



National  
Defence

Défense  
nationale



# OVERVIEW of Defence R&D Canada



## About DRDC

- A National Leader in Defence and Security Science and Technology (S&T)
- A Civilian agency of the Department of National Defence (DND)
- Provides DND, the Canadian Armed Forces (CAF) and other government departments, as well as the public safety and security communities, with the knowledge and technologies needed to defend and protect Canada's interests at home and abroad.
- Assistant Deputy Minister (S&T)



## S&T Strategy

- [Science and Technology in Action: Delivering Results for Canada's Defence and Security \(2013\)](#)
- A comprehensive, long-term blueprint
- Based on three key approaches to knowledge advantage:
  - Build, Collaborate, Access



# DRDC Key Facts

- 8 research centres located in 4 provinces
- 1,400 employees
- \$275 million operating budget





# S&T Portfolios



ARMY



AIR FORCE



NAVY



FORCE EMPLOYMENT



JOINT FORCE DEVELOPMENT



PUBLIC SAFETY AND SECURITY



STRATEGIC DECISION SUPPORT



PERSONNEL



# Innovation for Defence Excellence and Security (IDEaS)

Department of National Defence  
November 2017



“Innovative technology, knowledge, and problem solving are critical for Canada and its allies to mitigate new threats, stay ahead of potential adversaries, and meet evolving defence and security needs, while generating economic benefits for Canada.”

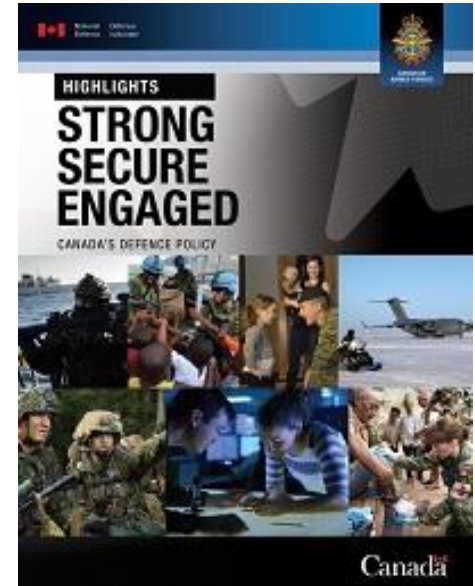
**Strong, Secure, Engaged**  
Canada's Defence Policy



# Defence & Security Science & Technology (S&T)

- The **complex** and **constantly evolving** nature of **conflict** and **crises** requires S&T to address potential threats and risks, such as:

Space, cyberspace	Natural disasters, major accidents, crime
Emerging disease, pandemics	New and unpredictable adversaries (e.g. ISIL)
Unstable and failing states	Terrorism and technology
Globalization of S&T and pace of technological development (e.g. quantum, synthetic biology, artificial intelligence, etc.)	



- In this new environment, IDEaS is an augmentative approach to accessing innovation allowing Canada's military to better tap into extraordinary talent and ingenuity resident in Canada.





# The Innovation Imperative

## WHY WE MUST INNOVATE

- Nature of conflicts and threats is rapidly evolving and changing as new technologies, players and domains emerge;
- Current suite of S&T defence and security programs and investments is inadequate to address these changes (“innovation deficit”);
- Must innovate to maintain defence capabilities that address current and emerging challenges; to stay ahead of rapidly evolving technology; and inform future decisions; and
- Must innovate to remain economically competitive.

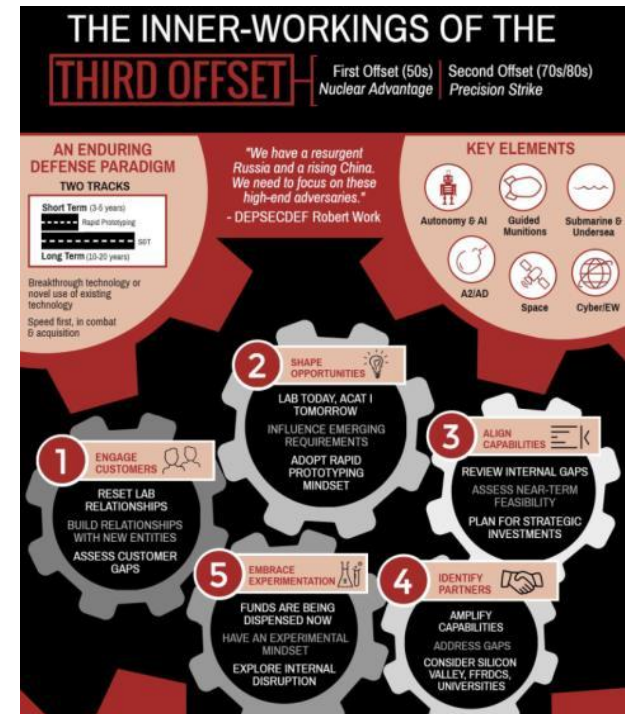
## HOW WE CAN INNOVATE

- Recruit more of the Canadian innovation ecosystem to be partners in the delivery of S&T for defence and security;
- Foster a technologically advanced and innovation-driven defence and security sector capable of addressing evolving threats and generating economic benefits;
- Increase partnerships and collaboration to foster and leverage emerging S&T developed across the innovation ecosystem; and
- Leverage the buying power of government to target sectors that have the most innovative solutions.



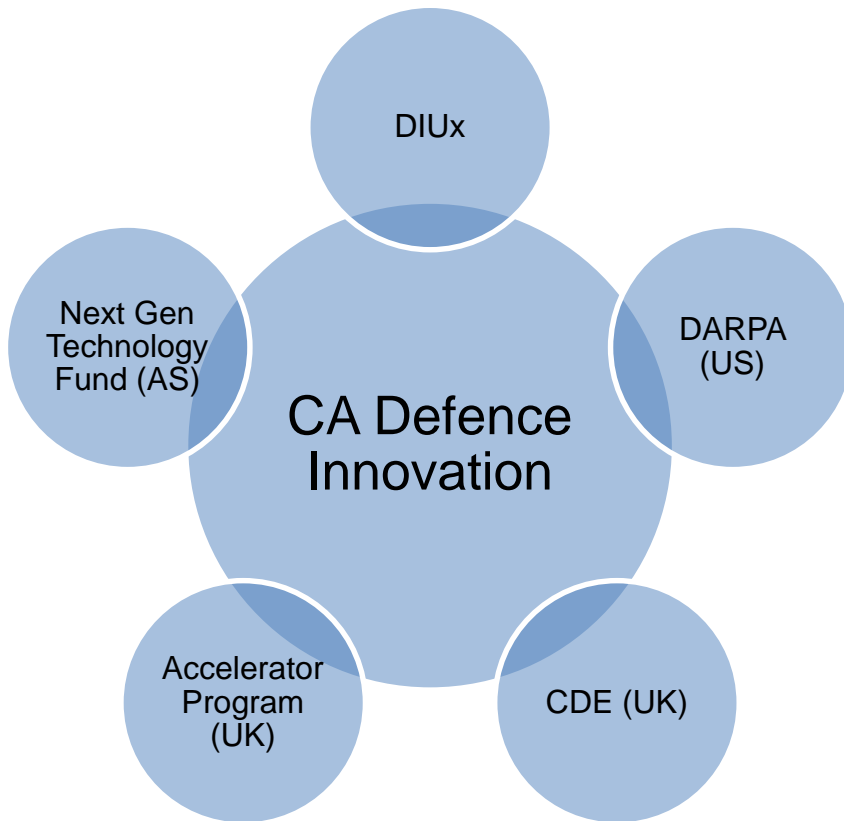
# Aligning with Allies

- In 2014, the **U.S.** launched its *Third Offset Strategy* (U.S. \$3.6 billion) aimed at leapfrogging the conventional R&D process by tapping into civilian efforts and improving collaboration with innovative private sector enterprises.
- In 2016 **Australia** launched the *Next Generation Technologies Fund* (\$730 million over 10 years) and a *Defence Innovation Hub* (\$640 million over 10 years) to undertake collaborative innovation activities from initial idea, through testing to application.
- In 2016, the **United Kingdom** in support of Innovate UK, launched the *Defence Innovation Initiative* (£800m over 10 years).





# Lessons Learned from the International Defence and Security Innovation Landscape



## PRINCIPLES

- Fail fast, learn fast
- Agile business process proposal, selection and engagement
- Multi-disciplinary approach
- Hardest problems attract best ideas

## ELEMENTS

- Ideation across innovation cycle
- Open calls for proposals – Competitive Projects and Contests
- Innovation networks
- Curated demonstration (sandbox) allows innovator to get feedback
- Innovation assessment & implementation - allows innovator to get evaluation in realistic environment
- Integrator - partner to accelerate adoption
- Mobility – share human resources between organizations



## Canada's New Defence Policy makes significant investments in innovation

- The policy commits to investing \$1.6 billion in innovation over 20 years (\$313M in the first 5 years).
- DND to launch the **Innovation for Defence Excellence and Security (IDEaS) Program** with this investment, to be led by ADM(S&T).
- The IDEaS Program will accelerate and stimulate S&T by:

Engaging academia/industry/scientists/entrepreneurs in <b>Ideation Events</b> to identify Defence & Security S&T Challenges;	Creating and supporting <b>Networks</b> to build a critical mass of S&T expertise across academia, industry and government;
Creating <b>Contests</b> around key Defence and Security problems to access innovation and stimulate breakthroughs;	Providing <b>Sandboxes</b> that will provide Canadian innovators with feedback on the applicability and effectiveness of their prototypes from D&S practitioners; and
Supporting phased (gated) <b>Competitive Projects</b> that will allow for development of promising ideas;	Allowing innovations to be acquired to evaluate and implement them in an operational environment.



## Examples of activities that IDEaS could support...

Challenge	Develop an algorithm for increasing data rate flow by 3 fold through a communication channel with constraints x, y and z	6 months project - sandbox – tech assessment
Project	Develop a diagnostic test for traumatic brain injuries that will show a correlation of at least 70% between the marker and disease symptoms	6 months project – 12 months project – 12 months project
Project	Develop a quantum-based method for measuring time and space	1 year project – 2 year project
Project	Study the determinants of resilience in a community to provide recommendations for government actions	3 year project
Project	Improve night vision goggle performance by two fold for resolution and lumen intensity	2 year project
Network	Create a working group of Containment Level 4 labs in Canada for the identification of best practices and capability gaps requiring research	Multi year network



L1 Priorities



Ideation Event



S&T Challenges

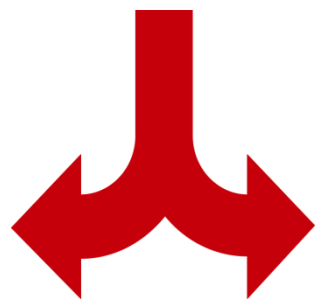
Competitive Projects

Contests

Innovation Networks

Mobility

Enablers



Sandboxes

Innovation Assessment & Implementation

Integrators



## Ideation Events (TRL 1-8)



Multi-disciplinary creativity sessions facilitating the generation of ideas



An environment to generate defence & security ideas and concepts by fostering collaboration

1. A series of design/lateral thinking exercises
2. May be conducted at any stage of the innovation cycle
3. Multiple ideation sessions each year



# Incentivise Innovative Ideas



Competitive Projects

Contests

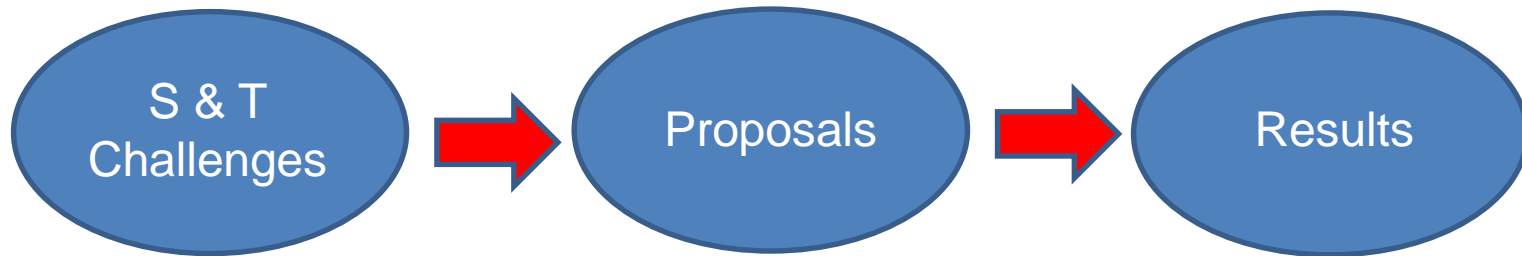
Assessment by Operators

- Competitive Projects
  - Responses to Defence and Security S&T Challenges
  - Agile contracting
  - Simplified contracting process
- “Contests” Outcome based prizes (Grants)
- Assessment by Operators
  - Support sequential development and gated evaluation through sandboxes
  - Putting the technology in the hands of operators for assessment
  - Enable quicker development toward adoption





# Competitive Projects (TRL 1-6)



- Defence & Security Challenges
- Call for Proposals
- Competitive Process



- Short Form Contract
- Up to 130 concurrent projects

- Gated Process
- High Risk / High Reward
- Evaluation Criteria



# Contests

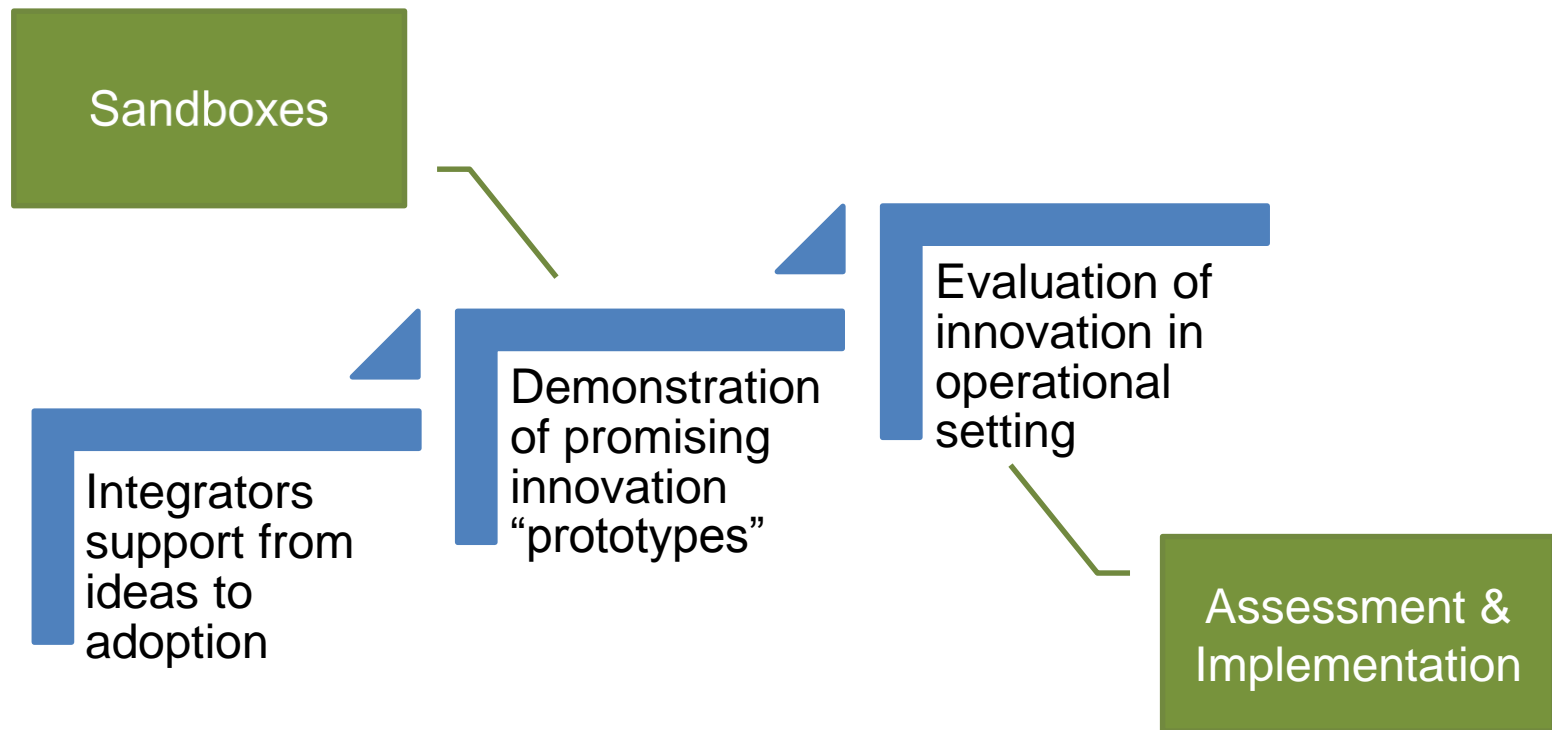
Challenges engage innovators to compete and demonstrate solutions to defence and security problems

Challenges incentivize the creation of innovation by larger pools of participants

Challenges can award prizes for successfully addressing a defence & security challenge



# Accelerating the adoption of new ideas



- An opportunity to experiment and demonstrate early TRL (6-7) prototypes in a curated setting to facilitate the creation of a superior solution
- Expert feedback to innovators on the applicability and effectiveness from defence and security practitioners



## Sandboxes (TRL 6-7)

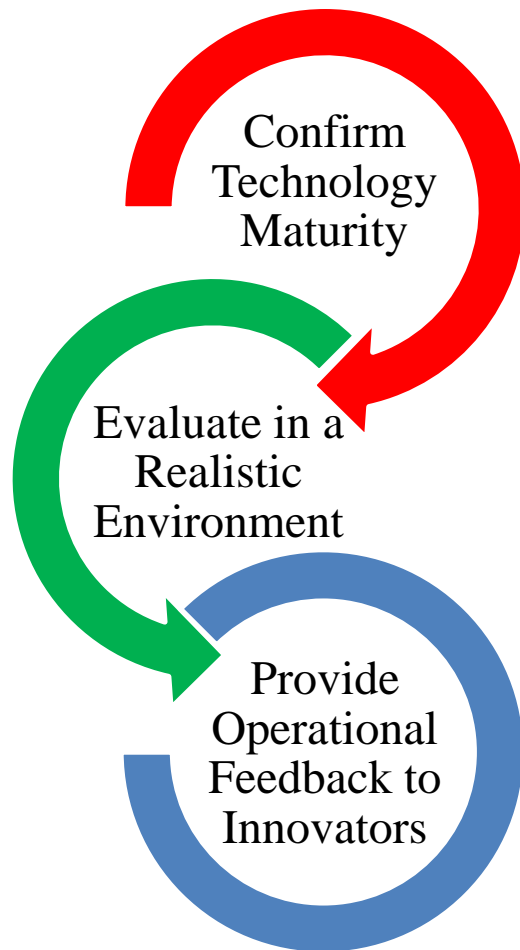
Provide Canadian innovators with:

- An opportunity to demonstrate early TRL prototype in a curated setting to experiment to create a superior solution
- Expert feedback on the applicability and effectiveness from defence and security practitioners

- Iterative Experiments
- Rapid Prototyping
- Fail Fast Approach
- Obtain Expert Feedback
- Up to 5 Sandboxes per year



# Innovation Assessment and Implementation



To allow defence & security practitioners to procure solutions for the purpose of evaluation in a realistic setting by defence and security stakeholders



And many more...



## Next Steps

- Consultation with industry, academia, partners (national and international), and innovators to shape program elements and business cycles
  
- The first IDEaS Calls for Proposal will:
  - Address multiple S&T Challenges in one single call
  - Seek innovation proposals from participants (Competitive Projects)
  - Be launched at the end of fall 2017
  - Be followed by other calls using other IDEaS tools in the weeks/months to come



# Comparison between IDEaS and other innovation programs

	BCIP	ISC	IDEaS
<b>Program Development and funding</b>			
TRL 1-6		✓	✓
TRL 7-9	✓		✓
Gated Developments		✓	✓
Vote 1 contracts	✓	✓	✓
Vote 10 grants/prizes			✓
Vote 10 contributions			✓
Provides funding to innovators (100%)	✓		✓
First customer procurement	✓		✓
Defence and Security focus	✓		✓
<b>Participation</b>			
Academics/not for profits			✓
Small and Medium Enterprises	✓	✓	✓
Large companies	✓		✓
Allies			✓
<b>Engagement of Innovators</b>			
Ideation events to engage innovator			✓
Assessment of innovation	✓	✓	✓
Foster mobility of innovators between organizations			✓
Establish/fostering of networks of innovators			✓
Client and SME to act as integrator to transition innovation			✓