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Connecting Arizona to Canada's Arctic:

The Next Frontier in the Canada-Arizona Relationship

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Canada's Arctic is entering a period of extraordinary investment and modernization. Canada is strengthening surveillance of its northern approaches, modernizing NORAD-related capabilities, expanding aerospace and space-based surveillance, improving northern military infrastructure, developing and addressing the enormous technological and logistical challenges associated with operating across the arctic. These developments create a significant but largely unrecognized opportunity for Arizona.

Arizona has one of the most concentrated aerospace, defense, space, optical-science, advanced-manufacturing in North America. The opportunity for Arizona is not to physically establish itself in the Canadian Arctic, but to become part of the network supporting Canada's arctic requirements. The opportunity for Canada is to access Arizona's capabilities that can complement Canadian companies, universities and government programs.

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The most immediate opportunity is to connect Arizona's existing aerospace and defense ecosystem with Canada's rapidly expanding Arctic requirements. This includes the F-35 training relationship at Luke Air Force Base for 5th generation fighter jets to be based at Cold Lake Alberta and Bagotville Quebec. This, plus Arizona's radar and missile technology, is a key deterrent for enemies of North America and integrates as one platform with the U.S military for defense of the north.

The Golden Dome project is also part of this opportunity, but it should be viewed as a gateway rather than the central theme of the research. The University of Arizona has already joined a Precise Systems-led team eligible to compete for Golden Dome-related contracts through the SHIELD contracting vehicle, potentially exposing Arizona research and technology organizations to a very large U.S. missile-defense market. The University has identified space science and satellite systems, hypersonic, quantum technologies and cybersecurity among the relevant capabilities. Arizona startups are part of the Precise consortiums as well as large contractors. General Dynamics in Arizona is also heavily involved in the ground management and operational infrastructure for the Proliferated Warfighter Space Architecture (PWSA), the core low-earth orbit satellite tracking mesh for the Golden Dome.

The significance for this Canada-Arizona research is that technologies being developed for advanced missile defense overlap with several Canadian Arctic requirements. The Arizona vendors of space-based assets are relevant to the broader continental-defense environment. Arizona companies participating in this technology ecosystem therefore have an opportunity to develop further relationships with Canadian organizations working on Arctic surveillance and northern defense.

Canada's Arctic Over-the-Horizon Radar program represents another major area of opportunity with Arizona based companies, potentially adding tracking software that could be programmed in Arizona when Canadian satellites over the Arctic pick up high speed thermal activity. Then companies in Arizona could assist in processing the raw imagery and coordinate tracking telemetry. Canada is investing more than \$6 billion in the broader A-OTHR program, with the radar procurement itself valued at approximately \$2.5 billion. Canada expects an initial capability by December 2029 and ultimately intends to develop a much larger northern surveillance capability. The system is intended to detect and track airborne and maritime threats approaching Canada's northern and Arctic regions and to strengthen NORAD domain awareness. Arizona-based entities may be part of assisting this program.

Although Canada is acquiring the core OTHR technology from Australia and BAE Systems Australia, the program creates opportunities beyond the principal radar contract. Canada has specifically stated that its Industrial and Technological Benefits arrangements are intended to bring Canadian companies into the program and develop domestic expertise. This creates potential opportunities for Arizona companies in areas such as sensors, electronics, communications, software, data processing, environmental monitoring, and related technologies where Canadian and Arizona capabilities can complement one another to bring these products to the market faster.

The broader NORAD modernization program provides an even larger framework. Canada identifies Arctic and Polar Over-the-Horizon Radar, space-based surveillance and other northern surveillance systems as

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components of its modernization effort. Canada's official project information specifically identifies Defence Enhanced Surveillance from Space as a NORAD modernization project designed to improve Canada's ability to detect and track threats using advanced space-based surveillance technologies. Arizona satellite experience is very deep and could add value. All of this is very important as it takes time to ramp this activity up and Arizona-based companies and divisions of Canadian companies operating in Arizona may cut down on development and implementation timelines. This creates a natural connection with Arizona's space industry and the University of Arizona. Tucson has a significant aerospace and space ecosystem, while the University of Arizona and Arizona State University have major capabilities in all the sectors mentioned above. The real opportunity is to connect those capabilities with Canadian requirements for space-based surveillance, satellite communications, imaging, sensing and data analysis needs.

The Canadian Arctic relationship also extends into Arizona's defense manufacturing sector. Arizona divisions of companies like Boeing, Northrup Grumman, Honeywell, and Raytheon Missiles & Defense in Tucson are identified by the Canadian government as current and potential Arizona participants in Canadian defense procurement. Other Arizona companies could also become supply chain participants on the Canadian Hornet jet aircraft Extension Project. This provides a documented Canada-Arizona defense-industrial relationship that can be examined alongside Canada's broader modernization requirements. Arizona's mission-systems and communications sector represents another opportunity. Canada's northern defense architecture will increasingly depend on the ability to integrate information from radar, aircraft, satellites, maritime systems and other sensors. The value of those systems depends on communications, software, data integration and command systems that can turn individual sensor inputs into usable operational information. Arizona companies are also involved in these sectors and can add value. In spite of all the politics between Canada and the USA, a fully integrated North American defense program will need to stay intact.

Raytheon is also a designated developer for the space-based Interceptor prototype initiative that Raytheon's Tucson facility manufactures. They are kinetic interceptors that would be deployed to neutralize an over the-the pole attack. In addition Raytheon produces the advanced radar homing munitions like AMRAAM variations that are cross-procured by the Royal Canadian Air Force to arm existing CF 18 Hornet fighter jets securing Canada's norther Arctic border. The industrial supply chains explicitly link factory production in Pima County, Arizona to defense deployment in the Canadian North.

Arctic climate and environmental research is another opportunity for joint work between the Canadian Arctic and Arizona. ASU has expertise in climate science, sustainability, Earth systems, and remote sensing that could support Canadian Arctic communities and governments dealing with rapidly changing environmental conditions. The University of Arizona's optical sciences and related technology ecosystem creates another potentially important connection - the Canadian Arctic presents unusually difficult sensing conditions, and the country's expanding northern arctic surveillance architecture will require sophisticated imaging, infrared, optical, laser and remote-sensing technologies. Arizona's research and commercial ecosystem provides a strong base for developing these technologies and for creating partnerships with Canadian research institutions and companies in regards to Canada's arctic.

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Autonomous systems (drones) represent another emerging area globally. Canada's vast northern geography creates an obvious need for technologies that can operate with limited human presence. Un-crewed aircraft, autonomous ground systems, maritime systems and underwater vehicles can support surveillance, transportation, environmental monitoring, infrastructure inspection and resource development. Arizona's aerospace and defense community has capabilities that warrant examination against these Canadian requirements. All of the above are in development and deployment in Arizona and other parts of the world.

In addition to all that we have discussed here, the massive Arizona semiconductor industry, along with TSMC and Intel, is at the core of what we have been talking about and cannot be left out of the supply chain between Canada and Arizona, both for military and commercial use, and protected by a North American supply chain.

Another key opportunity between the Canadian Arctic and Arizona is Indigenous Economic Development: Indigenous governments, development corporations and businesses are central to economic development across Canada's Arctic, particularly in critical minerals, infrastructure, energy, transportation, housing and community development. Arizona offers a strong potential partner through its experience with tribal governments and enterprises in areas including energy, water, infrastructure, tourism, hospitality, construction and natural resources. This creates an opportunity for a two-way Canada-Arizona relationship connecting Canadian Arctic Indigenous organizations with Arizona tribal enterprises, investors and businesses to explore commercial partnerships, joint ventures, technology, procurement and investment opportunities across the North American economy.

In regards to working together on other sectors like mining and critical minerals, ASU's engineering, geology, sustainability, and business capabilities could connect with Canada's Arctic mineral-development opportunities, particularly as Canada seeks to develop critical minerals while working with northern and Indigenous communities. Mining and critical minerals may ultimately provide one of the largest commercial opportunities outside defense. Canada's Arctic contains substantial mineral potential, while Arizona has deep expertise in copper, mineral exploration, mine engineering, automation and large-scale resource development. Northern mining projects face extraordinary logistical challenges, creating demand for remote operations, autonomous equipment, satellite communications, advanced exploration, artificial intelligence and specialized engineering. The massive two-way Canada-Arizona mining relationship that is in place with Canadian companies developing mines in Arizona, as well as Canada having 31 of the 34 critical minerals in the Canadian Northern region, are going to be a key part of the Canada-Arizona relationship.

Infrastructure creates another important connection. Canada's northern development will require transportation and telecommunications. Arizona has considerable experience with infrastructure in difficult environments, particularly in water, energy, and remote operations. Although the Arctic and Arizona environments are fundamentally different, the technologies used to manage scarce resources, distributed infrastructure and difficult operating conditions can create useful areas of cooperation. The opportunity therefore extends beyond military procurement. Canada's Arctic development will require an ecosystem of companies capable of providing technology, infrastructure, resource-development expertise,

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communications, energy, transportation. Arizona's capabilities can contribute to that ecosystem while Canadian companies can bring and do bring projects, technology and northern expertise into the harsh Arizona climate today.

Research and education should also be part of the relationship. Arizona universities and research organizations can work with Canadian institutions on all the above mentioned technologies. These relationships can produce commercial opportunities as well as scientific ones. The objective is not to claim that Arizona is already involved throughout Canada's Arctic. The objective is to demonstrate where some of the connections actually exist and then identify where they can be expanded.

Canada's Arctic is becoming a major national investment priority for North America. Arizona has capabilities that align with many of the technologies and industries required for that transformation. The connection already exists in aerospace, defense and training, and there are substantial opportunities to expand it in the radar, space, communications, optical systems, autonomous technology, mining, infrastructure and research.

The opportunity for the Canada Arizona Business Council is to help make those connections visible, verifiable and commercially useful. Canada has the Arctic requirements, northern projects, resources and investment needs. Arizona has aerospace, defense, space, technology, research, manufacturing, and mining.

The next frontier in the Canada-Arizona relationship is connecting those capabilities.

The desert does not have to be in the Arctic to be part of the Arctic.

