



National
Defence

Défense
nationale



CANADIAN
ARMED FORCES



20²²/₂₃ ANNUAL REPORT



IDEaS

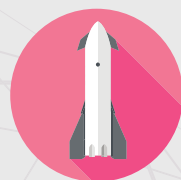
**INNOVATION FOR DEFENCE
EXCELLENCE AND SECURITY**

Canada 



IDEaS

INNOVATION FOR DEFENCE EXCELLENCE AND SECURITY



ABOUT INNOVATION FOR DEFENCE EXCELLENCE AND SECURITY (IDEaS):

Since launching in April 2018, IDEaS has been working with Canadian innovators to develop the 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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MESSAGE FROM DR. JASPINDER KOMAL

ASSISTANT DEPUTY MINISTER, DEFENCE RESEARCH AND
DEVELOPMENT CANADA

Tested and true: IDEaS is ramping up field-ready technology



As innovators, every step is a gamble. It's a bet on your instincts, your readiness to continue, your willingness to take things in a direction you didn't expect. What is born unsteady can suddenly take on a grace of movement all its own.

We see this every day as we push technologies forward.

More than 20 technologies which started in the infancy of this program have now graduated to a state of readiness for testing by the Department of National Defence (DND) and Canadian Armed Forces (CAF). This is a leap forward, but it is also just a drop in the ocean of potential of the Canadian innovation ecosystem.

Since the program's inception, we have seen innovators collaborate, create partnerships, and demonstrate leadership. You have bravely shared your vision to enhance defence capabilities, and real progress has been created simply by allowing these innovative concepts to breathe.

Many concepts have merged, been dissected, and diverged from where they started; this is the life of an innovator. Much of this technology has sought a place outside of the walls of the DND/CAF, we were happy to help you find it. That is why IDEaS created Marketplace, as an outlet to all the possibilities your technology can find. We built it, and defence primes, other government partners, and academia came.

From artificial intelligence to autonomous systems, quantum technologies to pop up cities, Canadian innovators have taken the leap over and over, and we are honoured to have been beside you. In our journey together, we see that movement in any direction is growth.

Together, we continue building an evergreen and growing innovation ecosystem for the DND/CAF and Canadians.

MESSAGE FROM PHILIPPE HÉBERT

DIRECTOR GENERAL R&D INNOVATION



I am pleased to share with you the 2022-2023 IDEaS Annual Report. This is an exciting year for IDEaS, with many technologies becoming a reality. We have been hard at work, advancing early-stage technology,

testing advanced concepts, and bringing innovators together in new ways.

Our first Contest, Pop up city: Integrating energy, water and waste management systems for relocated temporary camps selected three finalists to demonstrate their solutions. These innovators built project teams over the course of the previous rounds, pitched their concepts, and will be eligible to test their prototypes in Round 4 and vie for an additional \$2 million prize.

As concepts mature, iterative change drives progress. Returning this year was the second round of the Counter Uncrewed Aerial Systems (CUAS) Sandbox. The 2022 event brought 67 visitors from 10 countries and various areas of expertise to observe and assess the latest counter-drone technologies from 12 innovators. The Sandbox team also held its first corrosion detection in ships demonstration, to help the Royal Canadian Navy with maintenance through early detection and assessment.

Finally, through Competitive Projects funding, the Test Drive element was brought to life. Three technologies funded through our continuum and focusing on cyber attribution, detection, and classification of areas of interest, and interpreting full motion video are being put into realistic scenarios for testing. A fourth Test Drive, which sought market-ready solutions from industry for low carbon energy generation and transfer systems, will look to shrink the DND/CAF's carbon footprint.

Through five intense years of planning, trials, and hard work, many new technologies have come to light. Twenty products have been identified as a candidate for a Test Drive. Many more are being developed through the Competitive Projects element. A Pop up city Contest will deliver an integrated energy, water and wastewater system. Green energy solutions are being tested for the DND/CAF. And we are just getting started.

UNITING THE DEFENCE INNOVATION COMMUNITY

ENTERING ITS FIFTH YEAR, IDEaS CONTINUES TO GROW AND EVOLVE, INCORPORATING NEW INITIATIVES AND ELEMENTS INTO ITS INNOVATION PORTFOLIO.

The program's five funding elements have brought together networks of researchers, created innovative partnerships, and connected accelerators, the DND/CAF, and private industry.

Additionally, a new initiative called IDEaS Marketplace launched this year. IDEaS Marketplace brought IDEaS funded technology out of the lab and into the hands of the larger defence and security community.

The showcase event allowed innovators from the first calls for proposals under the Competitive Projects element to share their solutions developed with the assistance of the IDEaS program to potential end users. This included members of the DND/CAF, external government partners, and industry.



The event attracted over 400 stakeholders to view IDEaS funded technology, a testament to the need to invest in burgeoning fields of defence and security such as artificial intelligence, cyber security, and real-time data analysis.

Meanwhile, through IDEaS funding, technology is maturing and getting pushed forward at an accelerated pace into the defence and security sphere. The Test Drive element continued to strengthen the IDEaS technology portfolio, with three directed Test Drives and one open call Test Drive progressing advanced state technology through the IDEaS innovation continuum.

Through our Contests element, we have selected seven innovators to demonstrate their advanced robotic platforms and methods of control as part of our Robot round up challenge. And the Pop up city Contest is ready to demonstrate prototype integrated energy, water, and waste management systems for the CAF's Relocatable Temporary Camps (RTCs).

IDEaS is also engaging with the broader innovation community. The program is helping to support the establishment of the NATO DIANA program's Canadian hub. The challenge-based program is designed to bring together an ever-increasing network of accelerators, test centres, and innovators across the NATO alliance. IDEaS also supports the Canadian Safety and Security Program (CSSP), which focuses on improving emergency management and public safety response.

Seeing advancements reach real world scenarios helps provide incentive for the next generation of Canadian innovation, as well as drive the change needed to keep the Defence Team at the ready.

PROGRAM PERFORMANCE

IDEaS continued to advance multiple solutions through its innovation continuum for DND/CAF.

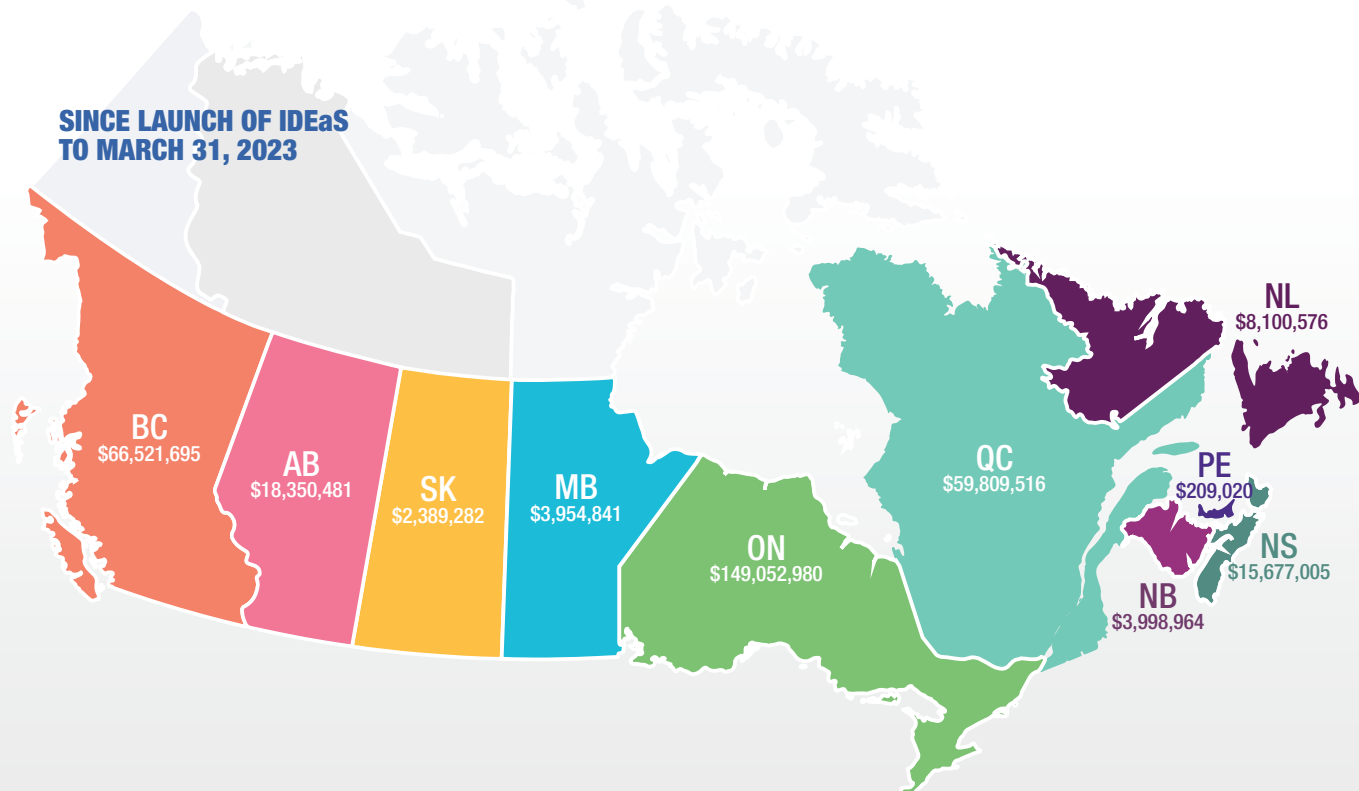
SINCE LAUNCH OF IDEaS TO MARCH 31, 2023



APRIL 1, 2022 TO MARCH 31, 2023



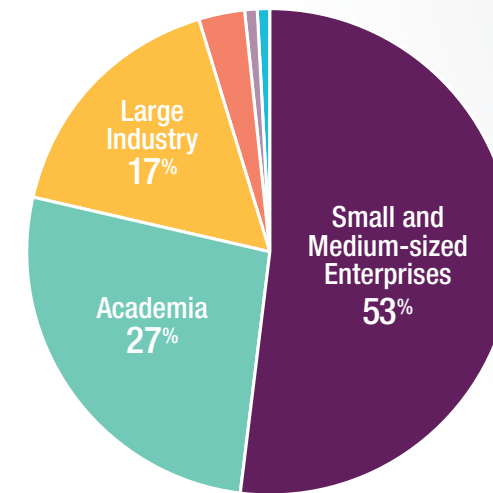
SINCE LAUNCH OF IDEaS TO MARCH 31, 2023



INNOVATOR TYPE BREAKDOWN:

SINCE LAUNCH OF IDEaS TO MARCH 31, 2023

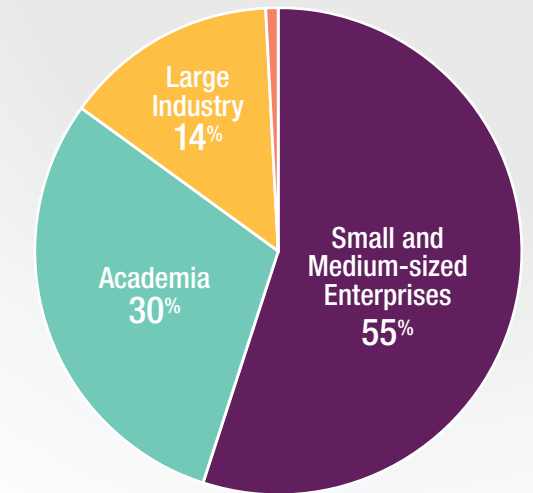
OTHER <1%
INDIVIDUAL <1%
NOT-FOR-PROFIT 3%



305 UNIQUE RECIPIENTS

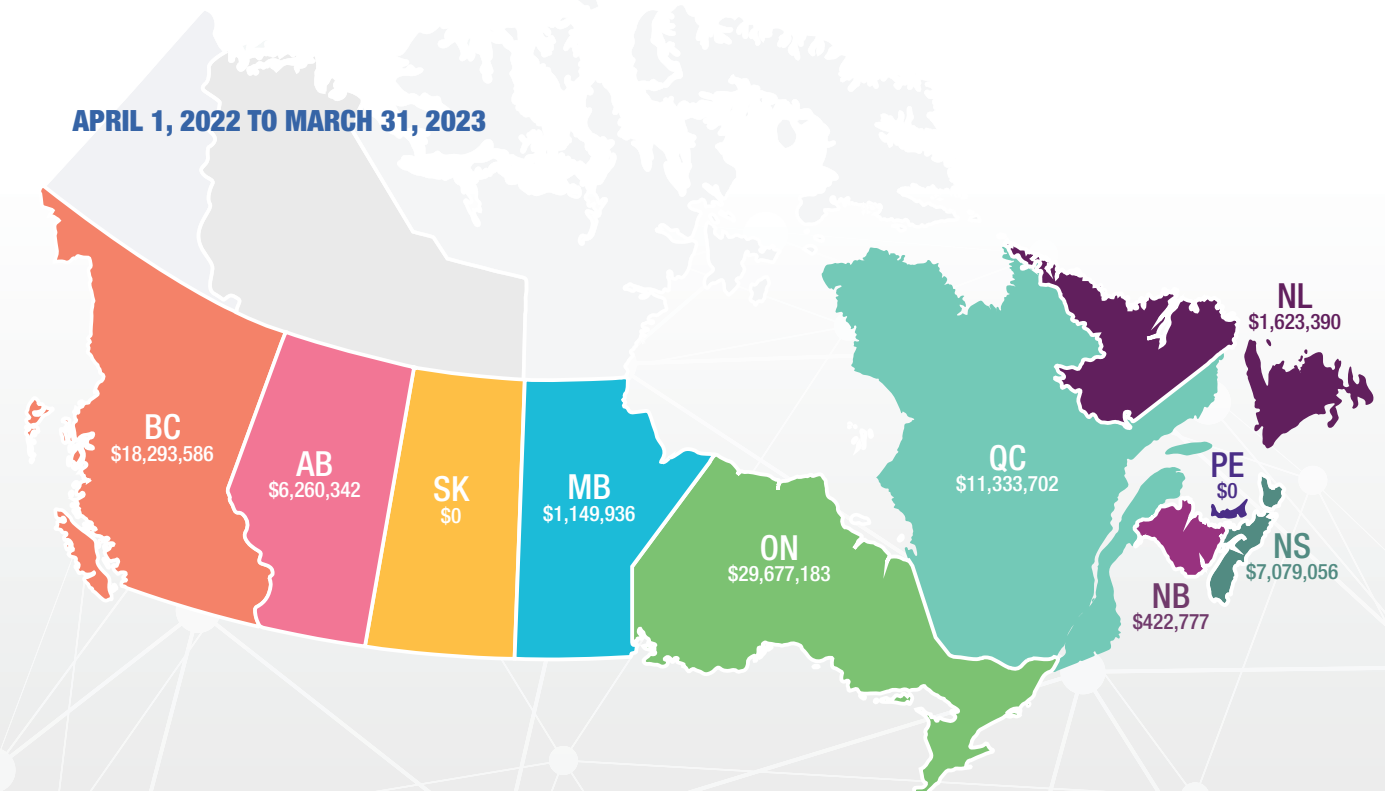
APRIL 1, 2022 TO MARCH 31, 2023

OTHER 0%
INDIVIDUAL 0%
NOT-FOR-PROFIT <1%



70 UNIQUE RECIPIENTS

APRIL 1, 2022 TO MARCH 31, 2023



PROGRAM OF WORK UPDATES

COMPETITIVE PROJECTS: FIFTH CALL FOR PROPOSALS CONTINUES



IDEaS' FIFTH CALL FOR PROPOSALS CONTINUED IN 2022-2023 WITH AN ADDITIONAL EIGHT CHALLENGES LAUNCHED.

Challenges

Do You Copy? Establishing and Maintaining Broadband Connectivity in Remote and Hostile Areas

The Needle in the Haystack: Space-Based Intelligence, Surveillance and Reconnaissance (SB-ISR) Imagery for Decision Making

Sub-Zero Infrastructure, Security, and Sensors: Safekeeping Assets in the Arctic

Under the Sea: Real-Time Detection of Marine Mammals During Sonar Operations

Land to Sea with Low GHGs: Arctic eco-safe transit of personnel and cargo from ship to shore

Loud and Clear: Assured naval radio communications in complex electromagnetic environments

Best of Both Worlds: Human autonomy teaming for effective decision making

Under Pressure: Just-in-time medical resupply in austere environments

COMPETITIVE PROJECTS AT A GLANCE FOR 2022-2023

8
CHALLENGES
LAUNCHED
(ADDITIONAL CFP5 CHALLENGES)

198
PROPOSALS
RECEIVED

64
PROJECTS
SIGNED

TOTAL FUNDING:
OVER
\$12.7M

TEST DRIVES



IDEaS MARKED SIGNIFICANT MILESTONES FOR TECHNOLOGY ADVANCEMENT, WITH ITS FIRST PROJECT FROM THE COMPETITIVE PROJECTS ELEMENT COMPLETING A TEST DRIVE, AND A THIRD PROJECT COMMENCING A TEST DRIVE.

In December 2022, Sapper Labs' solution concluded its Test Drive, with the DND/CAF looking forward to reviewing the results of this effort in the coming months.

In May 2022, another Test Drive contract valued at \$10.5 million was officially awarded to TerraSense Analytics Ltd. for their Input Surveillance & Tracking (MIST) technology, making it the third project selected from Competitive Projects' first Call for Proposals to be "test-driven" by the DND/CAF.

The MIST solution is an integrated hardware and software Artificial Intelligence (AI) solution that detects, tracks, and identifies multiple objects, persons, and events of interest across multiple sensors.

Since December 2021, work has been underway to complete a Test Drive of Ecopia's solution from the Competitive Projects' first Call for Proposals. The Canadian Forces Intelligence Command has now commenced its first phase of testing their technology to detect, recognize, identify, and track objects of interest using AI and machine learning.

The Green Heat Test Drive, which aims to equip an existing building in Canadian Forces Base Kingston with a large-scale, low carbon energy generation/transfer system that is integrated with its current hydronic heat distribution systems, is nearing construction anticipated in 2023.



INNOVATION NETWORKS



This year, the Innovation Networks element launched a new challenge titled *Preparing for a quantum world: Defence applications of quantum technologies*. The challenge looked to stimulate the application of advances for quantum technologies in the defence and security domain from academia and private sector partners. There was an impressive response, and the IDEaS team evaluated over 50 applications. Ultimately, six teams will be selected to share \$18 million in funding.



In May 2022, the program also signed eight contribution agreements (total value of \$12 million) for the development of research clusters to advance 5G capabilities and concepts for defence and security. The challenge looked to expand upon the defence specific domains of architectures for defence and security operations, assured performance and security, and applications and sensors.

In June 2022, IDEaS also held its 2nd Annual Innovation Networks Symposium for two Innovation Networks challenges: Autonomous systems for defence and security: Trust and barriers to adoption, and Advanced materials for defence & security: Seeking innovation in detection avoidance and physical protection. This is the mid-point in these research projects, and researchers highlighted the work underway. The event also provided an opportunity to engage with other innovators and officials from the DND/CAF, DRDC, and Other Government Departments.

CONTESTS



In January 2022, Round 3 winners of the Pop up city: Integrating energy, water and waste management systems for the CAF's RTCs Contest were officially announced, with Terragon Environmental Technologies Inc., Innocorps Research Corporation and SNC-Lavalin Integrated Utility Management System receiving \$1.5 million contribution agreements to build their prototypes. In spring 2023, these innovators will be eligible to test their prototypes in Round 4 and vie for an additional \$2 million prize!

In June 2022, IDEaS launched the new Robot round-up – Advanced robotics platforms and control solutions Contest. Canadian innovators were asked to propose a solution using advancements in robotic platforms and methods of control, such as AI, machine learning, haptic sensing, and heads-up display (HUD) that could be leveraged to help the DND/CAF members accomplish high risk tasks. Seven finalists have been invited to demonstrate their solutions.

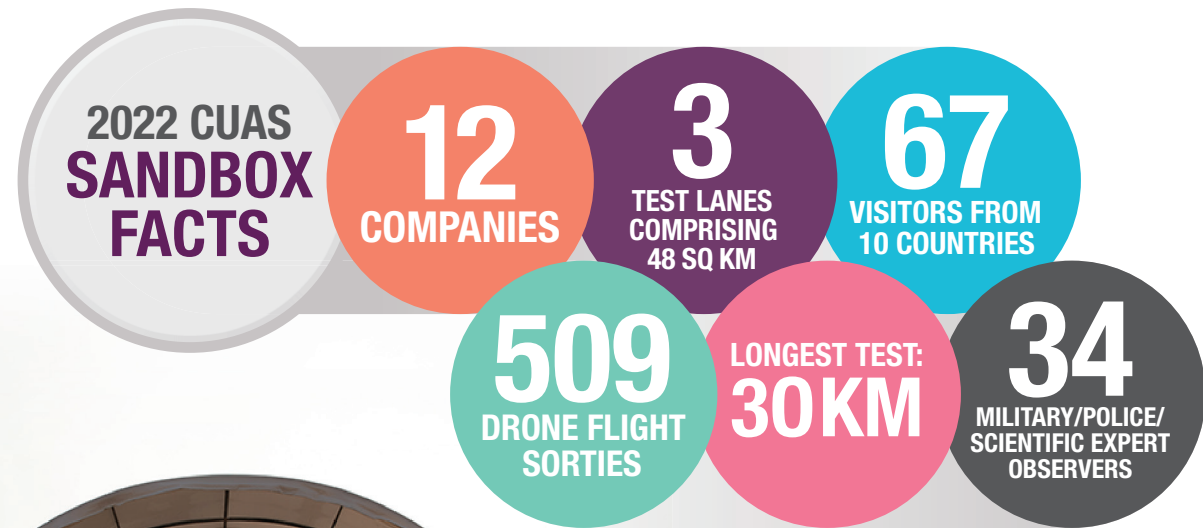


SANDBOXES



Sandboxes are opportunities for innovators to get their products and services in front of National Defence experts and demonstrate their capabilities. Innovators receive observational feedback from DND/CAF experts, and potential users. Demonstrations are experiences where innovators are given real world defence scenarios and equipment to test their technologies.

The second IDEaS Sandbox for Rise, Detect, Defeat: Countering Uncrewed Aerial Systems (CUAS) took place from September 12 to October 7, 2022, in Suffield, Alberta, with companies from Canada and abroad who demonstrated their innovations. Due to the success of CUAS 2022 and the rapidly evolving nature of the security threat and technology solutions in this challenge space, IDEaS will be conducting a third CUAS Sandbox in 2024.



COVID-19 CHALLENGES: IDEaS FUNDED SOLUTION HITS THE MARKET

In January 2023, an IDEaS project funded as part of the COVID-19 super sanitize challenge geared up for market. GermStopSQ, a surface disinfectant with staying power, was approved by Health Canada for commercial uses.

At the onset of the COVID-19 pandemic, the IDEaS program launched four challenges, ranging in topic from moral trauma to sanitization to using big data to track the virus, as part of the pan-governmental response to COVID-19. IDEaS selected 48 projects to receive \$200,000 in funding. Of these original 48 projects, 12 projects received an additional \$1 million in funding to pursue their research.



COLLABORATION AND OFF-RAMPING OPPORTUNITIES

MARKETPLACE: BRINGING NEW IDEAS TO LIGHT

A new initiative by IDEaS looked to extend IDEaS investments while allowing innovators to find new paths forward for their technologies.

Launched in June 2022, IDEaS Marketplace brought innovators face to face with potential partners, investors and government programs that could benefit their technology.

Dynamic presentations covered a number of challenges faced by the DND/CAF. Some of these themes included: Human Performance Enhancement, Artificial Intelligence, Maritime Surveillance, Robotic Systems, Chemical, Biological and Radiological Hazard Detection, Identification and Classification of Space Objects, and

Advancements in the treatment of Post-Traumatic Stress Injuries.

Held at the Infinity Convention Centre in Ottawa, Ontario, the inaugural event featured innovators from the first Competitive Projects Call for Proposals that reached a Technology Readiness Level 6 or above.

With the ability speak directly with decision makers and pitch their concepts, innovators had meaningful interactions across both government and private industry.

Building on the success of the 2022 event, the next Marketplace will be held in June 2023 at the Shaw Centre in Ottawa, Ontario, and will look to continue to foster new connections, collaboration, and partnerships.



The pitch style event allowed innovators to showcase their solutions, as well as build new partnerships to help further push their technologies forward.



PROGRAM EVALUATION

IDEaS underwent a formal [program evaluation](#) through DND's Program Review Services Branch and in accordance with the Treasury Board Policy on Results.

THE EVALUATION FOCUSED ON:

- 1 THE RELEVANCY OF THE PROGRAM;**
- 2 THE PROGRAM'S ABILITY TO ENGAGE INNOVATORS;**
- 3 BENEFITS OF PROGRAM OUTCOMES TO THE DEFENCE AND SECURITY COMMUNITY; AND,**
- 4 THE EFFICIENCY OF THE PROGRAM FOR THE PERIOD BETWEEN FISCAL YEARS (FY) 2017/18 AND 2021/22.**

Also considered was the extent to which the program has achieved expected results, in line with its short-term and medium-term objectives. Over the short-term, the program aimed to engage innovators and solicit concepts and initiatives to solve the DND/CAF issued challenges (i.e., competitions in need of solutions to specific defence and security issues). In the medium-term, IDEaS aimed to engage Canadian innovators to solve defence and security challenges.

The findings of the evaluation show that the IDEaS program remains relevant in the evolving global defence and security environment and has effectively engaged small or medium-sized enterprises and academia, further cultivating those networks to strengthen the innovation ecosystem within Canada. The program has effectively facilitated the advancement of a range of solutions to address defence and security challenges and has had varying levels of success in delivering its allocated funding throughout the evaluation period.

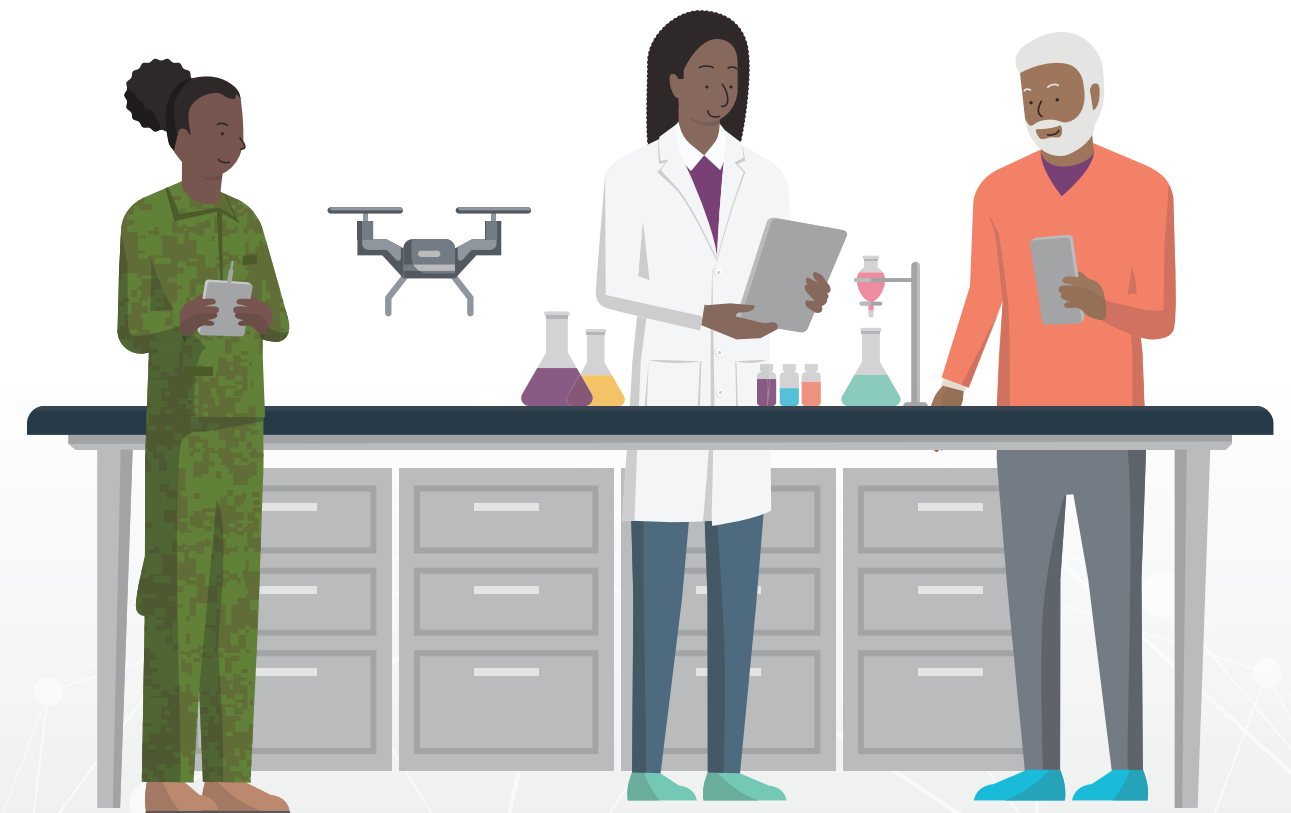
CONCLUSION

Like technology, the defence innovation landscape is constantly shifting. New synergies are being created and defence and security related capabilities are being augmented. The advent of challenge-based programs such as NATO DIANA and other government efforts such as Innovative Solutions Canada, are bringing new players to the table.

Through continued collaboration with these programs, as well as initiatives like Marketplace, IDEaS continues to deliver solutions for the DND/CAF, while widening the possibilities for Canadian innovators. The Test Drive pipeline is full, with over twenty test ready products having traveled through the IDEaS innovation continuum.

Research networks in advanced fields are tapping into academic expertise and preparing for the next generation of opportunities and threats. And the ability for innovators to demonstrate their capabilities to the DND/CAF provides invaluable insight into the state-of-the-art technologies available.

Navigating the terrain of the future requires an agile solution framework, of which IDEaS is an integral part.





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