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SUB-COMMITTEE ON TRANSATLANTIC ECONOMIC RELATIONS (ESCTER)

SCIENCE AND TECHNOLOGY COMMITTEE (STC)

MISSION REPORT*

OTTAWA, YELLOWKNIFE AND RESOLUTE, CANADA

11 – 15 SEPTEMBER 2017

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* This Mission Report is presented for information only and does not necessarily represent the official view of the Assembly. It was prepared by Henrik Bliddal, Director of the Science and Technology Committee.

I. INTRODUCTION

1. From 11 to 15 September, 31 Parliamentarians from 17 NATO member countries visited Canada's capital Ottawa, the Northwest Territories' capital Yellowknife and Resolute, one of Canada's northernmost communities and one of the coldest inhabited places in the world, with an average yearly temperature of −15.7 °C and a population of 198 (2016 census).

2. The delegation comprised members of the Economics and Security Committee's Sub-Committee on Transatlantic Economic Relations (ESCTER) and the Science and Technology Committee (STC). The delegation was led by Maria Martens, the Vice-Chair of the Science and Technology Committee (Netherlands) and was hosted by the Head of the Canadian Delegation to the NATO PA, Leona Alleslev.

3. The delegation explored Canada's perspectives on a range of Arctic issues, including climate change, economic sustainability, natural resource development and engagement with northern communities. A key focus of many discussions was Canada's changing defence and security policies in the Arctic. Other issues discussed during the visit included Canada's new defence policy, its defence industrial base and the Canada-US relationship.

II. CANADA'S NORTH

4. The Arctic* represents 40% of Canada's landmass, but only 119,000 inhabitants live across the Northwest Territories, Nunavut and Yukon. 41% of the population of these three territories is concentrated in the capitals of Yellowknife, Iqaluit, and Whitehorse. These territories have the highest percentage of Indigenous people in Canada (Yukon: 23%; Northwest Territories: 52%; and Nunavut: 86%). Indigenous groups are largely governed through comprehensive land claims agreements or self-government agreements. Demographically, the territories have a higher than average percentage of young people: 23% of the population is under 15 years, compared to 16% in the rest of Canada.

5. The Arctic has a special position in Canadian national identity. "Canada's North is at the heart of our identity," **Mark Gwozdecky**, Assistant Deputy Minister for International Security and Political Affairs at Global Affairs Canada, told the lawmakers. Therefore, "we need to make sure that we keep it as a zone of beauty, predictability and cooperation". Indeed, the Arctic was understood as a key to Canada's future and the government should focus on its long-term development, Mr Gwozdecky argued. According to **Stéphane Roussel**, Professor at the National School of Public Administration, other countries often did not understand the centrality of the Arctic for Canada. Outsiders needed to understand that Canada thought about the Arctic as a domestic question, not an international one and that identity played a central role in discussions of the Arctic in Canada. Overall, the Canadian public preferred unilateral over multilateral actions in "its" Arctic, Mr Roussel posited. Unfortunately, this had fostered the notion among Canada's Arctic partners that Canada took an aggressive position on Arctic matters, he said.

* For the purposes of the report, the Arctic refers to the three territories: Northwest Territories, Nunavut and Yukon Territory. It should be noted that the Canadian Government is currently developing a New Arctic Policy Framework that will apply to Northwest Territories, Nunavut, Inuit Nunangat, the Nunatsiavut region in Labrador, the territory of Nunavik in Quebec and northern Manitoba, including Churchill.

III. CLIMATE CHANGE AND THE ARCTIC

6. Climate change is a significant driver of Canada's changing Arctic policies. Over the course of the visit, the delegation gained a comprehensive view of how climate change was affecting the Canadian Arctic.

7. **Louis Fortier**, Science Director at ArcticNet, introduced the delegation to some of the basic characteristics of the Canadian Arctic. He illustrated how it differed from other parts of the Arctic and explained the many ways in which climate change was reshaping the Canadian Arctic. ArcticNet is a Network of Centres of Excellence of Canada which comprises over 150 researchers and around 1,000 specialists which studies the impacts of climate change and modernisation in the coastal Canadian Arctic.

8. The Arctic region as a whole was warming much faster than the global average, Mr Fortier told members. Its transformation could be seen as a bellwether or a canary in a coal mine for global climate change. He described the rapid decline in the extent and thickness of ice cover in the Arctic Ocean. While 11 million square metres were covered by sea ice in the summer of 1950, the extent of sea ice fell to as little as eight million square metres in recent years. The science community expected the Arctic to be ice-free in the summer by 2020-2030, Mr Fortier said. This would mark the first time in 3 to 13 million years that the Arctic would be ice-free. Moreover, scientists saw a retreat of glaciers, a decline of coastal ice shelves, the destabilisation of permafrost and many other signs that the Arctic was rapidly transforming.

9. The impact of climate change on the people in the Canadian Arctic would be drastic, Mr Fortier argued. In Canada's North, about 60,000 Inuit and other Indigenous peoples live in 53 different coastal communities. Their unique ecosystems and ecosystem services would come under threat, Mr Fortier underlined. However, he expressed confidence in the ability of Inuit and other Indigenous groups to adapt to many of these changes, as they were extremely resilient people.

10. The impact of climate change on wildlife in the Arctic was complex, Mr Fortier stressed. Overall biological productivity would increase in the region as a result of warming, but biodiversity would decrease. Even within certain species, the impacts were not always clear: Some polar bear populations were growing, while others were declining, for example. Additionally, invasive southern species, referred to as generalists, were also displacing specialised Arctic species, or those adapted to life in ice-covered seas. For example, the Arctic cod, a key component of the Arctic Ocean ecosystem, was under threat of being replaced by other species of fish migrating from southern waters – which, in turn, was impacting the seal population.

11. All these changes in the Arctic would create regional and global ripple effects, Mr Fortier noted, and the impacts were already apparent. For example, the jet stream, which determines most of the world's climate, was slowing down. In the future, extreme weather events would occur with ever greater frequency, Mr Fortier argued, citing such events as Hurricane Sandy in 2012.

12. A changing climate in the Arctic meant that human activity was increasing, including shipping, tourism, extreme sports activities, fishing, exploration and exploitation of natural resources and consequently, so was the pollution. As a result, social and economic development patterns were shifting and demand for governmental services, including scientific research and exploration, was increasing. Moreover, issues of sovereignty and conflicts linked to maritime delimitation, borders and seabed exploitation were once again on the agenda.

13. To learn more about how the Arctic was changing, the delegation met with officials of the **Polar Continental Shelf Program** in Resolute, whose mission was to provide safe, efficient and cost-effective logistics in support of science and government priorities. The Program provided critical logistical support throughout the Canadian Arctic for field research conducted by Canadian

Government, academia, and independent and international research organisations. Additionally, the Program provided specific field logistics support for the Canadian Armed Forces Arctic Training Centre. The Program mainly supported activities in the February to November time frame. Its personnel were also very often the first responders on search and rescue missions as it maintained an aircrew of 35-55 people. It also had an in-house weather forecasting system that complemented other Canadian weather services.

IV. CANADA AND THE GEOPOLITICS OF THE ARCTIC

14. The changing Arctic environment has sparked an active debate in all Arctic states and beyond on geopolitics in the Arctic. In Canadian politics, the questions of how global strategic challenges affect Canada's Arctic, and which Arctic defence and security policies the country should pursue has been hotly debated for many years. The delegation engaged with Canadian government officials and experts to learn about the wide array of Canadian perspectives on this compelling set of challenges.

15. **Isabelle Desmartis**, Director General of Policy Planning at the Department of National Defence, told delegates that Canada had recognised that the security environment had changed, that military activity in the region had increased and that these were linked to matters of continental defence. Despite Russia's increasing power projection into the North Atlantic, Ms Desmartis told members that Canada had not discerned a direct military threat to the Arctic. Most experts the delegation met with echoed this sentiment. Mr Gwozdecky disputed the notion that the Arctic was becoming a new "Wild West". International disputes in the remote North continued to be handled peacefully, he said.

16. **Whitney Lackenbauer**, Professor at the University of Waterloo, told members that, under the Trudeau government, an evolution was indeed taking place in Canada's defence and security politics vis-à-vis the Arctic. Canada was expanding its presence in the Arctic while seeking to foster international cooperation there. Nevertheless, Prime Minister Trudeau's Arctic defence policy followed a similar line to that of the Harper government, albeit with several key differences, in particular insofar as NATO's role was concerned.

17. Many experts contend that security risks in the Arctic are rising and many of these challenges are linked to non-Arctic security issues, for example rising geopolitical tensions, environmental concerns, human trafficking and resource competition. Bilateral political issues entered all Arctic issues, he argued, but defence and security considerations should not drive Arctic affairs, as conflict in the region was still unlikely. He argued that the formerly dominant thesis that risk had increased because of competition over natural resources and maritime delimitation had grown obsolete. Mr Lackenbauer argued that a new interpretative framework was therefore needed. He did not believe that the current geopolitical picture in the Arctic region should be seen as an element of a new Cold War. The big questions, to his mind, were whether the game had changed with Russian actions in its neighbourhood and whether Russia was a revisionist actor in the Arctic. However, he urged members to carefully distinguish between global and Arctic strategies. He thus saw room for increased Arctic cooperation and dialogue, while maintaining a robust deterrence strategy.

18. **Rob Huebert**, Associate Professor at the Arctic Institute of North America at the University of Calgary, took a very different line. He thought that experts liked to separate pieces of the puzzle. Today, however, many changes in the Arctic were occurring simultaneously. This posed difficult questions for Canada and NATO. A new strategic Arctic reality was evolving because of three developments:

- New natural resources were being discovered and could be accessed more easily;
- The Arctic touched core Russian and US strategic interests;

- Non-Arctic states, including China, Japan and South Korea, were developing a larger interest in the Arctic.

19. Mr Huebert argued that the Great Game had returned to the Arctic, which brought with it questions of deterrence, war fighting, power projection and spillover effects. This meant that countries needed to generate new constabulary capabilities to secure emerging navigations routes, responsible resource development and environmental protection. In many ways, Arctic states had been spoilt between 1989 and 2005, as they believed geopolitics had ended in the Arctic. However, since then, the United States and Russia had been reinvesting in Arctic capabilities. The United States had built up its submarine forces as well as its aerospace and ballistic missile defences capabilities in Alaska. Russia had renewed its submarine and strategic forces and resumed exercises in the Arctic. China was also pushing into the Arctic and had developed a rotational naval presence in the region.

20. Russia's intervention in Ukraine had soured Arctic cooperation, Mr Huebert argued. Russia had become more assertive and aggressive in the Arctic, including through long-range bombing runs and a very substantial increase of violations and near violations of national airspace. As a result of recent Russian behaviour, Mr Huebert argued that the Arctic was at a point of transformation. Arctic states were now reluctantly caught up in a new Great Game. Mr Lackenbauer mostly agreed with Mr Huebert, although according to him, Russia employed a parallel narrative about Western aggressive behaviour. He agreed that Russian Arctic capabilities had increased but cautioned that they should not be overstated. Moreover, he did not necessarily link Russia's military build-up with a disruptive intent. Many of these capabilities were needed to defend Russian sovereignty in the Arctic. NATO therefore ought to be very clear in its messaging. **Andrea Charron** of the University of Manitoba also felt that too much was made of Russia's long-range aviation sorties and the alleged Arctic designs in the 2017 Zapad military exercise. Canada should engage with NATO Allies on the Arctic, but only on a bilateral basis, she argued. Moreover, exercises should not be undertaken close to the Bering Strait, which Russia would see as a provocation.

21. As a consequence of climate change, maritime delimitation under the UN Convention on the Law of the Sea (UNCLOS), which was already a complicated process based on the morphology of the sea bed, would grow more contentious as new resources became accessible and sea lanes opened up. In terms of maritime delimitation, Mr Fortier recommended building on the Ilulissat Declaration of 2008, listening to the specialists and those governments which had enjoyed success in establishing good bilateral relationships and resisting the media hype often surrounding the issue. To safeguard the Arctic Ocean, Mr Fortier raised the possibility of creating an area around the North Pole as an international region, similar to the Antarctic.

22. The Northwest Passage could become another point of contention. Its legal status had been unresolved for 60 years, Mr Fortier stressed. The issue is a very different issue from maritime delimitation around the North Pole, however. Submitting a claim for an Exclusive Economic Zone was preceded by a very complicated process. Canada considered the Northwest Passage to be internal waters. Russia supported this claim. However, the United States and some European states argued that the Passage should be considered international waters, as they did not want to set precedents for other cases such as the Strait of Hormuz and the Philippines, Mr Huebert explained. Mr Fortier underlined, however, that Canada routinely allowed innocent passage. Mr Huebert explained that with two US exceptions, every country had formally requested permission for passage. While many partners disagreed with Canada's sovereignty claim to the Northwest Passage through historic title, they were able to manage this in practice, Mr Lackenbauer posited.

23. Mr Gwozdecky argued that Canada and Russia agreed to disagree on many things. The Arctic, however, remained an area of agreement, although cooperation with Russia in the Arctic had not yet matured due to the political environment. Mr Gwozdecky was very much in favour of delinking these issues and did not yet see any spillover from non-Arctic tensions into Arctic relations. That being said, he recognised that Russia had a propensity to link issues across the

strategic spectrum. Mr Gwozdecky told delegates that Canada was striving for a stable and rules-based region, building on a peaceful and cooperative approach with Arctic and non-Arctic states. The Arctic needed to be shielded from what was fast becoming a perfect storm on the international scene, which was challenging the rules-based international order. Canada recognised the Arctic as a key piece of its defence and thus sought strong and robust military capabilities as well as close cooperation with the United States, which remained Canada's most important ally and defence partner.

24. As far as NATO was concerned, Mr Gwozdecky did not see an immediate military threat in the Arctic. However, NATO was not ignoring challenges in the North Atlantic, in particular in the GIUK (Greenland, Iceland, UK) gap. Because Russia was improving its military capabilities, including in submarine warfare, NATO needed to preserve the vital maritime link between Europe and North America. He argued that the 2016 Warsaw Summit decisions made this very clear, with their emphasis on the preservation of freedom of movement, a 360-degree approach to security and more joint exercises. Mr Lackenbauer suggested that there was some space to evaluate NATO's role in the Arctic, but NATO had to tread very carefully in this regard. Mr Roussel, however, took the view that NATO should not concentrate on military and defence in the Arctic and avoid overstepping its mandate.

25. While it was not Canada's intent to militarise the Arctic, Ms Desmartis argued that it was very difficult to separate security in Canada from the global security situation. She explained that the evolving security picture in the Arctic had inspired five new initiatives:

- an increase in Canada's mobility, reach and footprint;
- the extension of the Canadian Air Defence Identification Zone to cover the entire Canadian Arctic Archipelago;
- increased investment into the Canadian Rangers;
- increased investment in new surveillance and control capabilities; and
- more joint exercises with Arctic allies and partners.

V. THE CANADIAN ARMED FORCES IN THE ARCTIC

26. The delegation had a unique opportunity to visit the Canadian North and gain direct insights into the challenges in the Arctic from a military perspective.

27. **Deputy Commander Steven Thornton** hosted the delegation at **Joint Task Force – North (JTF-N)** in Yellowknife in the Northwest Territories. The JTF-N exercised sovereignty and contributed to safety, security and defence operations in the Canadian North.

28. **Helen Vaughan Barrieau**, Intergovernmental Relations and Aboriginal Affairs Advisor at the JTF-N, gave the delegates an overview of the mission of the JTF-N. With the new Canadian defence policy, the Arctic had become a priority area for the Canadian Armed Forces.

29. The Canadian Armed Forces maintains 800 installations on 60 sites throughout its area of operations. The area of operations amounts to four million square metres (or about 92% of the land area of the European Union (EU), and its coastline is longer than the combined coastlines of the Pacific and Atlantic Ocean.

30. JTF-N takes part in a number of recurring operations, including Operations Nanook, Nunalivut, Nevus, Nunakput and LIMPID. Ms Barrieau said that the JTF-N was looking forward to incorporating new Arctic capabilities, including Arctic offshore patrol vessels, the Nanisivik Naval Facility and Polar Epsilon 2 as well as to the modernisation of the Canadian Rangers.

31. **Lieutenant Colonel Luis Carvallo**, Commanding Officer of the 1st Canadian Ranger Patrol Group, provided an overview of the unique Canadian Rangers, a formation of which was already active in the 1940s. Canada has around 5,000 Rangers based in remote, isolated, and coastal communities across Canada, and they are part of the Canadian Armed Forces. Rangers provide lightly equipped, self-sufficient, mobile forces in support of Canadian Forces conducting sovereignty and domestic operations in Canada. They do so with all available methods of transportation. In the North, they collect local data by foot or on, *inter alia*, horses, kayaks, ships, planes and snowmobiles. They also play a large part in community bridge building in the North.

32. The 1st Canadian Ranger Patrol Group (1 CRPG) encompasses Nunavut, Yukon, Northwest Territories, and Atlin (British Columbia), which account for about 40% of Canada's land mass. 1 CRPG has over 1,850 Rangers in 60 patrols and more than 1,650 Junior Canadian Rangers in 41 communities across the North. 1 CRPG headquarters is located in Yellowknife, Northwest Territories and reports to the Canadian Army and Canada Joint Operations Command/Joint Task Force (North).

33. In a given year, the Rangers support major interagency operations, more than 130 regular patrols and three company-level patrols. They also inspect North Warning System installations, provide support to scientific research, and assist in search and rescue efforts. Indeed, Lieutenant Colonel Carvallo argued that virtually nothing happens in the North without Ranger support.

34. In Yellowknife, the delegation also visited the **440 "Vampire" Transport Squadron**, which conducted operations in the Yukon, Northwest Territories and Nunavut. 440 Squadron's tasks included airlift, utility and liaison flights in support of Canadian Forces Northern Area, the Canadian Rangers, other Canadian Forces activities and the Cadets in the North. 440 Squadron can conduct search and rescue missions as a secondary search and rescue resource but has no dedicated search and rescue capability. 440 Squadron operates four short take-off and landing CC-138 Twin Otters to carry out its wide range of tasks. The Squadron operates these rugged aircraft in some of the harshest weather conditions on the planet. The Squadron is comprised of approximately 55 aircrew and technicians who are a mixture of Regular Force and Reserve Force members. Well-suited for Canada’s northern climate, the Twin Otter can be outfitted with wheels or skis to land on water, snow, ice and tundra.

35. The delegation also had the opportunity to visit the **Arctic Training Centre** in Resolute. The Centre provides a permanent footprint in a strategic location that allows for staging and force projection across the high Arctic. The facility enables training and routine operations by providing a location to pre-position equipment and vehicles and can also serve as a command post for emergency operations and disaster response in support of civilian authorities. The Centre can accommodate up to 140 personnel and has 1,100 square meters of warehouse space to store its 130 snowmobiles and other material.

36. **Major Gary Johnson** of the Arctic Training Centre told members that the Centre could support training missions as far away as 300 nautical miles from Resolute Bay. The Centre conducts individual and collective training, ad hoc and emergency operations and Arctic trials, with the main training period lasting from January to the end of April. In the future, the Centre was looking to support year-round training, increased diving training and a greater level of international cooperation, Major Johnson said. Training focuses on the three elements that are essential to Arctic operations: mobility, sustainability and survivability.

37. The Canadian Coast Guard also plays a central role in Canada’s approach to the Arctic. As **Gregory Lick**, Director General, Operation, in the Department of Fisheries and Oceans, explained, the Canadian Coast Guard’s mission in the Arctic had four dimensions: the environment, safety, security and the economy. In the Canadian Arctic Archipelago, where waters were mainly uncharted and, even if charted, poorly so, the Coast Guard was providing a number of services, most importantly marine search and rescue, vessel escort and icebreaking. The Coast Guard also has an important role in the resupply of communities, both in a support function and sometimes

directly. Marine communication to commercial shipping is being provided to ensure safe navigation services. The Coast Guard is also enhancing its marine pollution response, in light of increased human activity in the Arctic.

38. The Coast Guard has more ships at sea than any other service, and 4,500 people are working on or off all three coasts. As the operational season was expanding, the Coast Guard was modernising, Mr Lick said. It had just procured 22 new helicopters and the ship fleet will continue to expand. New ice breakers were expected to be ready in the early 2020s, thus guaranteeing capabilities that were available year-round.

39. Mr Lick underlined that no country is positioned to deliver comprehensive services in the Arctic and in international waters. No country has been able to manage an oil spill alone for example. For Canada, the primary maritime partner was the United States. The cooperation with the United States Coast Guard was as close as one could get, in particular on the Great Lakes and other contiguous areas, he said. The two Coast Guards were also working together on vessel design cooperation.

40. In Resolute, the delegation also had the chance to visit the **CCGS Henry Larsen**, an Improved Pierre Radisson-class icebreaker based in St John's, Newfoundland and Labrador, which entered service in 1988. The members were hosted by **Captain Byron Briggs**, who gave them a full tour of the vessel and explained its upcoming mission in support of a navigation sounding study. The delegation also heard first-hand accounts of the challenges related to conducting maritime operations in the Arctic and learned how the Coast Guard cooperates with academia, private industry, and various levels of government to carry out its main tasks. Crew members also provided their perspective on increased security concerns in the Arctic.

VI. DOMAIN AWARENESS IN THE CANADIAN ARCTIC

41. Even though the Canadian Arctic was becoming more accessible, it remained an extreme environment. Ms Charron argued that “our Arctic will kill. It is harsh and it is huge.” The Canadian Armed Forces are one of the few organisations that can operate in the Arctic. This underlined the need for increased domain awareness.

42. In Ottawa, the delegation visited the **Canadian Ice Service**, which provides the most timely and accurate information about ice in Canada's navigable waters to promote safe and efficient maritime operations and help protect Canada's environment. The Ice Service provides real-time ice and iceberg information and forecasts to mariners. It also archives information for use by scientists and policy makers, and monitors waters for oil spills and other pollution through various tools, including satellite and aircraft generated data. The Ice Service is always looking to upgrade its capabilities by procuring new technical assets and incorporating innovative forecasting and modelling techniques.

43. Sea ice is a huge challenge for Canada, as it has the world’s longest coastline and greatest area of ice. The annual variation in the extent of ice is approximately half the area of Canada. Sea ice has seasonal effects on weather and climate, and marine ecosystems shape the safety and efficiency of marine transportation. Moreover, sea ice varies greatly: It varies in age, strength and thickness, and it can form ridges and be covered by snow – all of which pose unique challenges for those operating on or near the ice.

44. **John Parker**, Director of Marine and Ice Services at the Ice Service, and **David Jackson**, Special Project Advisor of Marine and Ice Services, told delegates about the special challenges of working in the Arctic, in particular the cold and dark that pervades the region for extended periods, the isolation, the variable topography and unique navigation conditions. Only 10% of the Arctic is

charted to modern standards and only limited data communications is available above 77 degrees north, illustrating some of the challenges to navigation, the pair said.

45. The Arctic environment, moreover, was rapidly changing, Mr Parker and Mr Jackson noted, which led to increased ice mobility and multi-year ice increasingly moving into shipping lanes. Icebergs and ice of land origin will continue to present a significant danger. Even with less overall ice due to climate change, sea ice extent within the Canadian Arctic is extremely variable. Weather-related events will increase as open water increases. While the Arctic may be "ice-free" in future summers, there would always be darkness, cold, snow and ice in the winter, they noted.

46. Space-based technology constituted a crucial component in domain awareness in the Arctic. **Luc Brûlé**, Vice-President of the Canadian Space Agency, argued that, in Canada's North, satellites played a critical role in mining; geological mapping; the monitoring of coastline change; pollution and permafrost movement; as well as shipping and navigation. In short, space technologies represented a solution to the challenges of accessing a vast and harsh area such as the North.

47. The Canadian Space Agency promoted the peaceful use and development of space, advanced the knowledge of space through science, and ensured that space science and technology provide socio-economic benefits for Canadians. Key Canadian programmes since the establishment of the Agency in 1989 concentrated on exploration, satellites, technology development as well as awareness and inspiration.

48. From 1995 to 2013, Canada had the RADARSAT-1 satellite as an asset, which was succeeded in 2007 by RADARSAT-2. Currently, RADARSAT-2 has major gaps in maritime approaches, incomplete coverage of the Northwest Passage and insufficient coverage of the Canadian land mass. In response, in 2018, the RADARSAT Constellation Mission will begin, based on three satellites, which would greatly enhance coverage of the Canadian Arctic.

49. Currently, Canada's space assets included RADARSAT-2, a commercial satellite launched in 2007, as well as commercial satellite automatic identification system, and ground stations. These came together in such projects as Polar Epsilon and Unclassified Remote-sensing Situational Awareness (URSA). In the future, Canada would have access to three satellites in tandem to form the RADARSAT Constellation Mission, which could then help establish a Polar Epsilon 2 project, a Medium Earth Orbit Search & Rescue capability and Defence Enhanced Surveillance from Space Project. Canada was also working together with Denmark, Norway and the United States on the Enhanced Satellite Communications Project-Polar.

50. **Colonel C.D. Stoltz**, Director of Space Requirements in the Canadian Armed Forces, provided a background on the Canadian Armed Forces' space mission: to maintain space domain awareness and deliver space-based capabilities to enhance and enable joint Canadian Armed Forces operations. Space was increasingly congested, with over 22,000 objects tracked and hundreds of thousands that are too small to be tracked, Colonel Stoltz told delegates. Space was also increasingly contested, with an increasing number of states possessing counter-space capabilities such as anti-satellite systems. Space was becoming a domain of mounting international competition, with over 60 countries supporting space programmes. Orbital slots were becoming ever scarcer. However, space was critical to modern military missions, Colonel Stoltz stressed, including missile warning, C4ISR (Command, Control, Communications, Computers, Intelligence, Surveillance, and Reconnaissance), precision strike, counter-improvised explosive devices, weather services, positioning and navigation and space surveillance.

51. **Isabelle Julien**, Director of Science & Technology at the Force Employment and Strategic Decision Support in the Department of National Defence, presented the All Domain Situational Awareness (ADSA) Science and Technology Programme, which would:

- analyse requirements;
- work with partners to identify and leverage innovations;
- conduct R&D projects to de-risk and test unproven technologies;
- integrate and deliver advice to senior decision leaders;
- provide information on technical maturity, predicted operational performance, sustainability and risks; and
- access innovation and capacity within industry and academia.

. The ADSA programme had four lines of operation:

- strategic surveillance of airborne traffic and aerospace warning;
- awareness of maritime traffic in Canadian approaches and Arctic littoral regions;
- awareness of sub-surface activity approaching or in the North; and
- analysis of sensor mixes and information integration for domain awareness to detect threats beyond the threshold of current systems.

52. **Matt Ivis**, VicePresident at MacDonald, Dettwiler and Associates, a multinational communications and information company, profiled his company's portfolio in space-based radar technology, where it is a world leader. Given the complexity of operating in the Arctic, enhanced satellite technology offered an attractive option for improved situational awareness, he argued, as it had no impact on the environment on the ground and provided near-time coverage.

VII. ECONOMIC DEVELOPMENT OF CANADA'S NORTH

53. Canada aspired to develop a robust, diversified and sustainable economy in its North. In 2016, the GDP of the Northwest Territories, the Yukon and Nunavut amounted to CAD 8 million. The public sector contributed 30% of the GDP, followed by the natural resources sector with 21% and construction with 9%.

54. **Virginia Poter**, Vice President of the Canadian Northern Economic Development Agency, laid out how the Agency supported this mission with its four main offices, concentrated on innovation, science and economic development in a whole-of-government approach. In 2017, the Northwest Territories enjoyed a 12.2% growth in GDP, mostly due to a new mine in Gahcho Kué. Nunavut was undergoing robust growth of 3.5%. While Yukon was stagnating, the Agency estimated that growth of over 6% would return in the years 2018 to 2020.

55. The North had one of the most diversified natural mineral bases, in particular base metals, diamonds and rare earth minerals. Economic opportunities existed in the transport and construction sectors and in increasing the participation of Inuit in the economy and business development. The territories were focusing on the innovation and diversification of their economic activities particularly in natural resources. Expanding sectors included tourism, fishing and biomass energy.

56. The economic development of Canada's North faced challenges because of a skills shortage in the workforce, insufficient infrastructure (especially in the energy, telecommunications and transport sectors), the high cost of business, complex social issues and climate change.

57. Ms Poter argued that environmental protection needed to be balanced with the wishes of the local communities. **Marian Campbell Jarvis**, Assistant Deputy Minister at the Lands and Minerals Sector of Natural Resources Canada, stressed that Canada was historically an extractive state, but that the environment and economy went hand in hand. Canada thus needed to find a way to encourage responsible and sustainable economic development. Working with the local communities was key, she said. Indigenous groups also supported strong environmental protection balanced appropriately with long-term economic development.

58. Ms Jarvis, told delegates that Canada's North went from not knowing that diamonds could be found just 20 years ago to a situation where a significant share of GDP was now generated through mineral resource exploitation. About a quarter of exploration projects in Canada are conducted in its North.

59. Infrastructure deficiencies constitute a major obstacle for mineral extraction. Diamonds are an exception because they are light and can be flown out. Ms Jarvis argued that more ports were needed to boost mineral extraction. Also, housing for miners was a problem, but modular design was helping the cause. She pointed to the fragility of the northern environment, which meant special care needed to be taken. Incorporating traditional knowledge was key in this regard, she said.

60. **David J. Scott**, President and CEO of Polar Knowledge Canada, argued that the environment in Canada's North was changing rapidly not only in terms of climate, but also economically and socially. To address these interrelated challenges, more knowledge was required.

61. Mr Scott told delegates that the current Canadian Government was seeking a renewed relationship with Indigenous peoples based on the recognition of rights, respect, cooperation, and partnership.

62. Polar Knowledge Canada supports science and technology activities, including indigenous science, across the Canadian Arctic, and engages in knowledge management. It aims to leverage international initiatives to fill the gaps in knowledge throughout the Canadian Arctic. Polar Knowledge Canada is in the process of opening its Canadian High Arctic Research Station Campus, which will operate as a year-round science facility to advance science and technology, focused on improving the lives of Northerners and all Canadians. The Campus is open to the community, drawing on local knowledge. Housing is a particularly important issue in a changing environment. Polar Knowledge Canada aimed to design more culturally relevant and energy efficient housing.

63. Energy in the Arctic represented another conundrum, Mr Scott told delegates. While resources existed, the significant investments in critical infrastructure required to extract energy in such harsh conditions made it difficult to provide stable and affordable energy resources. Moreover, there was now a five-year moratorium on energy extraction in the Canadian Arctic. However, renewable and alternative energies were more competitively priced. Indeed, experimental wind power sites could drive prices as low as one to two US dollars per kWh. Many communities used diesel generators that were 30 to 40 years old. These are highly inefficient, although communities are now experimenting on ways to use heat generated in these processes. Ms Poter argued that at present there was no set of technologies that could completely replace diesel for powering Northern communities.

VIII. CANADA'S EVOLVING DEFENCE AND SECURITY POLICIES

64. Ms Desmartis told delegates that Canada's new defence policy, released in June 2017, was predicated on a world where the balance of power was shifting, the rules-based international order was being challenged and the nature of conflict was changing. In addition, climate change threatened to disrupt the lives and livelihoods of millions around the world, and rapid technological development made adaptation essential. In particular, the cyber and space domains presented new opportunities while nonetheless posing important challenges. Advanced technologies also had implications for the proliferation of weapons of mass destruction. Thus, the threat that Canada confronted was increasingly diffuse at a time when borders themselves become less of an obstacle to bad actors.

65. The government announced it was going to increase annual defence spending over the next ten years from CAD 17.1 billion in 2016-2017 to CAD 24.6 billion in 2026-2027 (on an accrual basis). Total forecasted defence spending, as a percentage of gross domestic product, was expected to reach 1.40% by 2024-25, Ms Desmartis said.

66. Canada's new defence policy would ensure that the country was "strong at home, secure in North America and engaged in the world", Ms Desmartis argued. In the new policy, there was also a renewed focus on deterrence.

67. Key areas that the Canadian government would focus on included increased joint intelligence, surveillance and reconnaissance, academic outreach, defence industry, defence infrastructure, and new technology programmes. Moreover, one of the new initiatives announced in Canada's defence policy was the commitment to enhance the Canadian Armed Forces' ability to operate in the Arctic, conduct joint exercises with Arctic partners, support situational awareness and information sharing in the Arctic, including with NATO allies.

IX. CANADA'S DEFENCE INDUSTRIAL BASE

68. As the defence industry sector was a key issue for the Economics and Security Committee and the Science and Technology Committee in 2017, the delegation met with important players in the sector while in Ottawa.

69. **Patrick Finn**, Assistant Deputy Minister for Material, Department of National Defence, told members that the new defence policy, which calls for significant defence investments, represented a key change for the Department.

70. Already in 2015, Canada established a Defence Industry Advisory Group to facilitate coordinated dialogue and increased stakeholder engagement between the government and the defence industry, Mr Finn said. On defence innovation, the Department had reached out to NATO Allies to explore how other allies approached innovation. As a result of this process, Canada was launching a new Innovation for Defence Excellence and Security Programme to nurture clusters of defence innovators conducting leading-edge research and development in areas critical to future defence needs. The Programme was planning to invest CAD 313 million over five years.

71. Mr Finn highlighted the importance of NATO in defence investment and industry engagement, including in the Conference of National Armaments Directors' Main Armaments Group, the NATO C4ISR Industry Conference & TechNet International, the Framework for NATO-Industry Engagement and the NATO-Industry Forum. While NATO standards could be somewhat of an afterthought for a country as large as the United States, for Canada they were essential, Mr Finn said.

72. **Sharon Irwin**, Director for Innovation, Science and Economic Development Canada, noted that Canada had an established and diversified defence industry sector, with 638 firms generating CAD 10 billion in revenue. The export sector was strong, as 60% of sales were made abroad. A third of the companies were strictly defence focused, with the rest being dual-use companies. The share of small- and medium-sized enterprises was small, she said. Innovation, Science and Economic Development Canada aimed to make Canadian industry more competitive by focusing, *inter alia*, on innovations, skills, research and development and scaling up. A Strategic Innovation Fund and innovation clusters had been established as well. Defence business reform was another key area for the Innovation, Science and Economic Development Canada.

73. **Janet Thorsteinson**, Head of the Canadian Delegation to the NATO Industrial Advisory Group (NIAG) and Special Advisor at the Canadian Association of Defence and Security Industries, argued that the Canadian defence sector was mostly focused on dual-use technologies.

The crown jewel of the sector was Canadian companies' strength in C4ISR. A quarter of the Canadian defence companies are involved in this field. Ms. Thorsteinson suggested that earlier and continued industry engagement would be crucial going forward both nationally and within NIAG. She told delegates that many of Canada's defence companies were founded by immigrants to Canada. Many European companies had offices in Canada and vice versa.

X. CANADA-US RELATIONSHIP

74. At a time when old and new fault lines were emerging, the delegation also used the opportunity to talk about the Canada-US relationship.

75. **Martin Benjamin**, Acting Assistant Deputy Minister for the Americas, at Global Affairs Canada, argued that the bilateral relationship between Canada and the United States was one of the closest in the world. Indeed, experts had come up with a new word for it, as it was neither an international relationship nor a domestic relationship, but an "intermestic" relationship. This was revealed in the 2016 economic data:

- Trade between Canada and the United States amounted to USD 635 billion;
- Goods amounting to a value of USD 2 billion crossed the border every day;
- 72% of Canada's exports went to the United States;
- 9 million US jobs were directly dependent on trade with Canada;
- For 32 US states, Canada was the number one trading partner; and
- Canada invested USD 340 billion in the United States.

76. Based on an integrated market, the energy relationship was the closest in the world. US energy independence relied on a safe, reliable and secure partner – and Canada fit the bill, Mr Benjamin argued. In 2016/2017, 94% of all Canadian energy exports were destined for the United States, amounting to USD 96 billion in value. Hydroelectricity, oil and gas were all exported to the United States in large quantities, using 70 oil and gas pipelines and over 30 major electricity transmission lines.

77. Turning to the North American Free Trade Agreement (NAFTA), Mr Benjamin told delegates that the regional market consisted of 480 million consumers with a combined GDP of USD 21 trillion. Since NAFTA's inception, a threefold increase in trilateral trade had taken place. Trade with Canada and Mexico today supported nearly 14 million US jobs. With the NAFTA modernization effort, the countries were aiming to make a good agreement better and to align it with new realities in trade and investment. For its part, Canada's progressive trade agenda focused on labour safeguards, enhanced environmental protections, gender and Indigenous rights, reforming the investor-state dispute settlement mechanism, cutting red tape and regulatory harmonisation. The North American states had a very ambitious goal, Mr Benjamin said, as they wanted to conclude talks by the end of the year, before the elections in Mexico.

78. Mr Benjamin stressed that the Canadian government wants to further develop the trilateral agreement. If the NAFTA modernisation talks failed, Canada and the United States still had a bilateral free-trade agreement that was currently dormant, as NAFTA superseded it. Moreover, if the United States pulled out of NAFTA, Mexico and Canada would remain bound by the agreement. North America could be the most competitive region in the world through deeper integration, he argued. Untangling the current supply chain mechanism did not make much sense, Mr Benjamin said. However, Canada was always looking to diversify its trade and aimed ultimately for a 70-30 split between the US market and the rest of the world. Several European companies were very interested in importing Liquified Natural Gas from Canada, which could help.

79. **Jill Wherrett**, Acting Assistant Deputy Minister with the Portfolio of Affairs and Communications at Public Safety Canada, addressed the homeland security relationship between

Canada and the United States. She told members that Public Safety Canada largely mirrored the responsibilities of the US Department of Homeland Security. The two organizations collaborated closely on a wide range of public safety and national security issues, including:

- national security, counter-terrorism and countering violent extremism;
- cybersecurity and critical infrastructure;
- border management, security and integrity; and
- cross-border emergency management.

80. In particular, Canada and the United States were closely collaborating on countering violent extremism. The two countries were major partners in the fight against Daesh but also in North America, as the number of foreign fighters was increasing.

81. Canada and the United States share the longest border in the world. Border management, security and integrity is therefore of utmost importance. The two countries had a preclearance agreement that allowed 12 million air passengers to be pre-cleared every year, Ms Wherrett underlined. She argued that cooperation was extremely deep and would continue to be so.

82. **Major General A.D. Meinzinger**, Director of Staff at the Strategic Joint Staff in the Canadian Armed Forces, told delegates that Canada and the United States had a wide array of bilateral defence institutions, with 80 treaty-level agreements and 250 memoranda of understanding. 700 Canadian service members were serving in the United States, with 300 at the North American Aerospace Defense Command (NORAD).

83. The delegation learned about the Permanent Joint Board of Defence - a bilateral forum focusing on defence policy, where the two co-chairs report directly to the Canadian Prime Minister and the President of the United States. In the Military Cooperation Committee, the two countries conducted strategic staff discussions. A civil assistance plan could be invoked in emergency situations, such as natural disasters, to facilitate military assistance from one nation's armed forces to the other, in support of civilian authorities.

84. NORAD remained a military cornerstone of the Canada-US defence relationship as a bi-national command, which was fully integrated in the HQ staff. Its missions included aerospace warning, air space control and (since 2006) maritime early warning.

85. **Major General Derek Joyce**, Director General at International Security Policy in the Canadian Armed Forces, pointed out the extension of the Canadian Air Defence Identification Zone would have important repercussions on NORAD. Canada was also examining the North Warning System and other alternatives to the current approach. Increased all-domain situational awareness was being explored through a science and technology programme.