





2023-2024

IDEAS ANNUAL REPORT

5th ANNIVERSARY | 2018–2023



Canada

ABOUT INNOVATION FOR DEFENCE EXCELLENCE AND SECURITY (IDEaS)

Since launching in April 2018, IDEaS has been working with Canadian innovators to develop the science and technology (S&T) landscape and is helping turn innovative thinking into tangible solutions for the Department of National Defence and the Canadian Armed Forces (DND/CAF), as well as Canadians.



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	Outreach and partnerships	

MESSAGE FROM DR. JASPINDER KOMAL

ASSISTANT DEPUTY MINISTER, DEFENCE RESEARCH AND DEVELOPMENT CANADA



In 2023, IDEaS celebrated its five-year anniversary. With the help of creative minds, we have been transforming the defence innovation landscape in Canada.

The IDEaS program is

designed to make ideas grow larger, develop faster, and transform them into practical solutions for the DND/CAF. I am proud to say that our investments have yielded great results. More than 20 technologies have been developed to a test-ready state for DND/CAF thanks to IDEaS funding.

From basic research to advanced prototype testing in real-world environments, the tools that IDEaS offers gives DND/CAF several avenues to pursue the solutions that ultimately meet their needs. This utility has driven technology forward in a variety of domains, from artificial intelligence to enhanced mapping technologies to cyber attribution. Still, we are always looking to do more.

Over the next five years, increased collaboration, stronger partnerships, and more meaningful feedback from the Defence Team will help innovative technology reach new heights. From what we have seen to date, the next five years will be even better than the past five.



MESSAGE FROM PHILIPPE HÉBERT

DIRECTOR GENERAL R&D INNOVATION



Expertise isn't born overnight: it's shaped through persistence, continuous learning, and the spark of breakthrough moments.

The IDEaS program is now working closely with several innovators

to test technologies that have advanced from earlystage development through the IDEaS ecosystem. Some of these technologies started their journey as part of the program's first call for proposals in 2018.

Five years later, DND/CAF are now getting technologies customized to their specific needs based on their direct feedback, refinement, and iteration in critical domains.

This is the result of hard work and of concepts being given the time and support they need to find their path.

From autonomous systems to quantum technologies, IDEaS has been venturing into entirely new and vital territory for defence and security. These new domains have time horizons that are approaching fast and shrinking daily. That means the time to invest is now.

The culmination of potential being developed both within and outside of the Defence Team is allowing us to expand far beyond our imagination, and there is nothing but open road and possibility ahead.

We will be no less ambitious in creating new tools and pathways that harness the collective potential of working together in the coming years.

IDEaS' FIVE-YEAR ANNIVERSARY:

CELEBRATING MILESTONES IN INNOVATION

In April 2023, IDEaS commemorated its fifth anniversary. Since its launch in 2018 as part of <u>Strong, Secure, Engaged: Canada's Defence Policy</u>, IDEaS has driven technological advancements that enhance Canada's defence capabilities by supporting a wide range of projects while fostering collaboration across the innovation community.

The five-year mark provided an opportunity to reflect on the program's role in transforming defence and security challenges into innovative solutions. During the first five years, IDEaS funded more than 660 projects, addressing more than 75 unique challenges from DND/CAF. More than four technologies progressed from early-stage development to readiness for real-world testing.

Since its inception, IDEaS has facilitated key partnerships, such as with Canadian Special Operations Forces Command (CANSOFCOM) and Canadian Joint Operations Command (CJOC) to enhance sensor capabilities through artificial intelligence.

The partnership with Procurement Assistance Canada (PAC) has led to increased participation of small businesses in federal government procurement across the country.

Overall, the program's impact has extended well beyond defence, contributing more than \$380 million to the Canadian innovation ecosystem, thus strengthening both national security and the broader economy.

Looking ahead, the program is committed to continuing its role in advancing defence technologies and fostering collaboration, with plans for another 15 years of innovation to support DND/CAF and the wider Canadian defence community.



IDEAS BY THE NUMBERS: THE FIRST FIVE YEARS

IDEaS : achievements :

Key figures

TOTAL INVESTMENT

MORE THAN

\$380

CHALLENGES ISSUED MORE THAN

CHALLENGES

PROJECTS FUNDED 664
PROJECTS

INNOVATORS ENGAGED 298
INNOVATORS ENGAGED

TECHNOLOGIES ADVANCED FOR TESTING

4

IDEaS INNOVATOR NETWORK MORE THAN

6,200

INNOVATORS IN THE NETWORK

(CANADIAN AND INTERNATIONAL)



SPOTLIGHT: IDEaS' FIFTH ANNIVERSARY

To celebrate the launch of IDEaS' fifth anniversary, a video was released showcasing key successes, highlighting achievements up to April 2023 and offering a glimpse of what was to come.



IDEAS PROGRAM PERFORMANCE AT A GLANCE

IDEaS program performance from launch of IDEaS to March 31, 2024





\$387,201,580TOTAL INVESTMENT

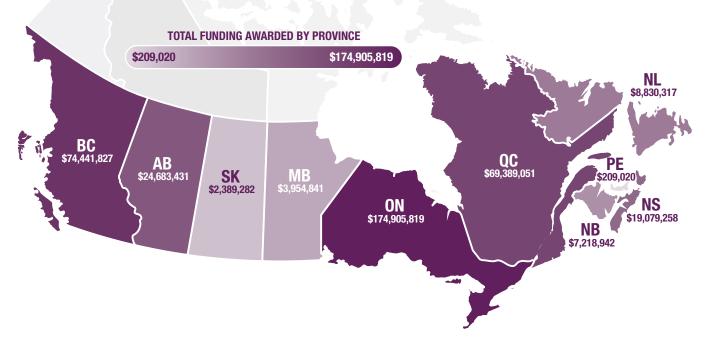
IDEaS program performance from April 1, 2023, to March 31, 2024





\$57,029,446TOTAL INVESTMENT

Total funding awarded by province from launch of IDEaS to March 31, 2024

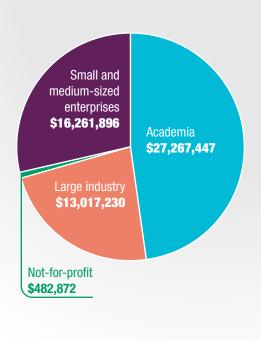


INNOVATOR TYPE BREAKDOWN

IDEaS innovators by type from launch of IDEaS to March 31, 2024



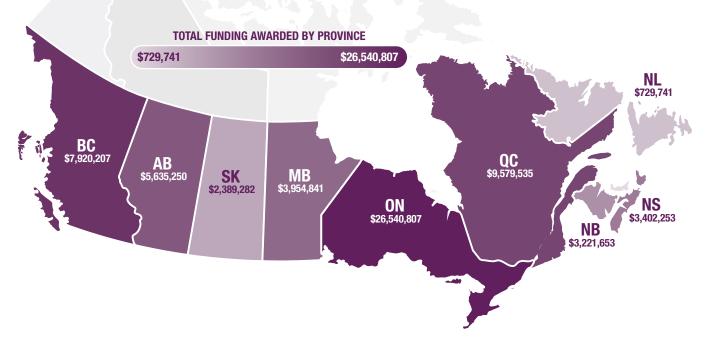
IDEaS innovator types, April 1, 2023, to March 31, 2024





328 UNIQUE RECIPIENTS

Total funding awarded by province from April 1, 2023, to March 31, 2024



IDEAS PROGRAM OF WORK UPDATES

The program has achieved remarkable progress in driving innovation and advancing defence capabilities. This success is a testament to the dedication of IDEaS staff—past and present—as well as the invaluable contributions of our partners in DND/CAF and Assistant Deputy Minister (Defence Research and Development Canada) (ADM[DRDC]). Their expertise and commitment have been instrumental in shaping the program's impact and success.

Year five (2023-2024) marked an important transition following COVID19 restrictions that ended in October 2022. The IDEaS program moved forward and made significant progress by awarding numerous contracts, launching new calls and successfully hosting the second IDEaS Marketplace event. The second iteration of the IDEaS Marketplace, held on June 2, 2023, at the Shaw Centre in Ottawa, showcased 55 innovators and 64 solutions across various research streams.

The event attracted over 450 stakeholders, marking a significant success in fostering defence innovation collaboration.

Over the five years since IDEaS was launched, all of its funding elements—including <u>Competitive Projects</u>, <u>Innovative Networks</u>, <u>Contests</u>, <u>Test Drives</u>, and <u>Sandboxes</u>—gained significant traction. The following provides an overview of each element, along with program spotlights that highlight some of the most fascinating and innovative accomplishments.



COMPETITIVE PROJECTS



Competitive Projects has accelerated the development of promising technologies through a fast-tracked, phased approach, driving innovation and advancing solutions to new levels in a short time frame.

Since 2018, five calls for proposals have been launched, setting the stage for the development of cutting-edge solutions.

HIGHLIGHTS FROM 2023-24

In 2023-24, IDEaS awarded multiple contracts to support innovation in defence and security, investing over \$25 million in new technologies through the Competitive Projects element. These investments have funded advancements in key areas such as cybersecurity, communications, energy efficiency and advanced surveillance.

Although no new Competitive Projects Calls for Proposals were launched, there was a significant increase in research and development (R&D) activity within projects already under way.

Many innovators progressed from proof-of-concept to mature prototypes, with several transitioning into Component 2 funding. Others expanded their work into new testing environments, including Arctic operations, marine surveillance, and space-based communications. This progression reflects both the growing technical readiness of solutions and the strengthening collaboration between IDEaS and Canadian innovators.

HIGHLIGHTS FROM 2023-24 INCLUDE, BUT ARE NOT LIMITED TO:

QEYnet: This company was funded to develop a Quantum Satellite Rekeying Device (QSRD), a groundbreaking system that enables satellites to update their encryption keys while in orbit. The technology is now being tested by the Canadian Space Agency.

MDA Systems Ltd.: Through its Arctic Critical Communications Engineered for Full Spectrum Solutions (ACCESS) project, MDA Systems Ltd. has developed a cost-effective and secure communications framework. The project successfully reached its Component 2 phase with the deployment of a system capable of delivering high-bandwidth, low-latency communications in remote, northern environments.

Labforge: In a challenge focused on Arctic security, Labforge created Snow Flea, a ground-based tactical electronic warfare system for safekeeping assets in sub-zero environments.

Dartmouth Ocean Technologies Inc. developed an eDNA sensor technology to detect the presence of marine mammals through "debris" in the water, offering a new approach to underwater environmental surveillance.

Other funded projects included GlobVision's Al-enabled space situational awareness platform and Jasco's neural networks for marine mammal detection, both showcasing the breadth of innovative capabilities supported through IDEaS Competitive Projects.

COMPETITIVE PROJECTS BY THE NUMBERS

CHALLENGES LAUNCHED SINCE 2018

64

PROPOSALS
RECEIVED
SINCE 2018

2589

PROJECTS APPROVED SINCE 2018

674

TOTAL FUNDING

28.6M

TEST DRIVES



Test Drives provide innovators with the opportunity to present solutions that have reached a high <u>Technology</u> <u>Readiness Level (TRL)</u> to address challenges faced by DND/CAF. The solutions are tested in real-world environments and, where feasible, selected innovators have the chance to observe the testing process.

HIGHLIGHTS FROM 2023-24

The program continued to test and evaluate promising solutions. Notably, a cybersecurity platform developed by Sapper Labs successfully completed its evaluation, while the green energy project at Canadian Forces Base (CFB) Kingston advanced closer to implementation. More test drives are expected in the coming year.

TEST DRIVES BY THE NUMBERS

TEST DRIVES COMPLETED

SINCE 2018

TEST DRIVES COMPLETED SINCE 2018

3 (plus 1 ongoing)

total funding for test drives \$39.5M

Since 2018, IDEaS has received 13 Test Drive requests, approving four projects for a total funding commitment of \$39.5 million. A Test Drive is DND/CAF's opportunity to evaluate an innovator's high-readiness solution in a real operational environment, assessing its potential for future integration. Each approved project undergoes rigorous testing by a designated DND/CAF client, with IDEaS funding the contract for the solution and the client providing personnel, equipment, and other operational support.

Ongoing Test Drive:

Green Heat – Kingston Energy Storage (details below) is testing renewable heating and energy storage solutions for CAF infrastructure to reduce emissions and enhance energy resilience across military facilities.

Completed Test Drives:

Sapper Labs – Canadian Active Cyber
Defence Platform (CACDP): Sapper Labs
developed a prototype capability for the
Canadian Active Cyber Defence Platform
(CACDP). This technology helps special forces
protect their networks by finding and stopping
advanced threats. It uses smart technology (like
Al) to find harmful activity on important networks
and helps cyber teams respond faster and more
effectively. This tool was tested by Canada's
Special Operations Forces.

Ecopia – Digitizing the World Using Al:

Ecopia tested its Al software that automatically creates maps and finds things like cars, ships, or buildings from satellite images. The Canadian Forces Intelligence Command (CFINTCOM) used this to see what was happening on the ground more quickly and on a very large scale.

TerraSense Analytics – MIST: TerraSense
Analytics tested its Multimodal Input Surveillance
& Tracking (MIST) technology. This is a tool that
watches video feeds from drones and other
sensors, using Al to spot and track people,
vehicles, or other important objects. It helps
analysts quickly find what matters in large
amounts of video footage. This was tested to
support Canada's military and its allies.



SPOTLIGHT – GREEN HEAT

One of the program's successes over the last five years includes challenges that have shown dual-use functionality. The Green Heat Test **Drive is a ground-breaking project** led by DND/CAF to install and test a large-scale, low-carbon heating system in an existing building. Aimed at modernizing energy infrastructure and reducing carbon emissions, the project began in April 2022. **Black & McDonald and FVB Energy** Inc. received \$477,000 to design and engineer the solution. The test **building at CFB Kingston was** equipped with a green energy heating system and energy storage to ensure continuous operation. The project aims to assess the system's effectiveness, costs, and scalability, supporting Canada's carbon reduction targets.



IDEaS Green Heat video

INNOVATION NETWORKS



Innovation Networks serves as a platform for fostering collaboration, creating new connections, and encouraging the free exchange of ideas—all of which are essential for driving innovation.

By partnering with academic institutions and private sector leaders, IDEaS aims to establish a comprehensive network of expertise to meet Canada's evolving defence and security needs.

Through Innovation Networks, the program seeks to collaborate with academia, industry, and other stakeholders to form micro-networks, or micro-nets.

These micro-nets focus on advancing solutions across TRLs 1 to 6, addressing specific challenges faced by DND/CAF and their safety and security partners.

HIGHLIGHTS FROM 2023-24

Challenge	Available funding	Key achievements (2023-2024)	Objectives
Quantum Technologies Challenge	Up to \$3 million per project	 Six funded projects Focus on integrating and demonstrating quantum technologies for defence 	 Accelerate integration of quantum technologies into defence/security systems Leverage research to enhance DND/CAF capabilities in sensing, communication, and computing Form small, targeted groups of collaborators to develop and advance innovations that could be useful for defence. Transition quantum advancements from commercial/academic to military uses Maintain and advance Canada's leadership in defence quantum tech
5G Advancements Challenge	Up to \$1.5 million per project	Eight funded projects	 Leverage advances in 5G and beyond to address DND/CAF operational needs in communications, sensing, and security Develop and demonstrate architectures that enhance situational awareness, resilience, and adaptability Make sure wireless communications stay dependable and secure anywhere, anytime Build and connect new apps and sensors that can send lots of data, very quickly, from many devices at once, with almost no delay Support small, collaborative research groups so Canada can become a leader in using 5G technologies for defence

INNOVATION NETWORKS BY THE NUMBERS

CHALLENGES

TOTAL \$47.9 M

CONTESTS



Whether the purpose is to strengthen continental defence, advance military technologies, or anticipate future global threats, contests provide innovators with a platform to face their competition head-to-head and push boundaries. By participating in and being selected for these contests, innovators gain the opportunity to secure grant prizes that will propel their research and development.

IDEaS contests seek ground-breaking ideas, concepts and prototypes that offer solutions to complex and high-impact problems in defence and security.

Contests welcome innovations at various stages of development, with TRLs ranging from 1 to 6.

HIGHLIGHTS FROM 2023-24

The program continued to test and evaluate promising solutions. Notably, a cybersecurity platform developed by Sapper Labs successfully completed its evaluation, while the green energy project at CFB Kingston advanced closer to implementation. More test drives are expected in the coming year.

Contest Description		Highlight of work from 2023-24		
Pop Up City Contest	Round 3 winners tested prototypes in Round 4 for a chance to win a \$2 million grant prize.	In August 2023, Autonomous Resilient Community Systems (ARCS), Circular City and SNC-Lavalin Integrated Utility Management System tested prototypes in Suffield, Alberta. Circular City won the grant prize.		
5G Advancements Challenge	Eight finalists were selected to demonstrate their advanced robotic platforms and methods of control during DND site visits.	\$3.9 million was awarded in contribution agreements to eight recipients to demonstrate their solutions.		

CONTESTS BY THE NUMBERS

CHALLENGES LAUNCHED SINCE 2018

6

PROPOSALS RECEIVED SINCE 2018

832

PROJECTS APPROVED SINCE 2018

11

TOTAL FUNDING SINCE 2018

\$9.4M

NUMBER OF GRANTS AWARDED

56



SPOTLIGHT – POP UP CITY

With military operations often taking place in remote and austere environments, the need for efficient, sustainable, and self-sufficient infrastructure has never been greater.

The Pop up city Contest challenged innovators to develop integrated utilities management systems for Relocatable Temporary Camps (RTCs) used by the CAF.

The competition aimed to enhance energy efficiency, water conservation and waste reduction.

Innovators competed in four progressive rounds, advancing towards the development and testing of a fully functional prototype.

In the final round, in August 2023 at CFB Suffield, in Alberta, three teams demonstrated innovative, portable solutions that could be deployed in standard shipping containers and showed at least a 33% increase in efficiency across energy, water, and waste systems.

The Contest concluded with a grand prize of \$2 million awarded to the best integrated solution of those demonstrated during the final round. Circular City, led by Innocorps Research Corporation, emerged as the winner, securing the top prize by demonstrating the most effective utilities management system for RTCs. Their solution featured a portable high-recovery reverse osmosis water treatment system that maximized greywater reuse, provided on-demand warm water, and featured a smart-grid battery solution that activated generators only when needed.



IDEaS Pop up city video

Other finalists included:

- Autonomous Resilient Community Systems (ARCS), led by Terragon Environmental Technologies Inc., whose system combined solar panels and wind turbines with a robust waste incinerator capable of safely processing both solid and liquid waste, including petroleum-based materials.
- Integrated Utility Management System (IUMS), led by SNC-Lavalin, which introduced the Grengine platform, a lightweight, scalable energy solution using plug-and-play battery and inverter racks and an advanced microgrid that integrated seamlessly with water and waste systems.

Their technologies have potential applications beyond defence, including disaster relief and remote community support, and have attracted interest from organizations such as the Canadian Red Cross.

SANDBOXES



Sandboxes offer a valuable opportunity for innovators to showcase their products to DND/CAF experts, allowing them to demonstrate the capabilities of their innovations in a real-world setting. These events provide an environment where innovators can present their expertise in solution development and gain observational feedback from key stakeholders, including DND/CAF personnel, and potential users.

Typically held at CAF bases or DRDC research centres, sandboxes may also take place at other designated facilities.

The timing and location of each event are determined by various factors, including the availability of test environments (such as ranges), safety requirements, technical infrastructure, seasonal weather conditions, and logistical considerations such as transportation, accommodations, communications, and security.

HIGHLIGHTS FROM 2023-24

Sandbox	Description
event	Highlight of work from 2023-24
CUAS Sandbox 2024	Planning and preparation for CUAS 2024 occurred during the year, with the Sandbox operation beginning in May 2024.

SANDBOXES BY THE NUMBERS



ADDITIONAL R&D HIGHLIGHTS FROM 2023-24

The Hospital for Sick Children received \$449,500 to focus on research related to post-traumatic stress disorder (PTSD), specifically on brain and mental health analytics.

Centech received \$27,000 to lead an event aimed at fostering artificial intelligence (Al) innovation.

Additionally, contribution agreements with a total value of \$4.5 million were signed to modernize the manufacturing of munitions in Canada.

RESEARCH AND DEVELOPMENT BY THE NUMBERS

PROJECTS

TOTAL \$20.6M



Project	Recipient/ Initiative	Contribution agreement	Key focus/ details	Objectives
Translational Applications in PTSD	The Hospital for Sick Children	\$4.495 million	Focus on advanced brain, cognitive and mental health analytics in PTSD	 Advance research on brain, cognitive, and mental health analytics to better understand and address PTSD. Translate neuroscience and data science discoveries into diagnostic and treatment tools. Enhance CAF capacity to prevent, detect, and treat PTSD in personnel.
Al Innovation Ecosystem Engagement	Centech	\$27,000	Leading an engagement event for the Al innovation ecosystem	 Connect stakeholders in Canada's AI ecosystem to explore defence and security applications. Identify collaboration opportunities between innovators, academia, and industry. Increase awareness of IDEaS and stimulate participation in AI-related defence challenges.
Munitions Modernization	Various projects under Munitions challenge	\$4.5 million	Evaluation of projects to modernize Canada's munitions manufacturing in line with the Government of Canada's priorities in this domain.	 Advance technologies to modernize Canada's munitions manufacturing capabilities. Improve production efficiency, safety, and adaptability to evolving needs. Strengthen domestic defence manufacturing resilience and innovation capacity.

IDEAS MARKETPLACE



The IDEaS Marketplace was launched in June 2022 and has become the premier event of the IDEaS program. This event facilitates collaboration among academia, industry, and government partners, with the goal of assisting innovators in finding additional funding to bring their innovations to market. It also provides a platform for exchanging ideas and addressing challenges beyond traditional defence technologies.

As part of its broader impact, the IDEaS program also responded to national priorities during the COVID-19 pandemic. In total, \$5 million in agreements was awarded and 60 proposals were funded across two phases. Many of these projects were featured at the 2023 IDEaS Marketplace.

The 2023 iteration brought together more than 450 stakeholders and 570 attendees with 72 booths showcasing 64 innovative solutions, from innovators funded through the program's second

and third calls for proposals (2019-2020), the COVID-19 call for proposals and academia-led research clusters on autonomous systems and advanced materials. The COVID-19 call for proposals highlighted advancements to support future pandemic responses.

The event achieved several key program objectives:

- Increased awareness of IDEaS program innovations.
- Provided DND/CAF stakeholders with insight into newly developed technologies.
- Facilitated interactions between IDEaS innovators and potential public and private sector end-users.
- Highlighted cutting-edge research in advanced materials and autonomous systems.
- Showcased contributions to the Government of Canada's COVID-19 pandemic response.
- Created networking opportunities for the IDEaS alumni community.

MARKETPLACE 2023 BY THE NUMBERS

72 BOOTHS

64
SOLUTIONS
SHOWCASED

450+
STAKEHOLDERS

MORE THAN **570**ATTENDEES



IDEaS 2023 Marketplace video

INNOVATION SUPPORT REFERRAL PROGRAM

In May 2023, the IDEaS Innovation Support Referral (ISR) program was officially launched. This program aims to provide additional support to IDEaS innovators by connecting them with external government partners who can help them access further funding and advisory services.

In FY 2023–24, IDEaS referred 74 unique innovators and a total of 105 solutions to AGS. As a result, several of these innovators are now working with an AGS Innovation Advisor, receiving expert and tailored support to assist them in the next step of their innovation journey.

To strengthen these efforts, IDEaS has been working to establish Innovation, Science and Economic Development Canada (ISED)'s Accelerated Growth Services (AGS) as a key partner and recipient of IDEaS referrals.

The ISR program is available to all innovators who have completed or are in the process of completing advanced projects under Competitive Projects (Component 1B), Innovation Networks, and Contests.

OUTREACH AND PARTNERSHIPS



IDEaS partners with PAC to encourage the participation of small and medium-sized enterprises (SMEs) in the program. With five regional offices across Canada, PAC offers extensive knowledge of local subject-matter expert (SME) communities and maintains strong relationships with both suppliers and

buyers. Through memoranda of understanding (MOUs) with each region, PAC has expanded outreach efforts by organizing and participating in events and delivering information sessions to potential IDEaS innovators.



LOOKING FORWARD

After its first five years, the IDEaS program has evolved significantly, reflecting the changing landscape of defence and security as well as Canada's expanding role on the global stage. The world we face today is vastly different from the one we confronted just five months ago, let alone five years ago.

New and emerging threats—from cyberattacks to geopolitical tensions—are reshaping the way we think about defence, security, and sovereignty. These threats are increasingly complex and interconnected, underscoring the need for a dynamic and resilient defence ecosystem that is uniquely Canadian.

IDEaS has been central in fostering this innovation-driven approach, tapping into Canada's vibrant innovation ecosystem to strengthen our national security. As the pace of technological change and global competition accelerates, the program's role in advancing Canada's defence capabilities has never been more critical. By investing in cutting-edge science and technology, we are not only enhancing our ability to defend Canada but also ensuring our sovereignty and leadership on the world stage.

Looking forward, IDEaS will continue to support and drive core defence and security priorities identified by the Department of National Defence and the Canadian Armed Forces, while expanding its focus into new and emerging domains—such as cyber, artificial

intelligence, quantum, and space—where Canada can lead. Building collaborations and forging partnerships across sectors, IDEaS will help create the necessary linkages to bolster Canada's defence ecosystem. The program will empower innovators to contribute to a more secure Canada while supporting our ability to respond swiftly to evolving challenges and threats.



