community.

Today, CNL is invested in what it does best – cleaning up the environment, developing clean energy technologies for today and tomorrow, and improving the health of Canadians. To learn more, please visit www.cnl.ca.

MIRROTRON
THE WORLD OF NEUTRON

Mirrotron Ltd. was founded in 1991 by physicists and engineers who have worked at the Central Research Institute for Physics (KFKI Budapest). The company is still owned by the same founders. Mirrotron's activities are centered on scientific instrumentation, primarily related to neutron scattering. Initially it focused on the industrial production of neutron guides coated with supermirrors. The multilayer neutron supermirror coating of up to a few thousand deposited layers, originally discovered in 1976, allows us to increase by more than an order of magnitude the divergence and hence the intensity of neutron beams transported by neutron guides, compared to the traditional neutron guides formed by single Ni layer coated mirrors. By now Mirrotron has delivered high quality supermirror neutron guides of a total length of nearly 2 kilometers for neutron scattering facilities over more than 20 countries around the world. Based on this core activity, Mirrotron Ltd. steadily expanded its profile over the past 3 decades to the design and manufacturing of other equipment used in neutron scattering research, such as choppers, velocity selectors, neutron detectors, monochromators, polarizers. And also, to the delivery of turnkey/ready-to-use neutron scattering instruments, such as spectrometers and diffractometers, including substantial design tasks. In recent years design, manufacturing and installation of advanced radiation shielding systems was added to the spectrum of company products. Latest development efforts focus on extending the product line of Mirrotron Ltd. to delivering complete, turnkey compact accelerator driven neutron sources for research, industrial and health care use, adequate for installation at educational and industrial facilities, as well as in hospitals. The ongoing completion of a prototype high current compact neutron source (HICANS) is being pursued on the new plant of the company in the town of Martonvásár close to Budapest. Part of this effort is to develop low cost, solar energy based uninterruptible power generation systems for operating particle accelerators. The prototype compact neutron source at Mirrotron premises will also provide neutron beam services for industrial quality assurance needs and for the purpose of supporting the development efforts on compact neutron source facilities worldwide. Some Mirrotron products and procedures are protected by international patents, including cost effective alternatives with reduced carbon emission footprint in radiation shielding design.

Rans View Corporation

Chloride attack, the most serious cause of bridge deterioration, is progressing in coastal areas exposed to sea breezes and mountain bridges where salt is spread as an anti-freezing agent in winter, and there is a risk of serious accidents such as bridge collapses. If preventive maintenance based on deterioration diagnosis of structures can be realized, such accidents can be prevented, leading to longer bridge life and reduced maintenance costs. To realize preventive maintenance, there has been a strong demand for non-destructive measurement of chloride ion concentration.

In response to such needs, the Neutron Beam Technology Team in RIKEN has been developing non-destructive chloride ion concentration measurement technology using neutrons. As a result, we have succeeded in developing “RANS-μ”, the world's first technology that can non-destructively measure salt concentration inside concrete. To advance the social implementation of this technology, RIKEN launched the Technology Research Association for Neutron Next Generation Systems (T-RANS) (approved by the Minister of Land, Infrastructure, Transport and Tourism) in 2020 with the aim of standardizing neutron non-destructive testing technology, and has been conducting demonstration experiments, standardization activities, and industrialization activities through collaboration between industry, government and academia.

With this background, Rans View Corporation was launched as a company that contributes to the innovation of infrastructure maintenance using the world's first non-destructive neutron measurement technology developed by RIKEN. We are currently carrying out non-destructive chloride ion concentration measurement business for numerous bridges.

ACCEL-LINK LTD

Global Collaboration for Positive Societal Impacts

Sustainable Technological Advancements

Accel-Link focuses on (i) accelerator applications having the potential to reduce energy usage, carbon emissions, and/or pollution, (ii) accelerator technologies that are more energy efficient, utilize less consumable resources (water, helium etc.), and have a minimized physical footprint, (iii) accelerator developments yielding medical benefits and/or aiding safe food delivery, and (iv) advancing the use of quantum technologies and materials.

Education, Training and Workforce Development

Cultivating the Next Generation of Highly Qualified Personnel

Concomitant to the advancement of accelerator science and technology is the education of the next generation of vocational and graduate level personnel through the creation of specialized accelerator-based educational facilities such as the Selkirk Ion-source Research Centre (SIRC), through research projects at universities and National Laboratories around the world, and through commercial means. In addition, research and commercial environments fostering diversity, equity, and inclusion and/or advocating for, or bringing awareness to these principles shall be sought, nurtured, and promoted.

Science Communications

Enhancing Knowledge Exchange through Profiles, Commentaries, and Articles

At Accel-Link we will concentrate on science communication as it relates to particle accelerator applications and technologies, as well as aspects of the cultural and geographical milieu in which such applications are undertaken and such technologies are used. In particular, we will explore the people who ensure the accelerators are operating, and maintained. We will interview students to learn about what interests them, and to discover why they chose this area of research or skills development. We will profile administrators, and business people, famous inventors, behind the scenes workers, and, of course, scientists, engineers, and technologists. We will learn about the science, but we will also delve into the strange locations, or not so strange locations to operate an accelerator (up in a mountain, in a museum, in a dense central business district ....), and the types of food available for lunch for the employees at a National Laboratory, or at a medical radioisotope production facility, and other factors, circumstances and activities that we humans do as we live our lives whilst being involved in the world of particle accelerators.

Commercial Endeavours

Broadening the Impact of Accelerator Technologies

Accel-Link commercial activities involve consulting, contract research assignments, start-up investments, and Board advisement work. Accel-Link leverages the Founder's network across many National laboratories, universities, accelerator manufacturing companies, end-user companies, and suppliers to connect the community to solutions, ideas, technologies and people from one particle accelerator market segment to another, or from one technology domain to another. Often techniques that are well known in one area of particle accelerator application, are not very well known in another, and highly beneficial new developments can occur by linking old or new ideas from one area to another. This applies to advancing discovery science, or inventing a next generation accelerator system or component for medical isotope production, or for semiconductor manufacture through advances in ion implantation.

D-Pace

D-Pace supplies products and services to the international commercial accelerator industry. Our areas of expertise include ion sources, beam diagnostic devices, and beamline systems for research, industrial, and commercial accelerator systems.

D-Pace Provides:

- Precision accelerator equipment – accelerator sub-systems, industrial beamline systems, or individual components such as magnets, vacuum chambers, beam diagnostic devices, and electrostatic devices.
- High performance, filament powered and RF powered, reliable DC volume-cusp negative ion sources: H^- / D^- / C_2^- . Ion sources are licensed from and backed with TRIUMF & University of Jyväskylä support.
- Professional ion-optical modeling, engineering, mechanical design, drafting and documentation services – industrial beamline systems and components.

Our knowledgeable design staff are well-versed in the special details associated with designing accelerator-related equipment. D-Pace works with experts worldwide to meet our customer's needs, and is committed to innovation, quality and customer satisfaction.

We take pride in offering our customers:

- High quality, thorough work.
- Confidentiality, integrity, and professionalism.
- Individual tailoring based on customer values and requirements.
- Flexibility, including onsite work.

In 2024 D-Pace and Buckley Systems announce a major transition in D-Pace's ownership structure. After a decade of successful joint ownership with Buckley Systems, D-Pace transitions back to independent Canadian ownership. D-Pace's independent ownership and its continuing, collaborative relationship with Buckley Systems will drive further success for both organizations.

In 2014 Buckley Systems invested in D-Pace (50% ownership), and as a consequence D-Pace developed and commercialized approximately a dozen new products for the particle accelerator market. This was a win-win for several reasons: D-Pace launched a number of new and useful products to the industry, Buckley Systems generated additional products to manufacture, and the collaboration was providing excellent technical cross-pollination.

Building off the solid foundation created with Buckley Systems, D-Pace remains committed to delivering next-generation solutions for its customers in the international accelerator industry.

ESS Bilbao: Pioneering Innovation in Neutron and Particle Accelerator Science and Technologies

The ESS Bilbao Consortium stands as an international benchmark in the development of technology and innovation in the fields of particle accelerators, and neutron science and technology. The consortium is committed to generating knowledge and added value through its in-kind contribution to the European Spallation Source (ESS ERIC), currently under construction in Lund, Sweden.

With a highly qualified team and state-of-the-art infrastructure, ESS Bilbao positions itself as a key player in the research and development of advanced technologies that drive scientific and technological progress. Our commitment to excellence and international collaboration makes us a strategic partner for large-scale projects in the field of particle accelerators, neutron science, and technology.

Beyond its focus on ESS ERIC, ESS Bilbao actively collaborates on other international projects in the fields of particle accelerators, neutron scattering, and fusion energy, such as MYRRHA (SCK-CEN), ISOLDE (CERN), ITER, and IFMIF-DONES. ESS Bilbao promotes technological development and innovation in collaboration with industry through various public programs at national and regional levels.

ESS Bilbao is actively advocating the development of HiCANS (High-Current Compact Accelerator Based Neutron Sources) – a revolutionary concept of neutron sources that is poised to play a key role in the sustainability of the European Neutron Ecosystem in the near future.

With recent developments in the field of HiCANS neutron sources the members of the ELENA (European Low Energy Accelerated Based Neutron Sources Association) of ESS Bilbao (Spain), Jülich Center for Neutron Science (Germany) and Laboratoire Lèon Brillouin (CEA-CNRS France) plan to join common forces for a dedicated HiCANS platform to be established in the next years. Combining the very recent achievements of ARGITU, ICONE and HBS projects, the aim is to demonstrate the feasibility and option of a full high current accelerator driven neutron source in Europe for the next generation of neutron sources. The partners plan to have the combined system ready for operation in 2026 at the ESS Bilbao site in Bilbao, Spain. The unique combination of resources by the three partners will show the possibilities for HiCANS neutron sources and help to improve its concept for the realization of HiCANS facilities in the countries of the ELENA association.

Industry-Grade Control Systems for Tomorrow's CANS

Nik Razoršek, Rok Hrovatin
COSYLAB (nik.razorsek@cosylab.com, rok.hrovatin@cosylab.com)

Particle accelerator systems are becoming more complex with each new installation, yet reliability remains a fundamental requirement for both industrial and research installations. Ensuring that beams are delivered on time and within specified parameters is essential. While the combination of complexity and high reliability may seem challenging, this can be addressed effectively through systematic engineering of the control system. A well-engineered control system not only ensures reliability but can also enhance the overall performance of the entire accelerator.

Cosylab specializes in providing engineering and turnkey software solutions tailored to sophisticated systems, among which are also *compact accelerator-based neutron sources* (CANS). With over 20 years of experience and hundreds of successfully delivered projects, we have built a strong reputation in the industry, and our commitment to quality is demonstrated by our ISO certifications and a global presence with subsidiaries in China, Japan, Switzerland, the United States, and Slovenia.

What distinguishes Cosylab is our ability to deliver complex projects that require deep domain expertise and a solid understanding of physical operational principles. Our services span from the development of turnkey control systems to systems engineering, architecture, and multi-year project planning. In addition to control software, we provide custom hardware in small quantities, ensuring that every phase—specification, procurement, development, assembly, delivery, and testing—meets the highest standards.

We develop and integrate subsystems such as timing systems, machine protection systems, interlock systems, slow and fast orbit feedback/feedforward systems and we integrate them into a modern central control system, providing also device list consultancy and validation. This is achieved by a holistic project approach and a keen understanding of each project's unique use cases. Our deep knowledge of accelerator control systems and project management ensures that projects are completed on time and within budget, mitigating risks and lowering the total cost of ownership.

We recognize the significant potential of the CANS domain, both in industry and research, and have already contributed to multiple projects within this area. With a strong technical and project management foundation, we bridge the gap between scientific advancements and industry developments, driving the industrialization of novel CANS systems.

Cosylab is proud to deliver cutting-edge software and engineering solutions to organizations such as ITER, CERN, RPI, SLAC, ESA, FAIR, Varian, Leo Cancer Care, MedAustron, Mevion, Northwestern Memorial Hospital, ProTom, DESY, ALMA, and Massachusetts General Hospital, among others.

Sponsor that were below the $2000 threshold. Logos only.