Submission to the Standing Committee on Science and Research's Study on Canada's Dual Use and Defence Research Needs

Submitted by U15 Canada

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Summary of Recommendations

To strengthen Canada's dual-use and defence innovation capacity, and ensure sovereign capabilities in critical technologies, U15 Canada recommends:

1. **Recognize research universities as foundational to sovereign capabilities.** Position the capacity of Canada's leading research universities across fundamental, dual-use, and mission-oriented research as a core pillar of Canada's sovereign capability development and Defence Industrial Strategy. This should be reflected in federal investment priorities and policy frameworks.
2. **Build scalable, structured mechanisms for university engagement in dual-use research.** Connect leading research universities with government and industry partners across the full research continuum. This should include mechanisms that are designed with sufficient ambition, structured to engage universities as genuine strategic partners, and resourced to operate at the scale the moment demands to advance sovereign capabilities.
3. **Establish trusted pathways for collaboration.** Enable controlled and classified collaboration with universities, including accelerated security clearances for researchers and accredited university research environments.

Introduction

Canada's leading research universities develop talent, drive innovation and deliver impact across the country. At a time when the rules-based international order is under profound stress, building domestic research capacity is critically important to Canada's sovereignty and prosperity.

Innovation is foundational to modern defence. Canada's leading research universities are uniquely positioned to drive breakthroughs in next generation, dual-use technologies like quantum, AI and arctic monitoring. This is research that supports both national security and economic prosperity.

Canada has now reached NATO's 2% defence spending target, a milestone that signals seriousness in a more uncertain world and reinforces Canada's credibility as a reliable partner. As Canada boosts defence spending, it will be critical to realize the unfulfilled potential of Canada's research ecosystem. Currently, a lower share of Canada's defence spending goes towards research than nearly all NATO members.

Leading research universities in Canada are home to expertise and advanced infrastructure in emerging technologies that will be critical to keeping Canadians safe and securing our economic and technological sovereignty. This capacity is a national asset. But unlike many of our peers, Canada has not yet built the mechanisms required to mobilize the existing capacity of our universities deliberately, at scale, in support of sovereign capability development.

Canada's dual-use and defence research needs require a coherent system in which universities, industry, and government laboratories operate not as disconnected actors, but as an integrated engine of innovation capable of moving from discovery to deployment across the full continuum of research and technology development.

Getting this right will not only strengthen Canada's security, it will help resolve some of Canada's most persistent economic challenges.

The Role of Leading Research Universities

Built through decades of sustained public investment and deep partnerships, the research ecosystem across U15 universities represents one of Canada's most significant and underleveraged national assets. U15 universities conduct the majority of Canada's academic research, perform approximately $8 billion in sponsored research annually, and host most of the country's approximately 84,000 researchers.

Canada's leading research universities are hubs that connect a network of partners to world-leading expertise, infrastructure and talent, helping to accelerate innovation in sovereign capabilities. U15 universities are connected to thousands of partners, produce thousands of invention disclosures and patents, and have formed over 1,100 research-based start-ups since 2010.

The task is not to create new capability from scratch, but to connect and mobilize what already exists.

Driving Innovation in Sovereign Capabilities

Leading research universities have already built world-leading capacity across the dual-use technology domains the Defence Industrial Strategy identifies as sovereign capability priorities.

In artificial intelligence, Canadian universities—anchored by institutions such as Mila, the Vector Institute, and Amii—helped establish Canada as a global pioneer and continue to train the majority of the country's AI talent.

In quantum computing and quantum sensing, U15 universities host more than 2,800 grants involving over 2,000 experts, with world-class facilities including the University of Waterloo's Institute for Quantum Computing and UBC's Stewart Blusson Quantum Matter Institute anchoring a broader national cluster.

In advanced materials, aerospace, autonomous systems, Arctic domain awareness, biodefence, and the life sciences, U15 universities have built critical mass, supported by $26 billion in Canada Foundation for Innovation infrastructure investments, that few peer countries can match at a comparable scale.

Canada's health and life sciences capacity deserves particular emphasis. CIHR invests roughly $1.3 billion annually in health and medical research and training, with over 90% competitively awarded to U15 universities. Affiliated academic health sciences centres and teaching hospitals extend this capacity further, embedding research universities in the infrastructure that connects discovery science to public health response and operational readiness.

Canada's social sciences and humanities research base contributes directly to defence policy, Arctic sovereignty, democratic resilience, ethics, and the governance of emerging technologies.

University research centres across Arctic and northern domains are building sovereign infrastructure in close partnership with Indigenous and northern communities. Sentinel North at Université Laval was backed by $98 million from the Canada First Research Excellence Fund and leveraging a further $242 million from the university and partners and built a globally networked platform spanning more than 90 interdisciplinary teams and 350 collaborations. The Churchill Marine Observatory at the University of Manitoba provides a unique multidisciplinary facility adjacent to Canada's only Arctic deep-water port.

Figure 1: Collaborating Organizations on Federal Grants with a U15 university (2023)

Examples of deliberate university-defence engagement are already emerging. The Centre for Applied Research in Defence

and Dual-Use Technologies (CARDD-Tech) at the University of Alberta, launched in 2025, demonstrates what structured engagement can deliver. In its first year, CARDD-Tech mobilized over $25 million in research projects across advanced materials, quantum, AI, space, and autonomous systems. It is already working with more than 30 defence industry partners and engaging faculty, students, and SMEs to strengthen supply chains and deliver innovations for Canada's sovereignty and economic security.

Developing Talent

Canada's research universities are also the primary engine of the talent pipeline that sovereign capability development depends on. The Defence Industrial Strategy targets the creation of 125,000 new jobs in the defence sector, a goal that cannot be achieved without a sustained supply of highly qualified talent who can generate knowledge, translate it into usable systems, and support integration, deployment, and sustainment over time. U15 universities are Canada's primary talent engine: they enrol nearly 700,000 students, train over 65% of Canada's doctoral graduates, and host more than 70% of Canada's Research Chairs and 75% of Canada's Excellence Research Chairs.

Federal research funding supports tens of thousands of researchers and research teams while training roughly 75,000 students each year. These graduates go on to fuel the talent pipeline that defence and dual-use innovation depend on. Building deliberate pathways that move talent between universities and the defence enterprise through scholarships, fellowships, secondments, and co-op placements aligned to DIS priority domains is as important as building the research interfaces themselves.

Trusted Partners

A trusted partnership between Canada's research universities and the defence enterprise requires more than research capacity. It requires the security frameworks, practices, and infrastructure to make collaboration safe, reliable, and scalable. Canada's leading research universities have made significant strides in this area and are committed to going further.

Through sustained collaboration with the Government of Canada, including the Government of Canada–Universities Working Group on research security, universities have acted to safeguard this advanced research from foreign threats and unintended intellectual property leakage. Budget 2022's $25 million annual investment in research security has underpinned this progress, enabling dedicated research security teams on campus, strengthening due diligence processes, providing expanded training, and enhancing cyber and physical security protections for sensitive research environments. The Sensitive Technology Research Areas of Concern policy and associated Named Research Organizations and Sensitive Technology Research Area lists provide an additional, threat-based framework to manage affiliations of concern in sensitive technology areas, establishing a coherent baseline for scaled defence-relevant collaboration.

These measures represent a genuine and ongoing institutional commitment to operating as trusted partners in Canada's national security ecosystem. Leading research universities remain committed to operating in an environment that is as open as possible and as secure as necessary.

Canada's Defence Innovation Gap

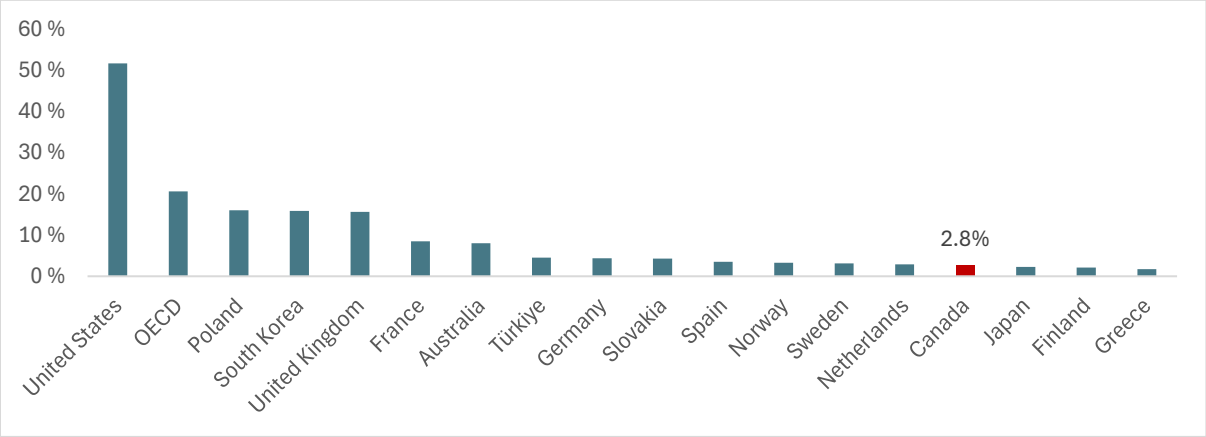
Strengthening Canadian industrial capacity and securing innovation strengths in sovereign capabilities is not simply a defence challenge. It is an economic one. For decades, Canada has faced a persistent productivity gap relative to its peers. Canada produces ideas and talent at an impressive level—but has been far less effective at turning those strengths into firms that scale, intellectual property that anchors value, and industries that generate sustained economic growth.

The Defence Industrial Strategy creates a genuine opportunity to address this gap. By identifying critical technologies linked to sovereign capabilities, it establishes a clear and sustained demand signal. That signal can anchor Canada's research and talent capacity, built through decades of public investment, with a national effort to develop new technological capabilities. But realizing that opportunity will require structured, long-term partnerships that connect talent, research, and industry into an integrated innovation system.

There is a persistent and widening gap between Canada's research strengths and the ability to translate these strengths into sovereign capability. That gap has two dimensions: chronic underinvestment in defence and dual-use research relative to peers, and a fragmented innovation system that lacks the interfaces to connect existing capacity to national security priorities.

Canada's investment in defence related research is historically weak. Canada allocates less than 3% of the federal research budget to defence, well below the OECD average of 20.7% and the United States' share of 51.7%. Of that limited funding, just $40 million flows through higher education. In the United States, 15% of federal university research is defence funded.

Figure 2: Defence R&D as Share of Total Government Allocations for R&D (2023)



This matters because government investment in defence research generates substantial spillover benefits. Defence-driven research has historically produced transformative civilian technologies—from GPS and the internet to advanced materials and medical countermeasures. Evidence shows that a 10% increase in government-financed defence research is associated with a 5–6% rise in private-sector R&D investment, while a one-point increase in the defence R&D-to-value-added ratio yields an 8.3% gain in annual productivity growth. Industry-supported research in Canada remains concentrated among a small number of foreign-owned prime contractors whose innovation strategies and intellectual property are largely anchored outside Canada.

Building Mechanisms for Sustained Collaboration

The problem is not only a lack of investment—it is a lack of connectivity. Canada's defence innovation ecosystem suffers from a fragmented front door: more than 160 federal programs creating overlapping entry points, inconsistent incentives, and weak pull-through from research to deployment. Defence-specific mechanisms like IDEaS (Innovation for Defence Excellence and Security), MINDS (Mobilizing Insights in Defence and Security), and ITBs (Industrial and Technological Benefits) provide valuable but narrow entry points, are small in scale and ill-suited to sustained institutional engagement. When collaboration occurs between the defence enterprise and research universities, it is episodic rather than mission-driven. Promising discoveries stall after early-stage research, never progressing to testing, validation, or procurement.

Peer nations are addressing this challenge by establishing mechanisms that enable government, academia, and industry to work together across time horizons. The United States embeds university talent directly into sovereign capability development through the Defense Advanced Research Projects Agency (DARPA), University-Affiliated Research Centers, and Federally Funded Research and Development Centers, with more than $10 billion USD in annual defence R&D flowing to higher education. The UK's Defence Industrial Strategy established the Defence Universities Alliance to formally partner with the higher education sector. Australia's whole-of-nation approach through the Australian Defence Science and Universities Network has generated more than $300 million AUD in university research supporting defence objectives.

The common thread is not just the scale of these programs, but also their structure. Each country has invested in mechanisms for partnership that make engagement between defence organizations and research universities routine, sustained, and mission-driven. Canada has yet to develop these mechanisms. The creation of the Bureau of Research, Engineering and Advanced Leadership in Innovation and Science (BOREALIS) provides the institutional foundation for university-defence engagement, but only if it is designed with the right ambition, given a clear mandate, and structured with formal mechanisms to engage universities as genuine strategic partners. The design choices made now will determine whether BOREALIS becomes a genuine system-builder or another coordination body operating at the margins of Canada's innovation ecosystem.

A System Built for the Full Continuum

Connecting Canada's research excellence to sovereign capability outcomes will require engagement across the full continuum of research and development. That continuum has three dimensions, each of which must be addressed if Canada is to build a coherent dual-use and defence research system.

The first is the spectrum from open to classified research. Early-stage research thrives in open environments—and must remain open to preserve the investigator-led excellence that generates Canada's upstream advantage. But as research matures and sensitivity increases, trusted pathways into controlled and classified collaboration are essential. Today, those pathways are ad-hoc, slow, and inconsistent. Personnel security clearances for researchers and students take too long. Accreditation of university-operated secure research environments is poorly adapted to academic contexts. The result is that promising work stalls at the boundary between open and secure environments rather than progressing smoothly into mission-driven development.

The second dimension is the spectrum from low to high technology readiness levels. Canada's existing defence-academic engagement is heavily weighted toward early-stage research with limited mechanisms to carry promising work through applied development, prototyping, testing, validation, and demonstration. The IDEaS program similarly provides a valuable but narrow entry point. However, there is no standing mechanism to move research across technology readiness levels in a sustained, coordinated way. Promising prototypes stall and early wins remain one-off successes rather than building into lasting national capability.

The third dimension is the time horizon. Sovereign capability development requires investment across short, medium, and long-term horizons simultaneously. Near-term applied work must be connected to mid-term directed research programs and long-term frontier research that sustains Canada's advantage in emerging technology domains. Canada's current system invests heavily at the early discovery end and the procurement end, with a significant gap in the middle—the applied, mission-oriented, directed research that translates frontier science into deployable capability.

Addressing these dimensions requires more than incremental adjustments. It requires building mechanisms that connect the needs of the Canadian Armed Forces to university research capacity in a predictable, sustained, and mission-driven way. BOREALIS, the Defence Innovation Secure Hubs, and the Science and Research Defence Advisory Council provide the emerging architecture. The task now is to ensure these mechanisms are designed with sufficient ambition, structured to engage universities as genuine strategic partners and resourced at the scale the moment demands.

Concluding Remarks

Canada faces a defining moment. The convergence of geopolitical pressure, the government's important new defence commitments, and an opportunity to respond to geopolitical pressures by rebuilding sovereign industrial and technological capacity has shaped this moment. Leading research universities are ready to meet this moment and secure the sovereign capabilities in advanced dual-use research that will make Canada more secure, resilient and prosperous. The choices made now—about how to invest, what to build, and whom to partner with—will shape our security and prosperity for decades to come.

Canada has world-class research capacity across the dual-use and sovereign capability technology domains that matter for our future resilience and prosperity. It has universities that are ready, willing, and increasingly equipped to be trusted partners in sovereign capability development. It has a Defence Industrial Strategy that, for the first time, creates the sustained demand signal that can anchor that capacity within a national purpose. And it has, in BOREALIS and the emerging defence innovation architecture, the institutional foundation on which a coherent system can be built.

What Canada has not yet built are the durable interfaces, standing mechanisms, and repeatable pathways that turn separate strengths into an integrated, end-to-end innovation system. That is the gap this study can help close.

Meeting this moment does not require starting from scratch. It requires the ambition to connect what already exists, research excellence, industrial capacity and existing partnerships, into a system capable of moving from discovery to deployment at the pace and scale sovereign capability requires. Canada's leading research universities are ready to play their part.

About U15 Canada

U15 Canada is an association of fifteen leading research universities across Canada. U15 Canada works to optimize research and innovation policies and programs that advance knowledge, develop highly qualified leaders for all sectors, and mobilize knowledge for the benefit of all Canadians.