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# Legal Aspects of Climate Change: Impacts on International Security

## Contents



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## Introduction

by Robert Gray Bracknell*

There is little doubt Earth's climate is changing in ways that alter human conduct – where and how we live, what we eat and drink, and how we conduct our activities – commercial, social, and security affairs. For NATO's purposes, the causes of climate change – fluctuations in the earth's orbit, natural climatic cycles, wildfires and volcanic eruptions, hydrocarbons and aerosols, intensification of solar radiation – are not as important to studying the international security impacts of climate change as the acknowledgment, to a clear scientific certainty, that the climate has changed and is changing. It is the effects of climate change that generate international security challenges. Regardless of why, the sea is rising, causing property destruction, instability and migration, and thereby contributing to the spread of diseases. Regardless of why, droughts are intensifying and changing their locations and effects from historical norms, making food harder to grow, displacing people, and intensifying international competition for fresh water. Regardless of why, polar ice is melting and opening new maritime navigational routes and displacing

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wildlife. Climate change has altered many of the social, commercial, environmental, and geographic factors underlying human analysis of security affairs. It is in this context that Issue 43 of the NATO Legal Gazette seeks to explore, through the contributions of an accomplished group of practitioners and academic experts, the legal norms, conventions, treaties and evolving law and law-adjacent policy governing and influencing climate change and its second and third order effects on international security, peace and stability.

Right on time, three military authors set the pace at the strategic macro level. **Captain Panagiotis Vasileiadis** kicks off Issue 43 of the NATO Legal Gazette with an article examining the issue of population displacement as a result of climate change, and the associated security concerns, including NATO's role in crisis management. **Colonel Drazen Smiljanic**, former staff member at HQ SACT and now a lecturer in defence economics and strategy at the Croatian Defence Academy, looks to NATO's ability to refine a proactive role in responding to the security aspects of climate change, including "radical transformation[s]" to respond effectively. **Colonel Ilias Manolis** follows with an article approaching climate change through the eyes of the Hellenic Ministry of Defence, including the Greek Forces initiatives on implementing the 2021 NATO Climate Change and Security Action Plan.

Italian authors **Antonio Carlo**, **Francesca Casamassima**, **Giulia Costella**, and **Antonio Salmeri** shift the focus to discrete geographic climate-related issues as they propose the novel approach of using satellite technology to assess NATO's operational environmental impacts. **Laetitia Cesari Zarkan** and **Nivedita Raju** focus on NATO operations in the Arctic and changes in "geopolitical and strategic dynamics within the Arctic" associated with climate change.

**Jody Prescott**, a former HQ SACT and Joint Warfare Center staff member, shifts the focus to the law of armed conflict and the discipline of human security and protection of civilians, especially in stability and counter-insurgency operations, and particularly with regard to the disproportionate effects of climate change on women and girls. Finally, **Lieutenant Colonel Michael Lipkin**, currently serving at ACT's Joint Warfare Centre, pragmatically focuses on the merits of integrating climate change scenarios, including extreme weather events, climate migration and refugeeism, and associated increased violent extremism, into the NATO exercise program.

Climate change looms as an important driver of competition in the 21st century – generating primary effects which themselves may inspire state or non-state conflict over mass migration or competition for resources such as water. Climate may also produce secondary effects that change or alter the environment in which conflict is undertaken, opening new strategic possibilities,

such as arctic maritime navigation, while foreclosing others – for example, environmental or natural disaster events may force non-combatant civilians into areas where armed forces are in conflict. Climate change may evolve the operating environment in new and unexpected ways, producing new and unique challenges for NATO forces and allied state actors, and NATO Legal Gazette Issue 43 seeks to contribute to the dialogue on this issue.


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Read the complete Secretary General Report here: Climate Change & Security Impact Assessment, 2022

Source : www.nato.int

## Environmentally displaced people as an international security issue in NATO's backyard[1]

By Captain Panagiotis Vasileiadis[2]

### Introduction

Global warming represents a multifaceted threat which, if left unanswered or receives an insufficient or uncoordinated international response, can result in dire consequences for the whole of humanity. While the precise impact of serious changes in the planet's temperature and weather patterns remains uncertain, it is sure that it will test existing legal authorities and force us to re-conceptualize environmental law's underlying relationship with national security.[3] Enter climate change-related population displacement.

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[1] **DISCLAIMER**: The views expressed in this article are solely those of the author and may not necessarily represent the views of NATO, Allied Command Operations, or Allied Command Transformation, or of their affiliated organizations.

[2] Captain Panagiotis Vasileiadis, PhD, is LEGAD to the Office of the Legal Advisor of the Deputy Minister of National Defence of the Hellenic Republic. The views expressed in this article are solely those of the author and may not necessarily represent the views of the Ministry of National Defence of the Hellenic Republic.

[3] Mark Patrick Nevitt, 'On Environmental Law, Climate Change and National Security Law' (2020) 44 HELR 321, 326.

NATO, whose recognition of environmental challenges as potential threats stretches back to the turbulent era of the Cold War,[4] recently recognized climate change as a threat multiplier that impacts Alliance security and committed to incorporate it into its full spectrum of work.[5] Notably, during the Brussels Summit of June 2021, the Heads of State and Government of the Allied countries endorsed a Climate Change and Security Action Plan. In that text, which sets out the framework for delivering on NATO's Agenda on Climate Change and Security, there's the interesting observation that the implications of climate change include the appearance or exacerbation of various natural phenomena that have the potential to lead, along with various other social or political factors, to displacement, migration, and human mobility, creating conditions that can be exploited by state and non-state actors that threaten or challenge the Alliance.[6]

The issue of population displacement due to environmental disasters is of major interest to the Alliance for two reasons: *First*, many of the usual countries of destination for migrants or refugees from the Third World, and especially from South America, Middle East and North Africa (MENA), Sub-Saharan Africa and South-East Asia, are NATO member states.[7] *Second*, in the absence of a comprehensive transnational legal framework or political alignment between the departure and destination countries, it is possible that international organizations with crisis management mechanisms and capabilities will step in to fill the gap. NATO, as the basic security provider in the North Atlantic area, may well be required to perform this role.

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[4] Amar Causevic, 'Facing an Unpredictable Threat: Is NATO Ideally Placed to Manage Climate Change as a Non-Traditional Threat Multiplier? (2017) 2 PfPC 59, 72.

[5] 'Brussels Summit Communiqué,' Issued by the Heads of State and Government participating in the meeting of the North Atlantic Council in Brussels 14 June 2021, para.58, <https://www.nato.int/cps/en/natohq/news_185000.htm>, accessed 15 May 2022.

[6] 'NATO Climate Change and Security Action Plan' (14 June 2021) para. 4 <www.nato.int/cps/en/natohq/official_texts_185174.htm> accessed 15 May 2022.

[7] See 'Refugees by Country 2022' (World Population Review) <https://worldpopulationreview.com/country-rankings/refugees-by-country> accessed 14 May 2022; 'Top 25 Destinations of International Migrants' (Migration Policy Institute Data Hub) < https://www.migrationpolicy.org/programs/data-hub/charts/top-25-destinations-international-migrants%20accessed%2014%20May%202022 >; United Nations General Assembly 'Report of the United Nations High Commissioner for Refugees' UNGAOR 76th Session Supp No 12 UN Doc A/76/12 (2021) (Report of the United Nations High Commissioner for Refugees 2021).

The idea that climate change is inextricably connected to population movements is not a novel one. Indeed, the concept of 'environmental refugees' has been popularized at least since 1985.[8] The term "environmental refugees" has been defined as:

> …people who have been forced to leave their traditional habitat, temporarily or permanently, because of a marked environmental disruption…that jeopardized their existence and/or seriously affected the quality of their life.

However, as will be demonstrated, the term itself, along with others that stemmed from it (e.g. ''climate refugees''), is not without controversy. The same applies with other important issues around the applicable terminology, including, *inter alia*, the number of people who will be forced to flee or have already fled their homes as a direct result of climate change, the measure of the latter' s contribution to those involuntary population movements, and the legal status of those so-called ''environmentally displaced persons.''[9]

Be that as it may, there is little doubt about the existence of least some degree of causal connection between climate change and insecurity among populations, mainly in the global South, that are already experiencing the conjugated effects of food, energy, and economic crises. That is the case even amongst scholars who question the scale of existing or projected climate change-related population movements.[10] The latter phenomenon is, by itself, related to the well-known correlation between mass influxes of refugees and threats to international peace and security.[11] However, the remarkable amount of occupation with the impact of climate change on human mobility -and consequently, on international security- by politicians, international

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[8] United Nations Environment Program, 'Environmental Refugees' (Nairobi: UNEP, 1985) UNEP(02)/E52, 4.

[9] International Organization for Migration (IOM) used this term to describe 'persons who are displaced within their country of habitual residence or who have crossed an international border and for whom environmental degradation, deterioration or destruction is a major cause of their displacement, although not necessarily the sole one'. IOM, *Glossary on Migration* (International Migration Law No. 25, 2nd ed, 2011) 34.

[10] Romain Felli, Managing Climate Insecurity by Ensuring Continuous Capital Accumulation: 'Climate Refugees' and 'Climate Migrants' (2013) 18 New Political Econ. 337, 338.

[11] Tyler H. Lippert, 'NATO, Climate Change, and International Security A Risk Governance Approach' (*Rand Corporation*, 2016) 56 <www.rand.org/pubs/rgs_dissertations/RGSD387.html> accessed 15 May 2022.

organizations, lawyers and security and migration experts has so far spurred little, if any, progress on the relevant legal landscape.

This study presents an examination of the nexus between environment and security, in direct connection with the so-called ''climate migration'' phenomenon and its implications for NATO.

## Climate change-a catalyst for involuntary migration?

The concept of people who are forced to abandon their land of origin as a result of climate change-related natural phenomena can be described as a fairly stereotypical one. According to a widely accepted view within the academia, climate change triggers involuntary population movements in roughly three ways:

*First*, by causing natural disasters of such an unprecedented scale, that leave their victims with no other choice than to evacuate their countries or regions of origin, on a temporary or even permanent basis. As put eloquently by the UN High Commissioner for Refugees, extreme weather events, whose increasing intensity and frequency is attributed to climate change (e.g. abnormally heavy rainfall, heat weaves and cyclones), are already inducing some 23 million displacements of people from their homes each year, as an average based on data from the past decade.[12] Although most of the countries seriously affected by such adverse effects of climate emergency number amongst the least developed, populations of advanced nations are not spared entirely: In 2021 alone, catastrophic flooding killed more than 200 people in Europe, heat waves caused deaths in Canada, and wildfires have raged in Siberia, across the Mediterranean and along the western coasts of the United States and Canada.[13]

*Second*, by slowly aggravating living conditions through its various manifestations in ways and to a degree that force the affected populations to seek relocation, after the failure of their adaptation efforts. Such ''slow-onset events'' may include persistent droughts, repeated crop failures, oscillations in

[12] United Nations High Commissioner for Refugees 'Strategic Framework for Climate Action' (11 March 2021) 4-5 <https://www.unhcr.org/604a26d84.pdf> accessed 15 May 2022 (Strategic Framework for Climate Action).

[13] Filippo Grandi, 'Climate change is an emergency for everyone, everywhere' (UNHR, 9 November 2021) <www.unhcr.org/news/stories/2021/11/618a301d5/climate-change-emergency-everywhere.html> accessed 15 May 2022.

precipitation and temperature patterns,[14] sea-level rise, and increased flooding of low-lying coastal areas.[15] Again, although the populations of the poorest countries are more vulnerable, the wealthier nations are by no means 'climate-proof'. Indeed, one of the most characteristic examples of mass population exodus, attributable to a gradual deterioration of environmental conditions, was the displacement caused by the so-called ''Dust Bowl'' in the United States during the 1930s, when severe (partly human-caused) droughts forced approximately 3.5 million people to move out of their states of origin.[16]

*Third*, by producing or overlapping with conflicts, competition over dwindling natural resources or extreme poverty, situations that are by themselves habitual causes for migration or refugee flows. Even if climate change cannot be held directly or solely responsible for such miserable states of affairs (which usually occur in nations with weak governance structures that lack the capacity and resources to adapt),[17] its interaction with them deteriorates living conditions to such an extent, that large swaths of the affected populations are pushed to breaking point, left with no other option than to emigrate. A scholar recently summarized that point of view in the following way:

> From Afghanistan to the Sahel, inhabitants of countries in conflict are often doubly vulnerable to climate risk. On one hand, conflicts limit their adaptive capacity by harming assets needed for adaptation, such as governance institutions, markets and livelihoods. On the other, climate change compounds challenges such as food and livelihood insecurity, poverty and marginalization – which are themselves drivers of conflict – fuelling a vicious circle.[18]

Building on those assumptions, many experts paint a particularly gloomy picture concerning the impact of climate change on the migration and refugee fields. Although the numbers vary, depending on the source, a frequently circulated conclusion amongst various books, research papers or

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[14] Robert McLeman, *Climate change, migration and critical international security considerations* (International Organization for Migration Research Series No 42, 2011) 17.
[15] Richard Black, 'Environmental Refugees: myth or reality?' (2001) University of Sussex Working Paper 34, <www.unhcr.org/3ae6a0d00.html> accessed 15 May 2022.
[16] Donald Worster, *Dust Bowl: The Southern Plains in the 1930s* (Oxford University Press 1979) 49.
[17] Nevitt (2020) 325.
[18] Janani Vinekanada, 'Climate, conflict and crises: first and foremost, do no harm' (*Humanitarian Law & Policy,* 27 February 2020) https://blogs.icrc.org/law-and-policy/2020/02/27/climate-conflict-do-no-harm/ accessed 15 May 2022.

reports of international organizations and NGO is that without ambitious climate action and disaster risk reduction, climate-related disasters could double the number of people requiring humanitarian assistance to over 200 million each year by 2050.[19] According to the European Union Parliamentary Research Service, since 2008 over 318 million people around the world have been forcibly displaced by floods, windstorms, earthquakes or droughts, 30.7 million in 2020 alone.[20] Special mention is usually made to Central America, the East, the Horn of Africa and the Sahel regions, where environmental degradation triggers migration waves and hampers access to assistance to displaced populations.[21]

Those estimations are far from having attained general consensus amongst the scientific community. Some experts point out that there is simply no empirical evidence to back precise projections,[22] which in many cases represent nothing more than conjecture.[23] Others underline that migration in response to adverse environmental conditions is nothing new and has been an integral part of traditions that extend back over the centuries, even in areas like the Sahel that are considered particularly exposed to the effects of contemporary climate change.[24] In addition, it is emphasized that migration has always been just one of the many ways that people use in order to adapt to the deterioration of environmental conditions in their homeland. [25] Such adaptation techniques may include dikes, changes to crops that require less irrigation, improvements in water supply management, local relocation to higher land, etc.[26] Furthermore, the possibility of a mass exodus of climate refugees represents the worst case scenario, which will come to pass only if

[19] Strategic Framework for Climate Action 5.

[20] EPRS, ''The concept of 'climate refugee'. Towards a possible definition.'' PE 698.753 (October 2021)2 (The concept of 'climate refugee').

[21] Report of the United Nations High Commissioner for Refugees (2021) 13.

[22] Himani Upadhyay, Ilan Kelman, Lingarai G.J., Arabinda Mishra, Cheney Shreve and Robert Stojanov, 'Conceptualizing and contextualizing research and policy for links between climate change and migration' (2014) 7 IJCCSM 394, 399.

[23] The widely accepted figure of two hundred million was popularized by Professor Norman Myers in a 2001 paper. Norman Myers, 'Environmental refugees: a growing phenomenon of the 21st century' (2002) 1420 Philos. Trans. R. Soc. Lond., B, Biol. Sci. 357, 609. Myers was widely criticized for this projection and later admitted that it largely depended on ''heroic extrapolations''. Oli Brown, *Migration and Climate Change* (International Organization for Migration Research Series No 31, 2008) 8.

[24] Black (2001).

[25] McLeman (2011) 24.

[26] Frank Biermann and Ingrid Boas, 'Preparing for a Warmer World: Towards a Global Governance System to Protect Climate Refugees' (2010) 10 GEP 60, 68.

global policymakers and local governments squander all of the many chances that they will have along the way to stop the slide towards a ''climate Armageddon''.[27]

Finally, and perhaps more importantly, many scholars argue that population mobility itself is an extremely complex social phenomenon. The motives of people who chose to leave their homes and become migrants or refugees are almost invariably multifactorial in nature. Consequently, climate-related calamities represent just one of the potential catalysts for migration or refugee waves, while situations like armed conflicts, abject poverty, lack of employment and development opportunities or even natural disasters irrelevant to climate change can be at least equally important factors.[28] Thus, laying the responsibility for some displacements exclusively on climate change can be viewed as an unacceptable simplification. Some go as far as to argue that such a simplistic model is nothing more than a pretext used from the rich countries of the global North to depoliticize the causes of displacement, so enabling them to derogate from their obligation to provide asylum. [29]

The precise correlation between population displacement and climate change remains an open question. Nevertheless, the debate about the qualitative characteristics of migration must not prevent the discussion about the real or potential impact of displacement for reasons related to climate change, especially from a security perspective. As NATO Secretary General Jens Stoltenberg recently pointed out, there are many different reasons for migration, including wars, conflict, poverty and political oppression, and climate change is now an additional one.[30] For now, it is enough to accept that relatively uncontroversial fact,[31] before proceeding to the evaluation of

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[27] McLeman (2011)12, 28.

[28] Betsy Hartman, 'Policy Arena: Rethinking Climate Refugees and Climate Conflict: Rhetoric, Reality and the Politics of Policy Discourse' (2010) 22 J. Int. Dev 233, 238. See also James Morrissey, 'Rural-urban migration in Ethiopia' (2008) 31 FMR 28, 29.

[29] Gaim Kibreab, 'Environmental Causes and Impact of Refugee Movements: A Critique of the Current Debate' (1997) 21 Disasters 20, 21.

[30] NATO Secretary General Jens Stoltenberg, 'NATO and the security implications of climate change' (Virtual speech, 28 September 2020) <https://www.nato.int/cps/en/natohq/opinions_178355.htm> accessed 22 May 2022.

[31] This approach of recognition of climate change's potential implications for migration, without expanding on precise numbers, was included in the *Global Compact on Safe, Orderly and Regular Migration*, adopted by the UN in 2018. UNGA Resolution 73/195 (19 December 2018) UN Doc A/RES/73/195, para. 18.

the legal status of so called ''climate refugees'', as well as their impact on the field of international security.

**Climate/environmental ''refugees''-are they?**

Generally speaking, the majority of those who flee their homes for reasons connected to natural disasters or environmental degradation remain inside the borders of their country.[32] Thus, they become 'internally displaced persons' (IDP), who are defined by UNHCR in paragraph 2 of its *Guiding Principles on Internal Displacement* as

> …persons or groups of persons who have been forced or obliged to flee or to leave their homes or places of habitual residence, in particular as a result of or in order to avoid the effects of armed conflict, situations of generalized violence, violations of human rights *or natural or human-made disasters*, and who have not crossed an internationally recognized State border.[33]

The legal status of those individuals is clear: While the *Principles* reflect, and are consistent with, international human rights law and international humanitarian law, they recognize that it is national authorities that have the primary duty and responsibility to provide protection and assistance to IDP.[34]

The status of persons who are displaced for the same environment-related reasons, but cross state borders, has been the subject of more discussions. According to the main international legal instrument for the protection of refugees, the Refugee Convention of 1951[35] (and its 1967 Protocol), a ''refugee'' is defined as someone who is unable or unwilling to return to their country of nationality

> …owning to a well-founded fear of being persecuted for reasons of race, religion, nationality, membership of a particular social group, or political opinion.[36]

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[32] Strategic Framework for Climate Action 8.

[33] UNHCR 'Guiding Principles on Internal Displacement' (22 July 1998) para. 2 (emphasis added).

[34] Angela Williams, 'Turning the Tide: Recognizing Climate Change Refugees in International Law' (2008) 30 Law and Policy 502, 511.

[35] Convention Relating to the Status of Refugees (adopted 28 July 1951, entered into force 22 April 1954) 189 UNTS 137 (Refugee Convention).

[36] Refugee Convention art. 1A (2).

Such individuals are entitled to asylum and are protected from deportation in accordance with the principle of *non-refoulement*, as enshrined in article 33 of the Refugee Convention.

Williams is correct to argue that there is no obvious provision for refugees created by environmental change within this definition.[37] Indeed, although adverse climate impacts such as rising sea levels, salination, and increases in the frequency and severity of extreme weather events are harmful, and in some cases fatal, they do not meet the threshold of *persecution* as this is currently understood in international and domestic law.[38]

In addition, it is difficult to conceive which of the five (exhaustive) grounds of the Refugee Convention could apply to climate displaced persons, largely because of the indiscriminate nature of climate change impacts.[39] In fact, the UNHCR has rejected the very use of the label ''environmental refugee'' or ''climate refugee'' on the grounds that the current legal category defining a refugee is linked to a notion of persecution and the crossing of an international border.[40]

The same obstacles are encountered in respect to the so-called ''complementary protection''. The phrase has emerged to describe a situation where a country grants an individual legal status because of broader international protection needs under national, regional or international law, despite the individual having failed to meet the definition of a refugee under the Refugee Convention.[41] Obviously, since the latter's application is excluded, an alternative legal base needs to exist for the application of any form of complementary protection for environmentally displaced persons.[42]

However, despite some indications that international human rights law and jurisprudence are gradually moving towards offering some form of

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[37] Williams (2008) 507-508.

[38] UNHCR 'Climate Change Displacement and International Law: Complementary Protection Standards' (Division of International Protection Geneva 2011) 12 <www.unhcr.org/4dff16e99.pdf > accessed 25 July 2022; Jane McAdam, *Climate Change, Forced Migration and International Law* (Oxford University Press 2012) 43.

[39] Thea Philip, 'Climate Change Displacement and Migration: An Analysis of the Current International Legal Regime's Deficiency, Proposed Solutions and a Way Forward for Australia' (2018) 19 Melb J Int'l L 639, 647

[40] Felli (2013) 346.

[41] Philip (2018) 649.

[42] Jane McAdam, *Complementary Protection in International Refugee Law* (Oxford University Press 2007) 23.

recognition towards victims of environmental disasters,[43] it has yet to be determined whether returning an individual to their home country that has been adversely affected by climate change could amount to a breach of human rights sufficient to warrant a subsequent grant of complementary protection.[44] Proposals by experts for the conclusion of new legal instruments to offer specific recognition and protection to environmentally displaced persons have not as of yet materialized.[45]

To sum up, the legal status of environmentally displaced persons under international law is the same as the one of economic migrants, despite the lack of volition in their decision to move. Consequently, the countries of destination maintain wide discretion concerning the rights that they will grant to such individuals, including, most notably, the right to remain at their territory. The situation is different when there are parallel, alternative legal grounds that could justify *by themselves* granting of asylum, e.g. persecution on the form and for the reasons mentioned in the Refugee Convention or EU Directive 2011/95.[46]

Despite the preceding analysis and conclusions, it is submitted that terms such as ''environmental refugees'' or ''climate refugees'' should not be rejected out of hand, provided that they are accompanied by the clarification that the terminology used is conceptual and not legal. Nevertheless, it would seem that the term ''environmentally/climate displaced person'' is more accurate, since it is purely descriptive –at least of one part of the mobility

[43] It would appear that environmental conditions in the country of origin are a factor that some national courts have begun taking into consideration when deciding upon asylum cases. See for example VGH Baden-Wuerttemberg [2020] A 11 S 2042/20 para. 25, where a German Higher Administrative Court explicitly mentioned ''environmental conditions, such as the climate and natural disasters'' as relevant factors for determining the humanitarian conditions in Afghanistan. Camila Chose, 'Climate migrants – How German courts take the environment into account when considering non-refoulement' (*Voelkerrechtsblog. International Law & International Legal Thought*, 3 March 2021) <https://voelkerrechtsblog.org/climate-migrants/> accessed 21 May 2022.

[44] Philip (2018) 650.

[45] B. Docherty and T. Giannini, 'Confronting a Rising Tide: A Proposal for a Convention on Climate Change Refugees' (2009) 33 HELR 349.

[46] European Parliament and Council Directive 2011/95/EU of 13 December 2011 on standards for the qualification of third-country nationals or stateless persons as beneficiaries of international protection, for a uniform status of refugees or for persons eligible for subsidiary protection, and for the content of protection, and for the content of the protection granted [2011] OJL 337/9.

spectrum (displacement) and does not necessarily imply responsibility as regards governance.[47]

**Environmentally displaced populations and NATO**

Cross-border displaced population flows are events with serious security implications, even if the displaced persons do not qualify as refugees from a legal point of view. The UN Security Council concluded in various occasions that there is a link between international peace and security and mass trans-border displacement of populations and, accordingly, did not hesitate to impose sanctions to the responsible regimes under Chapter VII of the UN Charter.[48] This attitude is consistent with the Security Council's post-Cold War willingness to address non-traditional threats to international peace and security, beyond aggression and inter-state conflict,[49] but also underlines the relatively uncontested admission that mass, non-organized and involuntary population influxes across state borders are inherently dangerous, not just for the states of transit and destination and their populations, but also for the displaced people themselves.

The fact that most of the environmentally displaced individuals remain within their state borders offers little reassurance, since internal displacement is often the precursor for cross-border displacement.[50] One frequently cited scenario suggests ''an increasing desertification and drought forcing people from northern and sub-Saharan Africa into Europe … [where] immigration issues are already a source of major tension.''[51] According to the German Advisory Council on Global Change, climate change could incite a mass migration from Central America and the Caribbean islands to the United States, combined with more migration within Central America.[52] A similar claim is included in a

[47] 'The concept of 'climate refugee' 4.

[48] See e.g. United Nations Security Council Resolution 688 (5 April 1991) UN Doc S/RES/688; UNSC Res 841 (16 June 1993) UN Doc S/RES/841; UNSC Res 940 (31 July 1994) UN Doc S/RES/940; UNSC Res 1556 (30 July 2004) UN Doc S/RES/1556.

[49] Nivett (2020) 343.

[50] Cullen (2020) 270.

[51] US National Research Council, *Climate and Social Stress: Implications for Security Analysis* (John D. Steinbruner, Paul C. Stern and Jo L. Husbands ed, National Academies Press 2013) 20 cited at Lippert (2016) 118.

[52] German Advisory Council on Global Change, *World in Transition: Climate Change as a Security Risk* (2007) 151, 163 cited at Biermann and Boas (2010) 72.

report by the Development, Concepts and Doctrine Centre (DCDC) of the United Kingdom's Ministry of Defence, which draws on a scenario for 2007–2036:

> A combination of resource pressure, climate change and the pursuit of economic advantage **may** stimulate rapid large scale shifts in population. In particular, Sub-Saharan populations ***will*** be drawn towards the Mediterranean, Europe and the Middle East, while in Southern Asia coastal inundation, environmental pressure on land and acute economic competition ***will*** affect large populations in Bangladesh and on the East coast of India. Similar effects ***may*** be felt in the major East Asian archipelagos, while low-lying islands ***may*** become uninhabitable. [53]

Open borders, global transportation networks, and ease of movement can enable rapid migration or refugee waves between countries. Political groups, state actors, and/or criminal networks can exploit this situation as a means to achieve organizational goals.[54] As it was aptly summarized in the *Foresight Report*,

> Whenever migration becomes large or rapid, or sensitive international boundaries are crossed, then geopolitical challenges may follow. For example, destination areas may face challenges relating to economic integration, social cohesion and increased tension/conflict.[55]

Furthermore, under certain conditions, population displacement can be exploited by authoritarian regimes as tools for the conduct of hybrid actions. International community has very recently bear witness to the instrumentalisation of irregular migration by President Alexander Lukashenko of Belarus against Allied countries.[56] By facilitating influxes —mainly from Iraq but also from Syria, Afghanistan, and other countries in the Middle East and Africa— at least since May 2021 to Belarus and on to Belarus's borders with neighbouring EU and NATO member states Poland, Lithuania and Latvia, Lukashenko tried to blackmail the West into easing sanctions imposed to his authoritarian regime

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[53] Development, Concepts and Doctrine Centre, *The DCDC Global Strategic Trends Programme 2007–2036* (3rd edn, 2007) 28 (emphasis original).
[54] Ibid 56.
[55] United Kingdom's Government Office for Science, *Migration and Global Environmental Change. Future Challenges and Opportunities. Final Project Report* (2011) 15 (Foresight Report).
[56] 'Statement by the North Atlantic Council on the situation at the Poland-Belarus border' (12 November 2021) <www.nato.int/cps/en/natohq/news_188529.htm > accessed 24 May 2022.

for its human rights abuses and violations of international law.[57] Similar tensions stemming from the exploitation of migrants and refugees for the conduct of hybrid attacks were noticed a year earlier in the broader area of the Alliance's south-eastern flank.

NATO's essential purpose is to safeguard the freedom and security of all its members by political and military means, in accordance with the principle of solidarity, which ensures that no member country is forced to rely upon its own national efforts alone in dealing with basic security challenges.[58] Since mass, climate change- related displacements of populations can affect and even be weaponized against its member states, studying and monitoring the phenomenon falls within its remit, as part of a more active and close engagement with climate aspects of international security affairs.[59]

NATO's response to climate change-driven population displacement should begin with the underlying assumption that while it cannot be a primary stakeholder to the issue, it cannot remain indifferent towards it either. It is submitted that any potential way forward should include, as a minimum, raising the Alliance's level of awareness (especially through technical means, like satellites) for potential hotbeds around the globe where new migration flows could be triggered because of climate change,[60] enhanced cooperation with states which are usual sources of such influxes, and preparation for more operations like the one conducted by the SNMG2 in the Aegean Sea, as part of national and international efforts to cut the lines of illegal trafficking and illegal migration.[61] In addition, NATO should advance cooperation with other international organizations and actors with an interest in migration management, including climate change-related one. The most obvious example is the European Union, to which NATO can claim a useful supporting role in working with its border agency, FRONTEX.[62]

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[57] Congressional Research Service, *Migrant Crisis on the Belarus-Poland Border* (IFI 1983, updated December 13, 2021) <https://crsreports.congress.gov/product/pdf/IF/IF11983> accessed *at 21 May 2022.*

[58] NATO, *The NATO Handbook. 50th Anniversary Edition* (NATO Office of Information and Press 1998-1999) 23.

[59] Lippert (2016) 18.

[60] Jamie Shea, NATO and Climate Change: Better Late than Never' (*GMF*, 11 March 2022) www.gmfus.org/news/nato-and-climate-change-better-late-never accessed at 21 May 2022.

[61] 'Standing NATO Maritime Group Two conducts drills in the Aegean Sea' (27 Feb 2016) <www.nato.int/cps/en/natohq/news_128657.htm > accessed at 22 May 2022.

[62] Shea (2022).

Furthermore, the Alliance could consider taking an even more active role in the efforts to mitigate the adverse effects of climate change by exploiting its rapid reaction capabilities in cases of climate emergency situations, thus reducing the potential for environment- related population displacements. There is interesting precedent in this direction, including the deployment of the NATO Response Force to Kashmir in 2006, to help Pakistan restore infrastructure and communications after a major earthquake,[63] but also the assistance provided to Bosnia and Herzegovina during the devastating floods that country experienced in 2014, where the Alliance's troops on the ground worked in tandem with Bosnian civil and military organizations,[64] under the coordination of the Euro-Atlantic Disaster Response Coordination Centre (EADRCC) .[65]

Obviously, such stabilization and aid operations beyond NATO's borders should, in principle, take place with the consent of host nations, in the form of humanitarian assistance.[66] However, non-consensual deployments should not be ruled out, provided that the emergency is judged by the NAC as sufficiently severe for the Alliance's collective security interests to warrant such a measure and there is an appropriate legal basis under international law. Such operations could include the creation of so-called ''safe heavens'',[67] for the protection of populations that could otherwise chose migration to save themselves from the effects of environmental degradation and other concurrent threats, like hostilities.

Finally, the Allies should act quickly to clean house in cases of allegations that their own conduct exacerbates the problem of environment-related population displacement. For example, Türkiye could re-examine its hydropower dam construction projects on the rivers Tigris and Euphrates in consultation with the government of Iraq, to make sure that the projections about destructive water shortages and food insecurity in Iraq will not come to pass. [68]

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[63] Ibid.

[64] Amar Causevic and Ibrahim Al-Marashi, 'Can NATO evolve into a climate alliance treaty organization in the Middle East?' (2020) 76 Bulletin of Atomic Scientists 97, 98.

[65] ''NATO Allies and partners assist Bosnia and Herzegovina in flood disaster relief' (20 May 2014) <www.nato.int/cps/en/natohq/news_110060.htm> accessed at 22 May 2022.

[66] See Allied Joint Publication (AJP) 3.4.3. Allied Military Contribution to Humanitarian Assistance.

[67] Barry R. Posen, 'Military Responses to Refugee Disasters' (1996) 21 International Security 72, 98-103.

[68] Causevic and Marashi (2020) 99. See also Paul Hockenos, 'Turkey's Dam Building Spree Continues, At Steep Ecological Cost' (*Yale Environment 360*, 3 October 2019)

Further study and monitoring of the issue of environmentally displaced persons could be achieved within the framework of a NATO entity dedicated to the study of climate change and its impact to Allied collective security. In this direction, the recent proposal by Canada to host a NATO Climate and Security Centre of Excellence is an excellent initiative.

## Conclusion

Global warming is a non-violent, yet existential, menace to mankind and consequently, to Allied common security. Population displacement caused by climate change is just an aspect of this broader problem, but an important one. Irrespective of the success of the global efforts to curb temperature rise, the ''climate refugees'' issue must be addressed by the international community, since it overlaps and can add to already existing problems for international peace and security.

Environmentally displaced people are not entitled to a special legal regime like officially recognized refugees and there seems to be little prospect for this situation to change in the foreseeable future. This is not to say that international policy makers cannot take measures to boost their adaptation efforts or mitigate the plight and, at the same time, protect borders from mass, unregulated and potentially destabilizing influxes of people from countries and regions battered by climate shocks. In what is, after all, a fight for more international security and stability, NATO can bring its sophisticated data gathering mechanisms, its analysis and rapid response capabilities, its expertise in maritime security and humanitarian assistance and, above all, the collective political will of 30 Allied nations from both sides of the Atlantic.

Undoubtedly, the Alliance will not solve the problem alone. Nevertheless, it can prove itself useful in a combined security and human rights approach to climate change-forced migration, aiming at preventing global instability and large influxes of environmental refugees at its member states, while guarantying basic rights for all affected people as a key component in maintaining international stability.[69] At the end of the day, more stability in its neighbourhood means more security for its own citizens, and this is exactly what

https://e360.yale.edu/features/turkeys-dam-building-spree-continues-at-steep-ecological-cost accessed at 22 May 2022.

[69] Jolanda van der Vliet, 'Climate Refugees. A legal mapping exercise' in Simon Behrman and Avidan Kent (eds), *Climate Refugees. Beyond the legal impasse?* (Routledge 2018) 27.

NATO, the largest and most successful military alliance in history, has been striving for during its entire history.


Source: www.nato.int

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## Addressing NATO challenges in the age of Anthropocene – the case of climate change[1]

By Col Drazen Smiljanic[2]

### Introduction

Since Paul Crutzen and Eugene Stoermer baptized our epoch the "Anthropocene"[3] in the early 2000s, many have used that word to highlight the specific new context we are now living in. While these two scientists identified the year 1784 as the "onset of the Anthropocene", a new geological epoch in which the global environment is significantly shaped by humankind rather than vice versa – this term provides a helpful shortcut to describe the "character" of our time. This is an era during which the significant impact of humans on life-sustaining systems and the negative externalities of progress reached a level

[1] **DISCLAIMER**: The views expressed in this article are solely those of the author and may not necessarily represent the views of NATO, Allied Command Operations, or Allied Command Transformation, or of their affiliated organizations.

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[3] Paul J. Crutzen, 'Geology of mankind' (2002) 415 Nature 23

that cannot be sustained, or in other words, where nature itself could no longer compensate for these factors. As a result, we are seeing in our physical environment certain "compensatory processes" manifested, for instance, through climate change.

The "anthropogenic" character of our current epoch also has a hand in other challenges, including COVID-19 pandemics that have significant causal links to the loss of biodiversity and the overall health of ecosystems.[4] In our time, extensive technological progress coincides with the rise of complexity in almost every domain of human endeavour. This, unfortunately, has its price in security matters too. While globalization may have erased physical borders, older concepts and baser impulses related to dominance, power, "historical rights", and identity projects have remained, as the Russian aggression in Ukraine shows all too vividly. This blend of old and new challenges makes conceptualizing national security extremely difficult. The old "habits" have left war's nature unchanged in terms of violence, while the new context has shaped and changed its character. Today, for instance, we see how old, aggressive habits in international relations have expanded into new operational domains, such as cyber or space, while crises have simultaneously proven to be a fertile ground for informational warfare ("battle of narratives").

NATO finds itself at the beginning of the third decade of the 21st century challenged to adapt its mission, structure, capabilities and mind-set, in order to confront the complex circumstances that characterize our security environment. This security environment is characterized by the use of hybrid warfare, conflicts in the grey zones, and other aspects of "unrestricted warfare". In addition, as seen with the Russian aggression on Ukraine, high-intensity war has returned as a realistic threat in the Euro-Atlantic area.

Moreover, on "the top" of these, there are other challenges from so-called "threats without threateners", such as pandemics and climate change, which are not guided by a human hand, and they are a threat to all alike but impact some more than others. Pandemics and climate change are examples of these challenges that cannot be tackled in the traditional sense of "countering them". Instead, they may require a profound change in our practices, a more decisive role for the state (in how it organizes public health, for instance), and closer international cooperation.

[4] Odette K. Lawler et al, 'The COVID-19 pandemic is intricately linked to biodiversity loss and ecosystem health' (2021) 5 The Lancet 840

The article proposes herein NATO's potential role in mitigating climate change through several objectives. First, it scrutinizes the causes and impact of climate change on security and identifies actors and their associated responsibilities ("who to blame?"). It then analyses NATO's perspective and current policies (key documents) related to dealing with climate change, its ambition, and potential role. Finally, the article discusses what NATO could and should do regarding climate change.

## Background

Climate change is a complex phenomenon and a world-wide challenge, with global impacts in terms of geography and temporality (across space and time). Climate change is also both a consequence and a cause[5]. It is a consequence of human (primarily) economic activities, as seen in increased levels of greenhouse emissions. And it has a negative impact on ecosystems through hazards, exposure, and growing vulnerability. Climate change generates effects and risks beyond an ecosystem's ability to adapt. As a result, we may observe losses and damages in ecosystems and the development of a whole range of instabilities, which inflict cost and potentially life-threatening phenomena or are environmentally unsustainable.

The causality between human behaviour (stemming from economic practices and lifestyle) and the exponential rise of greenhouse gases (GHG), especially during the last 100 years, has been scientifically demonstrated. And, there is no doubt – human society causes climate change[6]! According to scientific evidence, GHG emissions pose a broad threat to humanity by intensifying multiple hazards to which humanity is vulnerable[7].

This negative, undesirable effect of economic progress affects the biophysical environment globally and consequently has immense potential for creating instabilities and crises and, therefore, insecurity. After the fear of potential nuclear annihilation, which humanity experienced during the Cold War, climate change represents a new type of planetary issue. Even though different regions are expected to experience climate with varying degrees of severity, this issue requires multilateral engagement. And negative

[5] Intergovernmental Panel on Climate Change, 'Climate Change 2022: Impacts, Adaptation and Vulnerability. Working Group II Contribution to the IPCC Sixth Assessment Report. Summary for Policymakers' (2022) < https://www.ipcc.ch/report/ar6/wg2/ > accessed 19 March 2022

[6] Ibid p.4

[7] Camilo Mora et al. 'Broad threat to humanity from cumulative climate hazards intensified by greenhouse gas emissions' (2018) 8 NCC 1062

consequences of climate change are not related only to the environment. They may also be economical and social, impacting all aspects of what is known as sustainability (or, using a dated term, sustainable development).

The physical impact on the environment can be categorized as being either gradual or catastrophic. Gradual onset may be observed in longer-term shifts in climate patterns, sea-level rise, or enduring heatwaves. On the other hand, catastrophic impact includes extreme weather events or forest fires (recently seen in Australia and the USA). The most relevant international body, which was established by the United Nations, the Intergovernmental Panel on Climate Change (IPCC)[8], uses a 1.5° C temperature rise as a "not to exceed" target in their reports rather than the 2° that was initially (Paris Agreement 2015, for example) agreed as the upper limit for global warming. Namely, IPCC assessed this 0.5°C difference as significant in increasing climate-related risks for the natural and human systems[9], since the 1.5°C increase had been recognized as a critical threshold in many researches. This also led to the creation of new categorization[10] of climate-related risk categories, such as: >1.5 °C as dangerous; >3 °C as catastrophic; and >5 °C as unknown, implying beyond catastrophic, including existential threats.

The physical risks related to climate change have the potential to trigger a cascade of financial and economic impacts, including losses from physical damage to assets, supply chain or production capacity disruptions, and increased operating costs. For example, the *UN 20-Year Review*[11], which analysed economic losses, poverty & disasters between 1998-2017, concluded that there had been a dramatic rise in direct economic costs of 151% associated with climate-related disasters. Extreme weather accounted for 77% of these losses, amounting to $2,245 billion (i.e. more than 2.2 trillion). In addition, risks associated with these aspects have the potential to spill over into the

[8] For more information, see: https://www.ipcc.ch/

[9] Intergovernmental Panel on Climate Change, 'Global Warming of 1.5°C. Summary for Policymakers' (2018) < https://www.ipcc.ch/sr15/ > accessed 19 March 2022

[10] Yangyang Xu and Veerabhadran Ramanathan, 'Well below 2 °C: Mitigation strategies for avoiding dangerous to catastrophic climate changes' (2017) 114 Proc. Natl. Acad. Sci. U.S.A. 10315

[11] United Nations Office for Disaster Risk Reduction 'UN 20-year review: earthquakes and tsunamis kill more people while climate change is driving up economic losses' (2018) <https://www.undrr.org/news/un-20-year-review-earthquakes-and-tsunamis-kill-more-people-while-climate-change-driving > accessed 27 January 2022

security arena (including life-threatening weather, floods, droughts, forest fires, uncontrolled and massive emigrations, etc.).

As stated in the IPCC Sixth Assessment Report, near-term actions that limit global warming to close to 1.5°C would substantially reduce projected losses and damages related to climate change in human systems and ecosystems compared to higher warming levels but cannot eliminate them all. Even that effort will require significant change and adaptation. That's why Margaret Atwood[12], the celebrated author of The *Handmaiden's Tale,* claims it's not just climate change but "everything change". She vividly illustrated that we lived differently in the coal energy culture, which was a culture of workers and production, where "you are your job". In an oil and gas energy culture, which is a culture of consumption, we identify ourselves with what we possess. But in a renewable energy culture (the post-oil culture), "you are what you conserve". And the point of her claim was to highlight the nexus between the type of energy we use and our social "identity", and thus our behaviour.

## The forces and causes of climate change

Before we can engage in a productive discussion and develop potential proposals for any appropriate measures, including those related to security or legal, for addressing climate change, we must first understand the various actors and the setting that produce its causes ("who to blame?").

Without attempting to predict the potential severity of the impact of climate change, we may assume, based on the most relevant research, the two facts: (1) climate change exists and may have harmful impacts on different sectors of society[13], and (2) human society causes climate change. Bruno Latour, a late French philosopher, anthropologist and sociologist, even coined the term "New Climate Regime" to describe the current era where our relationship with the Earth is the determinant of our future[14].

In their 4th Report from 2007, IPCC stated that: "*The observed pattern of tropospheric warming and stratospheric cooling is very likely due to the*

[12] Margaret E. Atwood, 'It's Not Climate Change - It's Everything Change' (Medium.com, 27 July 2015) < https://medium.com/matter/it-s-not-climate-change-it-s-everything-change-8fd9aa671804 > accessed 19 November 2021

[13] See, for example: National Oceanic and Atmospheric Administration 'Climate change impacts' (2021) < https://www.noaa.gov/education/resource-collections/climate/climate-change-impacts > accessed 20 February 2022

[14] Bruno Latour, *Down to Earth: Politics in the New Climatic Regime* (Polity 2018) 140

*influence of anthropogenic forcing, particularly greenhouse gases and stratospheric ozone depletion*[15]." Some more recent studies have confirmed this observation, including more detailed indexes and the associated rates of human-induced warming[16]. The IPCC Sixth Assessment Report 2022 establishes the definitive responsibility of human society for climate change, without doubt[17].

Climate change can – simply put – not be attributed ("who to blame") to one source or group. There are the companies that extract, refine, and market carbon fuels[18]. But they are not solely responsible for emissions. The governments regulate the products and the consumers buy and use them. In general, the possibility to regulate - and thus the share of responsibility for climate breakdown - assumably lies with nations[19].

Accordingly, the causes of climate change could be found in unsustainable practices, which largely stem from economic progress and primarily are a consequence of using fossil fuels to satisfy energy needs. These practices are, essentially, the result of our everyday lives, our living standards, and, in the military context, the functionality (effectiveness) of our military power. Climate change and economic development have, therefore, likely to be closely intertwined. Ultimately, it turns out that the most important factor in understanding the root cause is to identify who holds power over available choices (market, policy/regulations, subsidies, etc.). Ability to determine and control how and for whom this power is gained and used seems to be the only efficient way to instil changes and tackle the causes of climate change.

Amitav Gosh[20] explains climate change as an unintended consequence of the presence of our species, human beings and his basic claim is that

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[15] Gabriele C. Hegerl et al. 'Understanding and Attributing Climate Change' in Susan Solomon et al (eds), *Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change* (CUP 2007)

[16] Karsten Haustein et al. 'A real-time Global Warming Index' (2017) 7 Scientific Reports 15417

[17] Ibid 5, pg. 35

[18] See, for example: Tess Riley 'Just 100 companies responsible for 71% of global emissions, study says' (The Guardian, 10 July 2017) < https://www.theguardian.com/sustainable-business/2017/jul/10/100-fossil-fuel-companies-investors-responsible-71-global-emissions-cdp-study-climate-change > accessed 19 January 2022

[19] Jason Hickel 'Quantifying national responsibility for climate breakdown: an equality-based attribution approach for carbon dioxide emissions in excess of the planetary boundary' (2020) 4(9) The Lancet Planetary Health e399, e404

[20] Amitav Ghosh, *The Great Derangement: Climate Change and the Unthinkable* (University

ultimately global warming is the product of the totality of human actions over time. This claim, however, does not fully reflect the wide variations in how much different groups have contributed to the problem (take, for example, slums in India or Latin American peons[21]). This is why, in the context of security, it is essential to emphasize that the big differences between nations' emissions levels can also be a cause of dispute.

Therefore, at the political level, it should be a governmental responsibility to tackle issues of global warming. Currently, the only formal (international) organisation seeking to garner agreement amongst countries to achieve defined climate goals is the United Nations Framework Convention on Climate Change (UNFCCC). This convention is organised around the Conference of the Parties (COP), which serves as the decision-making body in charge of monitoring and reviewing the implementation of the Convention. The Parties to this process are the nations, which agreed at COP21, held in Paris in 2015, to work together on limiting global warming to remain below 2 degrees and aim for 1.5 degrees. The same nations also decided to adapt to the impacts of the changing climate and to fund initiatives to deliver on these aims. While COP has often been criticised for achieving only limited success so far, as it is challenging to gain the consensus from 197 parties, there is (see COP26 Glasgow 2021), at least a verbal, while not legally binding, agreement to curb methane emissions, halt and reverse forest loss, align the finance sector with net-zero by 2050, ditch the internal combustion engine, accelerate the phase-out of coal, and end international financing of fossil fuels. These aspirations are, unfortunately, affected by the current stalemate in international cooperation, for example, due to the security situation in Europe.

## NATO's role viewed in an actantial model of security

The clarification of the actors in the climate change debate is vital for being able to analyse NATO's potential role(s) in dealing with the issue. In *NATO 2030,* climate change is identified as a "defining challenge of our time"[22] with global security implications.

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of Chicago Press 2017) 210

[21] The term *peon* is used generally to refer to poor people or those who perform menial labour, i.e. work that is often considered lowly and degrading

[22] NATO, 'NATO 2030' (NATO Public Diplomacy Division, Press & Media Section, 14 June 2021) < https://www.nato.int/nato_static_fl2014/assets/pdf/2021/6/pdf/2106-factsheet-nato2030-en.pdf > accessed 19 January 2022

In the analysis of actors, we borrowed the terminology and, to a lesser extent, the method used to analyse the action that takes place in a story, whether real or fictional, in structural semantics. The *actantial model*[23], also called the *actantial narrative schema*, may help to visualise the deep structure of human or social relationships, and present them in terms of agential functions by describing the constellation and their interaction in mutual relations of role, power and value. If we assume that NATO is the Protagonist, the question is: who is the Antagonist? And, is clear distinction possible in approaching climate change?

During the Cold War, the role of NATO in the constellation of actors, from NATO's perspective, was clear: NATO was the protagonist, and the Soviet Union the antagonist. Values to be protected were, and still are, broadly taken, democracy, the rule of law, sovereignty and, generally, peace in Euro-Atlantic Region. NATO's (first) rationale, *"Keeping the Russians out, Americans in, and Germans down"*[24], although it may seem oversimplified, lasted practically until the German unification and dissolution of the USSR. However, the last 30 years have brought about different challenges in international relations.

After the dissolution of the USSR, attempts to identify the antagonists in international relations became more and more difficult. Consequently, the critics of NATO's relevance questioned the reason for its existence – and this lasted almost until 2014, with the Ukraine crisis. As the security environment evolved from the Cold War paradigms, it became evident that NATO, designed and structured as a collective self-defence alliance, may not have capabilities and resources to answer all emerging security issues, particularly those of human security[25]. In this new reality, the lines between peace, crisis and war, between the forward and rear have become blurred, and the impact of "threats without a threatener", such as pandemics and climate change more influential.

One international team of researchers found that climate *"has affected organised armed conflict within countries. However, other drivers, such as low socioeconomic development and low capabilities of the state, are judged to*

[23] The model was developed in 1966 by semiotician Algirdas Julien Greimas. See: Algirdas Julien Greimas, *Structural Semantics: An Attempt at a Method* (University of Nebraska Press 1966)

[24] The rationale is attributed to the first Secretary General of the Alliance, Lord Hastings Ismay.

[25] United Nations' General Assembly resolution 66/290 defines human security as "an approach to assist Member States in identifying and addressing widespread and cross-cutting challenges to the survival, livelihood and dignity of their people."

*be substantially more influential*.[26]" This finding illustrates the entire complexity of climate change and the way it may impact security, from direct (i.e. floods, droughts, fires, etc.) to indirect (i.e. instability, migrations, conflicts, etc.).

Paradoxically, however, while NATO intends to tackle climate change, NATO (or rather NATO nations) is also an antagonist – by adding to the problem through mainly the use of fossil fuel. A prominent example is the United States, which, in 2017 alone, emitted 1,212 million metric tons of greenhouse gases, measured in $CO_2$ equivalent ($CO_2e$), through its defence operations. It means emitting more planet-warming greenhouse gases than the entire industrialised countries other than the U.S.[27]. The reasons for that are not only in size but also in the fact that U.S. military units employ equipment that consumes fuel at an incredible rate. Also, the logistical "tail" and the installations that support operations are extremely fuel intensive. While we may say that the example of the U.S. could be rarely matched and, therefore, may prove irrelevant for other NATO countries, the cumulative effect of fossil fuel use in NATO, or in Europe, brings more significance to this problem.

**Climate change as a challenge and opportunity for NATO (perspectives and ambitions)**

Challenges to NATO nations' security in the 21st century expanded from those of a geopolitical nature to include environmental issues and public health. These challenges are sometimes described as "threats without threateners". Even though they don't reflect the "traditional" notion of threats, they represent threat multipliers.

In NATO, climate change is yet to be understood and treated as a threat in the traditional sense, such as those stemming from geopolitical, military (operational) or technological domains. NATO is, however, aware that climate change is a threat multiplier, which feeds many other forms of instabilities, including mass migration from South to North.

Climate change is considered in NATO to be a threat multiplier that impacts Allied security, both in the Euro-Atlantic area and in the Alliance's broader neighbourhood. Climate change was also (already) featured in the

[26] Katharine J. Mach, 'Climate as a risk factor for armed conflict' (2019) 571 Nature 193-197

[27] Neta C. Crawford, 'Pentagon Fuel Use, Climate Change, and the Costs of War' (Watson Institute, Brown University, 13 November 2019) <https://watson.brown.edu/costsofwar/files/cow/imce/papers/Pentagon%20Fuel%20Use%2C%20Climate%20Change%20and%20the%20Costs%20of%20War%20Revised%20November%2019%20Crawford.pdf > accessed 10 November 2021

2010 Strategic Concept, and climate issues have been highlighted in Summit Statements since Lisbon in 2010.

An illustrative engagement scale that describes the intensity of efforts linked to tackling climate change-related challenges taken by states, organisations or individuals, may span from dealing with consequences of climate change (reactive measures), on one end, to an active contribution (proactive measures), on another end. So far, NATO has been more dynamic and "action-ready" at the lower end of the spectrum, as it presently takes into account the impact of climate change on security in relation to its three core tasks, more than undertaking a more profound transformation in terms of contributing to the mitigation of climate change. This more proactive approach, however, found its place in the NATO Climate Change and Security Action Plan[28].

*NATO's Green Defence Framework*, adopted in February 2014, strives to make NATO more operationally effective through changes in the use of energy while also meeting the environmental objectives of using fewer resources and enhancing sustainability. The Framework, however, does not contain specific targets or demands for activities. It, instead, highlights a number of initiatives apt to support or facilitate the development of green initiatives within NATO and in the member nations. Consequently, the Alliance has agreed it has a role to play in terms of being part of a comprehensive response to climate change.

NATO, in the *Climate Change and Security Action Plan*, formally declares an intent to contribute to the mitigation of climate change. However, NATO (and thus NATO nations) currently seems to be reluctant to (collectively) undertake a radical transformation of its capacities and practices (primarily transition in the area of operational energy towards renewables) to fully adapt to this new reality of Anthropocene, while the new reality is becoming more and more present and requires thorough commitment. Despite some significant developments (in NATO), "*further work and sustained political ambition are needed to ensure that NATO is fully prepared to continue to deliver in a changing climate,*" as stated in the *NATO Climate Change and Security Action Plan*.

NATO aims to become the leading international organisation when it comes to understanding and adapting to the impact of climate change on

[28] NATO, 'NATO Climate Change and Security Action Plan' (NATO.int, 14 June 2021) <https://www.nato.int/cps/en/natohq/official_texts_185174.htm > accessed 3 January 2022

security[29]. To do so, it must increase its ambition to mitigate climate change and demonstrate that climate- friendly or neutral practices and effective security can be reconciled.

A traditional enemy is countered by the military, while every other institution in a country prepares to alleviate or otherwise deal with the consequences of the enemy's actions. A relevant response to the global challenges of the new age, such as climate change, requires a different paradigm. Now governments, businesses, and individuals should be part of the greater resolve (be "the first responder"). Meanwhile, the military shoulensures that it doesn't contribute to increasing the negative aspects of challenges such as climate change.

It is, of course, hard to provide incentives for that kind of transformation at a time when the existing world order is challenged politically and militarily. No nation would go "green" to the detriment of its military effectiveness. However, in terms of operational energy, which in militaries world-wide primarily is based on fossil fuels, the transition towards renewables may be a game-changer in terms of both logistics and energy security and independence (less dependency on supplies, longer self-sustainment, manpower and transport resources for transport, etc.) and thus contribute to the effectiveness of the military.

## Conclusion

NATO, concerning its mission (collective defence) and its primary assets (military instrument of power), is not designed to be protagonist in the sense of being the main provider of security in the Anthropocene. As security is becoming a more complex matter, with different actors and their interactions expanding to the non-traditional spheres, NATO will need to seek its place in - and respond to - an equally more complex security environment.

This is particularly the case with facing the causes and consequences of climate change. The traditional security paradigm includes more or less clear protagonists (security providers) and antagonists (adversaries). Here, the paradigm of countering climate change would be inappropriate since it is essentially a process of rebalancing Earth's ecosystem (nature itself). Consequently, the most appropriate approach is to tackle it through mitigating the immediate effects and preparing for the further, potential consequences (reactive measures) while actively contributing to eliminating the causes

[29] Ibid

(proactive/preventing actions). NATO, if it wants to be a relevant stakeholder in dealing with climate change, will have to address all of the above.

A more proactive approach requires NATO to accept that the current ways of doing business (high carbon footprint) need to change, in particular in the context of operational energy. While this concerns mainly its military instrument of power, potential transition to renewable sources would allow Nations (member countries) to be less dependable on unreliable sources, which in and of itself represents a possible security challenge (autocratic governments etc.)

Arguably, the "Anthropocenic" challenges require more focus and self-transformation (in the sense of contribution), more cooperation to achieve interoperability while adapting the sources of energy for NATO nations' military forces and more strategic thinking (surviving in the complexity). Potential NATO's adaptation to a "more sustainable" alliance would also have many benefits. In the long term, it would decrease the overall complexity of the security environment by not only reducing the impact on the climate but also the dependency and the number of stakeholders in logistic chains).

To achieve the goal of becoming the leading international organisation when it comes to an understanding and adapting to the impact of climate change on security, NATO should increase its ambition on climate change and demonstrate that climate change and security can be reconciled. This may be achieved with its transition, an "energy transformation", which would require involving sustainability as a guiding principle in its capability development, similar to interoperability or, recently, resilience.

To succeed, it would require, above all, more vital determination and contribution of Nations to engage in that transformation at their level (national defence planning). NATO can do that more directly in the format of Common Funded Capabilities and as a facilitator, indirectly, by providing standards for this "sustainable" interoperability with political (and ecological) efforts.

Efforts to limit the causes of climate change on a global level, after we experienced the COVID-19 pandemics and a major war in Europe, will be even more complicated. We observe the new world order shaping with a more or less formal Sino-Russian axis. This may end the globalisation and multilateralism of the 21st-century version as we know it. As a result, we may expect the prolonged economic involution but also take it as an excellent opportunity to rethink better our economic models with less pollution and fewer dependencies on non-NATO nations and partners. NATO's military should follow

and ensure its capabilities are not only capable of operating in new operational domains but also in an "Anthropocenic" security environment. It should produce less carbon footprint and be less dependent on traditional sources of energy and unreliable suppliers, while providing an effective response to the crisis of the 21st century.


Source: www.nato.int


Source : www.nato.int

## Policy initiatives of Hellenic Ministry of Defence tackling climate crisis and adapting to climate change[1]

By Col Ilias Manolis[2]

### Background: EU Defence & NATO perspectives towards climate change impacts on defence

EU institutions (European Commission, Council of the EU and the European Parliament) have set a nexus of ambitious goals to promote sustainability transitions, tackle climate change and the loss of environmental

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quality, with specific focus on rendering the European Union area the first carbon-neutral region by 2050. The achievement of such goals is endorsed through the adoption of the European Green Deal strategy and its associated initiatives, policies and legislation.

In this context, the EU Defence related authorities (i.e. the EU Military Staff and the European Defence Agency) have drafted their first Climate Change and Defence Roadmap.[3] This Roadmap includes sets of tactical-operational-strategical action plans for ensuring the effective synergies of critical Common Security and Defence Policy (CSDP) elements with existing climate change policy aspects, both at national and EU wide level.

At the same time, NATO as well has highlighted the topic of climate change and the required mitigation of its impacts, at the highest possible political level, thus stressing the need for adaptation of missions, procedures, infrastructure, as well as changes in human resources management corresponding to this adaptation. In the 14 June 2021, Brussels Summit Communiqué it is stated that:

> *"Climate change is one of the defining challenges of our times. It is a threat multiplier that impacts Allied security, both in the Euro-Atlantic area and in the Alliance's broader neighbourhood. Climate change puts our resilience and civil preparedness to the test, affects our planning and the resilience of our military installations and critical infrastructure, and may create harsher conditions for our operations. Today we have endorsed an Action Plan to implement our NATO Agenda on Climate Change and Security, which increases our awareness, adaptation, mitigation, and outreach efforts, while ensuring a credible deterrence and defence posture and upholding the priorities of the safety of military personnel and operational and cost effectiveness. To increase awareness, NATO will conduct annual assessments of the impact of climate change on its strategic environment as well as on missions and operations. To adapt to climate change, NATO will incorporate climate change considerations into its full spectrum of work, ranging from defence planning and capability development to civil preparedness and exercises. To contribute to the mitigation of climate change, drawing on best practices of Allies, and taking into account their different national circumstances, NATO will develop a mapping methodology to help Allies measure greenhouse gas emissions from military activities and installations, which could contribute to formulating*

[3] https://data.consilium.europa.eu/doc/document/ST-12741-2020-INIT/en/pdf

*voluntary goals to reduce such emissions. NATO will also strengthen exchanges with partner countries as well as with international and regional organizations that are active on climate change and security issues."*[4]

In this respect, the NATO Climate Change and Security Action Plan, which was endorsed at the June 2021 Summit and comprises of the specific milestones, focuses on four different goals:

- to raise the awareness of the subject amongst the population of NATO member states.
- to adapt to climate change in terms of planning, operating and endorsing cutting-edge technologies.
- Third, to mitigate climate change effects by voluntarily adopting assessments of carbon footprint and reducing relevant emissions.
- Fourth, to render NATO as a focal point for the dissemination of national best practice and for peer-to-peer exchanges on green defence and smart energy, energy efficiency, and climate change mitigation and security resilience.

**Hellenic Ministry of Defence (HMoD) State of Play**

Since the mid-00s, the HMoD has dwelled on the necessity of incorporating environmental protection principles into its defence-related operations and activities, both in peacetime and during military exercises and missions.

Therefore, in 2007, the HMoD issued the first edition of a holistic Environmental Policy that aimed to introduce a "greener" and more sustainable way of managing military activities. This Policy relies on five (5) pillars:

a. Compliance with the EU/national legislation and NATO Agreements;
b. Rational management of natural resources and energy;
c. Pollution prevention;
d. Continuous improvement of environmental performance;
e. Active participation of the Hellenic Armed Forces personnel.

In 2014, in the framework of the Greek Presidency of the EU Council, the Policy document was revised and the second edition emphasized the way that the military activities taking place in peacetime (both staff level activities

[4] https://www.nato.int/cps/en/natohq/news_185000.htm?selectedLocale=en

and exercises) would be aligned with sustainable development principles and procedures, thus acquiring a more environmental-friendly character.

In late 2019, HMoD declared 2020 as the year of "Research, Innovation and Environmental Protection" for the Armed Forces. In the context of this initiative, the HMoD Environmental Policy was revised once again. The third, current, edition of the Policy Document, which is now titled "Environmental – Energy and Climate Change Adaptation Policy"[5], shifted its focus on the issue of climate change. It explores possible ways that the Hellenic Armed Forces can adapt their operations and activities in order to mitigate the impacts and the relevant threats, as well as to fulfil their mission while accomplishing the minimum carbon footprint possible. Moreover, as a follow-up action to the EUMS/EDA (Climate Change & Defence Roadmap) and NATO (Climate Change & Security Action Plan) initiatives, HMoD inaugurated a Working Group of Subject Matter Experts (named "HMoD Climate Change Task Force, which was tasked to draft the "Climate Change Adaptation Roadmap of the Hellenic Armed Forces".

## Hellenic MoD Environmental – Energy and Climate Change Adaptation Policy

*1. Basic Principles*

### Prevention

Following the fundamental requirements of the prevention principle, damages imposed by human behaviour to the environment should be confined to their sources before potential expansion at a wider scale. Special attention must be casted in incidents where rearranging the environmental balance is very difficult. This confinement attempt entails:

a. Top management and whole personnel commitment
b. Complete defining of the environmental elements involved in each military activity, as early as possible.
c. Access and effective implementation of the relevant legislative and technological aspects,
d. Reasonable utilization of available material and other resources

### Precaution

The precaution principle indicates that the lack of scientific certainty should not be used as an excuse to postpone degradation prevention

[5] https://www.greenarmedforces.mil.gr/pdf/EECCAP.pdf

measures, in the cases of threat of serious or irreversible damage to the environment

**Proximity/In situ management**

Waste management and the handling of relevant environmental cases, is bound to be dealt in an urgent manner ("on the spot"), in order to:

a. Minimize the risk of creating accidents related to transportation.
b. Mitigate the energy/carbon footprint and associated transportation costs.

**The polluter pays**

The individual or body that produces the waste is responsible for the environmental pollution. Hence it is by law regarded liable for covering any cost entailed to the effective waste management as well as any restoration/remediation activity of the area affected.

**Transparency –Security-Classification**

Disclosure of environmental information to all stakeholders is considered mandatory by law. However, in cases where the disclosure jeopardises the existing security and classification protocols, the person assigned with this task, needs to carefully identify the right recipients of the information.

**Interoperability**

Establishing the highest possible degree of synergies among the different operational aspects of the Hellenic Armed Forces is paramount. It assists in multiplying problem solutions of environmental nature as well as ensuring consensus among stakeholders and consequently achieving economies of scale, thus minimizing associated costs.

2. *Main Fields of Interest*

**Climate Change Adaptation**

The weather and climatic parameters which are listed below, have been regarded in the Policy Document as fundamental. In terms of interacting with military activities: solar radiation, sunshine and cloud cover, air temperature, air humidity, rainfall, strong winds and evaporation, dew, mist, fog, snow, hail.

Climate change effects have rendered their frequency and intensity of occurrence very difficult to predict and project its future behaviour. Therefore, it is also highly risky to estimate and assess the magnitude of their consequences, not only to the natural environment but also to the wider society. Indicative examples for the former are extensive coastal corrosion, pollution or drainage of coastal wetlands, reduction of groundwater replenishment rate, floods and landslides, and draughts threatening the unimpeded operation of military infrastructure. For the latter, the main impacts refer to related damage on transportation networks, coastal civil engineering projects, climate migration hinder defence contribution in civil protection procedures

**Energy**

Seeking to reduce their energy footprint, the HMoD's involved authorities take in regard the Energy Triptych model, when implementing "Health and Safety at work" legislation. This Triptych is comprised by the following principles:

a. Energy Saving, in terms of substitution of high energy consumption equipment and devices, with low energy ones.
b. Promoting the utilization of energy stemming from Renewable Energy Sources (RES)
c. Efficient use of fossil fuel deriving energy.

**Soil**

Soil is one of the fundamental natural resources. Therefore, its protection is regarded as critical, in association with the protection on the existing flora and fauna. All potentially polluted sites and areas are being registered and monitored, so that all suitable restoration and remediation actions will be implemented.

**Air**

With regards to air emissions, the Hellenic Armed Forces are trying to keep associated levels within the acceptable (by applicable laws) limits. Main sources of air emissions are: military vehicles and aircrafts, war naval vessels, as well as building stock's heating systems products. Special attention is casted to the legal time frames for replacing ozone depleting substances.

**Marine Environment**

The protection of aquatic and marine environment is also considered of extreme significance, not only at the level of the Hellenic Environmental Policy, but also at European and at global level. Natural processes, which are related to marine ecosystems, inter alias, are:

a. Filtration, dilution and storage of the water.
b. Flood prevention.
c. Maintaining microclimate balance locally and globally.
d. Conservation of biodiversity.

It is worth mentioning that almost all of the small Greek islands and islets are included in the European Natura 2000 Network, a fact that renders the sustainable management of these places and sites absolutely crucial, in terms of environmental, economic and social aspects. Associated Hellenic Armed Forces' entities contribute to this direction.

**Inland Water Resources**

Hellenic inland aquatic resources are following the wider degradation of the natural environment, caused by several human activities such as extensive land use and water extraction. Hence, phenomena linked to disruption of natural flow are met on a more frequent basis. This disruption is also impacted by the excessive demand of water in comparison to the available supply potential. Therefore, the need of sustainable utilization of inland water resources, both in groundwater and surface water terms, is considered mandatory. In this respect, the Hellenic Armed Forces should:

a. Apply suitable measures, in both organizational and technical terms, in order to ensure reasonable use of available water resources and, if possible, reduce consumption.
b. Implement measures to prevent any qualitative or quantitative degradation of water resources, caused by military activities

**Biodiversity**

Hellenic territorial resources possess, without doubt, rich biodiversity elements, both in terms of flora and fauna. These elements pose a significant support factor that assists maintaining proper balance of the related ecosystems.

For instance, habitats of the marine protected areas, assist in stabilizing sediments and thus contribute to the protection of these areas against erosion. Also, it is noted that marine protected areas may provide shelters for coastal populations, ensure consistency of natural landscapes, thus enhance mitigation of climate change impacts.

The conservation of the aforementioned natural resources is considered of paramount importance for the Hellenic Armed Forces. Moreover, protecting existing biodiversity elements is a key parameter in terms of planning, executing and monitoring the effectiveness of military training exercises,

**Hazardous substances/Waste Management**

All of the major stages of hazardous substances and materials handling, storing and disposing have to be performed by appropriately trained and skilled personnel. These processes also need to follow the respective provisions of both applied legal framework and best technological practises available.

In that context, the Hellenic Armed Forces follow the well- established (in both legal and technological terms) sequence: Reduce-Reuse-Recycle-Recover and then dispose the residuals. This fact ensures the effective handling of the wastes, as well as keeps the produced quantities of the waste to the lowest possible levels. Another fundamental principle of waste management, which is also considered as a baseline for the Hellenic Armed Forces, is the segregation of the different types of the waste, which takes place "at the source".

It should also be clarified that, with regards to the solid hazardous substances, the effective handling includes the safe temporary storage in sites that fulfil safety requirements for the people and the environment. These substances are handed over to specialized personnel of private contractors, who hold all of the necessary legal permits to properly perform the appropriate disposal. These permits are awarded by the Hellenic Ministry of Environment.

**Cultural Heritage-Property Protection**

One of the main objectives of the Hellenic MoD, with regards to its historic and cultural portfolio, is to ensure proper protection and preservation of the different locations and related infrastructure against military hazards, which are associated with operational activities (e.g. training exercises). More specifically, the related principles of protection refer to:

a. Ensure the integrity of the locations with historical and cultural interest.

b. Assess potential risks to the monuments, deriving from the operational activities, at the earliest possible stage (planning).
c. Create a holistic registry of all the historical and cultural assets which are owned by the Hellenic Armed Forces (ships, air-vessels, forts museums, etc.), in order to ensure the effective coordination of maintenance and restoration activities.

*3. Training-Education-Awareness*

The substantial endorsement and support of the guidelines of this Policy Document by the Hellenic Armed Forces' personnel is a key factor for its successful implementation. In that framework, it is considered essential to undertake initiatives for facilitating training and raising awareness activities. Under this context, it is easier for the people of the HMoD to develop values, attitudes, perceptions, skills and patterns of correct environmental behaviour. In order to fulfil this objective, the following action plans are either in the phase of drafting or in the phase of implementation:

a. Conduct of training-awareness programs, which address directly to HMoD's personnel, in collaboration with the National Centre of Public Administration.
b. Carry out of seminars and workshops.
c. Organization of sport and cultural events in the context of promoting sustainable initiatives.
d. Organization of relative lectures or small informative speeches in all levels of hierarchy of the Hellenic Armed Forces, starting at camp level, up to General Staff level, casting special attention to the students of the different military schools and academies.
e. Dissemination of related and updated material-information to all camps and Units, on a regular basis, addressing issues of collective or individual nature.

## Climate Change Adaptation Roadmap of the Hellenic Armed Forces

*1. The overarching context*

Consistent with the aforementioned HMoD environmental policy, the HMoD Climate Change Adaptation Roadmap, which is at the final approval stage, is attempting to enhance the resilience of the Hellenic Armed Forces against the adverse effects and to consolidate its leading role in the EU & NATO wider concept, with the aim of mitigating the consequences and adapting to the global challenges.

Based on this framework, it is considered imperative to:

a. Develop, disseminate and consolidate a robust status that will enable the Hellenic Armed Forces to operate with a minimum "climatic footprint".
b. Formulate a suitable transition model of operation, which will render the HMoD as a pillar of sustainability, an energy efficient organization and an example of achieving carbon neutrality and resilience.

2. *Basic Principles*

**Energy Efficiency as a top priority**

Ensuring energy efficiency should be the primary goal of the environmental adaptation of the Hellenic Armed Forces. This can be achieved with the correct cost analysis of the alternatives, taking in regard the social aspects of each alternative

**Not imposing damage to human environment**

Any measure or action is considered as a factor of causing potential damage to human environment, when[6], inter alia:

a. It is leading to uncontrolled emissions of $CO_2$ or other GHGs.
b. It is creating severe climatic conditions, which render the execution of certain human activities impossible.
c. It is imposing adverse effects on protected habitats, both on the ground and in the underwater environment.
d. It is generating huge quantities of waste, which is impossible to manage, without causing severe or irreversible effects on natural environment elements (air, soil, water, etc.).

3. *Main Objectives*

By issuing this Roadmap document, the following objectives are expected to be met:

[6] EU 2021/C58/01 Technical Guideline for Implementing EU REG on "Establishing the Resilience and Recovery Mechanism, available at https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52021XC0218(01)

- Improvement of the adaptation capacity of enhancing resilience and mitigating air emissions by incorporating climate change consideration in all aspects of planning (strategical, operational, tactical).
- Augmentation of the HMoD capabilities to operate effectively, efficiently and with an environmental friendly manner in all anticipated climatic conditions.
- Adaptation of the Hellenic Armed Forces personnel's attitude towards a "green" and sustainable transition, in order to contribute to the protection of biodiversity and natural and cultural property.

4. *Fundamental Pillars/ Action Plans*

The objectives that are analysed above are based upon two fundamental pillars: climate adaptation (leading to resilience) and climate mitigation (achieving climate neutrality). These two pillars are expected to be materialized via a series of short-, medium- and long – term action plans.

- Short-term actions of a 3 - year implementation period (thus, until 2025) are mostly low or zero cost, and have a preparatory/ administrative character, aiming at facilitating the decision making processes within the HMoD hierarchy.
- Medium – term actions of 10 years' implementation period (2026-2035) are of a larger cross- cutting nature, with corresponding budget requirements. They mostly consist of upgrading existing military infrastructure, in order to reduce its relevant carbon footprint, according to the EU and NATO respective guidelines and legislation framework.
- Long-term actions have a timeframe exceeding the year 2035 and last about 15 more years (until 2050). They have an even wider scope and reflect upon incorporating climatic protection considerations in defence platforms acquisition and/or retrofitting.

## Conclusion

Mitigating the impact of climate change and enhancing the resilience capacity of military infrastructure is essential for NATO member-state's Armed Forces. Primarily, to ensure a high level of both readiness and sustainability transitions but also, to contribute to each NATO member-state's specific energy and climate goals, as these are defined within its National Energy and Climate Plans (NECPs). Furthermore, improving the efficiency of defence infrastructure could save human and financial resources, which national defence

directorates instead can allocate and/or invest in other essential needs, respectively.

While there are several actions and ongoing initiatives at both the national and NATO level to achieve the aforementioned goals, efforts are unsystematic and occasionally duplicated or overlapping. It is also evident that a NATO member-state itself cannot always ensure the effective implementation of the climate change legislative provisions to military infrastructure, due to a number of potential obstacles such as organizational lack of awareness, motivation, and commitment; lack of knowledge and expertise; budget constraints and limited access to funding; asset deficiencies and lack of energy consumption data; etc.

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Source : www.nato.int

## Going Green, Staying Strong: an Operational Roadmap for "NATO Climate" Legal and Policy Tools[1]

by Antonio Carlo[2], Francesca Casamassima[3], Giulia Costella[4] and Antonino Salmeri, PhD Esq[5]

### Introduction

For over 70 years, the North Atlantic Treaty Organization (NATO) has safeguarded the freedom and security of all its members by political and military means. Collective defence and security are the core of the NATO

[1] **DISCLAIMER**: The views expressed in this article are solely those of the authors and may not necessarily represent the views of NATO, Allied Command Operations, or Allied Command Transformation, or of their affiliated organisations.

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purpose, which is "founded on the principles of democracy, individual liberty and the rule of law".[6]

Since its founding, NATO has been addressing security challenges on a daily basis. To meet these challenges, the alliance relies on the close network of its partner nations. NATO is confronted with new operational domains, unconventional attacks, cyber-events, threats to energy supplies as well as facing environmental challenges.

NATO has tackled environmental security from the first years of its creation. From the beginning, NATO realised that common environmental problems posed a threat to the welfare of all. In 1969, the North Atlantic Council established AC/274 "Committee on the Challenges of Modern Society"[7] (CCMS). The purpose of CCMS was to study environmental problems and the related quality of life issues facing the alliance.[8] Later in 2006, the CCMS merged with the NATO's Science Committee to form the Science for Peace and Security (SPS) programme[9] focusing on environmental emerging security challenges.

In June 2021, at the Brussels Summit, NATO's Heads of State and Government agreed to a new Climate Change and Security Action Plan.[10] Through this plan, NATO's aim is to become the leading international organisation in "understanding and adapting to the impact of climate change on security".[11] With this initiative, NATO will undertake a period of innovation and research focused on climate change and its impact on the operational field.[12] In accordance with this plan, NATO will produce an annual report on climate change and its security impact.

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[6] The North Atlantic Treaty (4 April 1949).
[7] North Atlantic Council, *Summary record of a meeting of the Council held at NATO Headquarters, Brussels, 39, on Wednesday 5th November at 10.15 a.m. and 3.30 p.m. and Thursday, 6th November at 9.30 a.m.* (Summary Record C-R(69)49) (24 November 1969).
[8] Evanthis Hatzivassiliou, *The NATO Committee on the Challenges of Modern Society, 1969–1975* (Springer 2017) 29-58.
[9] NATO, 'Science for Peace and Security (SPS)' (*NATO*, 31 May 2011) <www.nato.int/science/about_sps/historical.htm > accessed April 2022.
[10] NATO, 'Issued by the Heads of State and Government participating in the meeting of the North Atlantic Council in Brussels 14 June 2021' (NATO, 14 June 2021) <https://www.nato.int/cps/en/natohq/news_185000.htm > accessed April 2022 (Climate Change and Security Action Plan).
[11] NATO, 'Environment, climate change and security' (*NATO*, 3 December 2021 updated 8 June 2022) < https://www.nato.int/cps/en/natohq/topics_91048.htm > accessed April 2022.
[12] Climate Change and Security Action Plan, *supra note 10.*

NATO's continued engagement in environmental security was again confirmed at the 2021 UN Climate Change Conference (COP26) which was held in Glasgow, United Kingdom. On this occasion, NATO's Secretary General, Jens Stoltenberg, highlighted the importance of climate change awareness, reducing emissions, and needing to adapt to different operating conditions due to climate change.[13]

Moreover, to reinforce the strong involvement of NATO in environmental security, the NATO Standardization Office developed six "Environmental Protection Standardization Agreements" (STANAGs)[14] to define best practices to "shape the future security environment in areas of concern to NATO and have the potential to significantly affect NATO planning and operation".[15]

In this regard, this article aims to propose a new method to assess the impact of NATO operations on the environment by combining the organisation's existing capabilities with earth observation (EO) satellite technology.

## NATO's Space-based capabilities

Space has always been considered an important sector for NATO. In fact, the organisation's first space activities date back to the 1970s, with the launch of the first NATO-1 communications satellite in 1970. Between 1970 and 1993, NATO owned and operated a series of military communication satellites aimed at connecting the capitals of NATO member countries. Currently, NATO does not own any on-orbit spacecraft, such as satellites. Instead, it relies on NATO member states space service systems, which interacts with NATO owned and operated ground-based elements such as satellite communication (SATCOM) terminals.[16]

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[13] NATO 'NATO: An unexpected driver of climate action?' (*NATO*, 1 February 2022) <www.nato.int/docu/review/articles/2022/02/01/nato-an-unexpected-driver-of-climate-action/index.html > accessed April 2022.

[14] NATO Standardization Office, "Environmental Protection" Environmental Protection: NATO Documents < https://natolibguides.info/Environment/NATO-Documents > accessed April 2022.

[15] NATO, 'Wales Summit Declaration' (*NATO*, 5 September 2014) <www.nato.int/cps/en/natohq/official_texts_112964.htm#cap-init > accessed April 2022.

[16] Ntorina Antoni, Maarten Adriaensen, and Christina Giannopapa, 'Institutional Space Security Programs in Europe' in Handbook of Space Security: Policies, Applications and Programs (2nd edn, Springer 2020) 1191-1224 (Handbook of Space); Paul A. Tombarge, 'NATO Space Operations', (December 2014) 26 George C. Marshall European Center For Security Studies.

The turning point in NATO's position about the strategic nature of the space sector was reached in 2019, when space was officially recognized as a fifth operational domain, along with sea, air, land, and cyberspace.[17] Moreover, in October 2020, NATO Defence Ministers agreed to the creation of a NATO Space Centre to provide space-based support to operational and tactical units.[18]

Among the NATO agencies that make significant contributions to the organisation's space capabilities is the NATO Communications and Information Agency (NCIA).[19] This agency was created in 2012 following the unification of certain NATO Agencies, including the NATO Consultation, Command and Control Agency (NC3A) and NATO Communication and Information Systems Services Agency (NCSA). The aim of NCIA is to provide secure communications in support of NATO decision-making and command and control processes. In particular, it supports activities in the areas of Ballistic Missile Defence (BMD) and SATCOM.[20] The NCIA also provides intelligence, surveillance and reconnaissance (ISR) support through its Joint Intelligence, Surveillance and Reconnaissance (JISR) range of services.[21]

Among the five NATO's space-related capabilities,[22] for the purpose of this paper, major focus will be placed on capabilities concerning ISR and environmental monitoring activities.

ISR activities are essential for military operations, since they provide clear situational awareness to key stakeholders and decision-makers through the use of electronic observation tools such as space-based imagery satellites provided by member states (e.g., NATO's Alliance Ground System - AGS).[23]

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[17] NATO, 'NATO's approach to space' (NATO) <https://www.nato.int/cps/en/natohq/topics_175419.htm > accessed April 2022 (NATO's approach to space).

[18] NATO, 'NATO Space Center' (*NATO)* <https://shape.nato.int/about/aco-capabilities2/nato-space-centre> accessed April 2022.

[19] Prior to the creation of the NCI, the Joint Air Power Competence Centre (JAPCC) was established in 2005 to serve as the Department Head for Space Support to Operations, and to address the lack of a strategic component within the Joint Air & Space (A&S) Power; Handbook of Space, *supra note 16*.

[20] NATO, 'NATO Communications and Information Agency (NCI Agency)' (NATO) <https://www.nato.int/cps/en/natohq/topics_69332.htm> accessed April 2022.

[21] *Ibid.*

[22] ISR; SATCOM; Positioning, Navigation and Timing (PNT); Space Situational Awareness (SSA) and Space Surveillance and Tracking (SST); and Environmental Monitoring (NATO's approach to space, *supra note* 17).

[23] NATO, 'Joint Intelligence, Surveillance and Reconnaissance', (*NATO*, 12 March 2021) <https://www.nato.int/cps/en/natohq/topics_111830.htm > accessed April 2022.

Moreover, the use of technologically advanced Synthetic Aperture Radars (SAR) combined with Signal Intelligence (SIGINT) satellites allows for the collection of accurate data which can be used to develop accurate situational awareness and mission planning.[24]

As far as ISR related environmental monitoring activities are concerned, these are considered equally fundamental for mission planning as they provide valuable data about the meteorological and geographical conditions of a given area.[25] It is precisely these measurements that can be used to monitor the environmental impact of NATO operations. In particular, to measure greenhouse gas (GHG) emissions, as will be seen below, EO satellites, positioned in Low-Earth Orbit (LEO), are particularly effective as they guarantee a high level of revisit time, that is the time elapsed between observations of the same point on Earth, allowing a continuous and accurate monitoring of a given event or location.[26]

**EO satellites to monitor GHG emissions**

EO by spaced based assets can serve as an innovative approach to measuring and mapping GHG emissions, including identifying specific emission sources and collecting real-time data on GHG emissions.

GHG are gaseous substances in the Earth's atmosphere that help regulate the Earth's global temperature. The main GHGs in the Earth's atmosphere are water vapour ($H_2O$), carbon dioxide ($CO_2$), nitrous oxide ($N_2O$), methane ($CH_4$) and sulphur hexafluoride ($SF_6$).[27] All these substances have a dual origin, either natural or human made. However, there are also GHGs of a purely anthropogenic origin, i.e. produced by human activity. These include halocarbons, which, although emitted in much smaller quantities than the GHGs, it has a very long lifetime and a high radiative forcing effect.[28] Human

[24] Major Giuseppe Valentino, 'Using the Space Domain: An Intelligence, Surveillance and Reconnaissance Perspective', (2020) Joint Air Power Competence Center <https://www.japcc.org/articles/using-the-space-domain/ > accessed April 2022 (Using the Space Domain).
[25] Dr. Beyza Unal, 'Cybersecurity of NATO's Space-based Strategic Assets' (Chatham House, 1 July 2019) < https://chathamhouse.org/2019/07/cybersecurity-natos-space-based-strategic-assets-0/3-analysis-space-dependent-capabilities > accessed March 2022.
[26] Using the Space Domain, *supra note 24*
[27] EPA, Overview of Greenhouse Gases, < https://www.epa.gov/ghgemissions/overview-greenhouse-gases > accessed April 2022.
[28] Stephen Hardwick and Heather Graven, 'Satellite observations to support monitoring of greenhouse gas emissions' (March 2016) Imperial College London, Grantham Institute, Briefing paper No 16 < https://www.imperial.ac.uk/media/imperial-college/grantham-

activities has caused an imbalance in temperature regulation due to a sharp increase in anthropogenic GHG in the atmosphere. The consequence is climate disruption.

The starting point for combating this problem is a more complete understanding of current GHG emissions that contribute to global warming. With this knowledge, informed decisions may be made on how to tackle the problem. In developing this understanding, EO satellites are a powerful tool to provide comprehensive monitoring and reporting of changes in the Earth's climate over time.[29]

The assessment of GHG in the Earth's atmosphere by EO satellites is made possible by sensors that detect and record energy and gases reflected or emitted from the Earth's atmosphere.[30] One of these sensors is known as a spectrometer. Satellite-based spectrometers use several wavelengths to measure $CO_2$ and $CH_4$ according to their absorption spectra.[31] $CO_2$ near the Earth's surface can be observed at a shorter near-infrared wavelength, therefore the most useful satellites for detecting such emissions are those that observe these waves.[32] Satellites using longer thermal infrared wavelengths are needed instead to detect $CO_2$ in the troposphere (between 6 and 11 km above the surface).[33] Clouds are a problem for the detection of GHG emissions.[34] In fact, only cloud-free observations can be used, which is why it is difficult to have a complete GHG coverage of the entire globe.[35]

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institute/public/publications/briefing-papers/Satellite-observations-to-support-monitoring-of-greenhouse-gas-emissions-Grantham-BP-16.pdf > accessed April 2022 (Satellite Monitoring GHG).

[29] Group On Earth Observations, Climate TRACE and World Geospatial Industry Council, 'GHG Monitoring from Space' (November 2021) <https://earthobservations.org/documents/articles_ext/GHG%20Monitoring%20from%20Space_report%20final_Nov2021.pdf > accessed April 2022 (GEO).

[30] *Ibid.*

[31] Satellite Monitoring GHG, *supra note 28*

[32] European Space Agency, "Report for Mission Selection: An Earth Explorer to observe greenhouse gases" (*European Space Agency* 2015) <https://esamultimedia.esa.int/docs/EarthObservation/SP1330-1_CarbonSat.pdf > accessed April 2022.

[33] Satellite Monitoring GHG, *supra note 28*.

[34] S. Asefi-Najafabady, P.J. Ryaner, A. McRobert, Y. Song, K. Coltin, J. Huang, C. Elvidge and K. Baugh, 'JGR Atmospheres' (2014) Volume 119, Issue 17 <https://agupubs.onlinelibrary.wiley.com/doi/full/10.1002/2013JD021296 > accessed April 2022 (JGR Atmospheres).

[35] Satellite Monitoring GHG, *supra note 28.*

Among the most important satellite missions for monitoring GHG emissions are NASA's OCO-3 and JAXA's GOSAT. The former, or the Orbiting Carbon Observatory, is an instrument on board the International Space Station (ISS)[36] that studies the distribution of $CO_2$ on Earth in relation to "growing urban populations and changing patterns of fossil fuel combustion."[37] The latter is a satellite that aims to estimate GHG emissions and absorptions on a subcontinental scale.[38] Moreover, linking satellite remote sensing data with cloud computing platforms, such as Google and Amazon, contributes to the advancement of the field of EO for the creation of big data systems that enable the prototyping of forecasting models and GHG estimations in near-real time.[39]

**Building the operational roadmap**

Based on the assumption that NATO already has an internal coordination structure for satellite monitoring operations and that EO technology can provide real-time information about GHG emissions, this paper suggests the design of an operational roadmap aimed at supporting the process of setting NATO emissions cut targets.

The first phase of the roadmap involves the mapping of GHG emissions deriving from NATO operations, taking into consideration elements such as the number of land, air and sea vehicles deployed, or even the energetic consumption of military bases. It is indeed essential to acknowledge the levels, trends and sources of NATO GHG emissions, in order to understand where change is needed.

This first phase of data collection could be led by NCIA, given its well-established role in providing secure communications in support of decision-making processes. NCIA has the capability to leverage the EO capabilities of its members. Specifically, it could leverage the capabilities of 461 EO satellites, 428 of which are placed in Low Earth Orbit (LEO) for constant and increasingly updated monitoring.[40]

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[36] The International Space Station (ISS) is a large laboratory floating in space, moving around the Earth at an altitude of 400 km and a speed of 28,000 km per hour.
[37] NASA, Jet Propulsion Laboratory, 'Orbiting Carbon Observatory 3', <https://jpl.nasa.gov/missions/orbiting-carbon-observatory-3-oco-3 > accessed April 2022
[38] GOSAT Project, 'About GOSAT' < https://www.gosat.nies.go.jp/en/about_1_goal.html > accessed April 2022.
[39] GEO, *supra note* 29.
[40] The database of satellites currently orbiting earth is available at: Union of Concerned Scientists, 'UCS Satellite Database' (*Union of Concerned Scientists*, 1 January 2022).

This process can be similar to the Global Stocktake, launched by the Paris Agreement in 2021.[41] Global Stocktake is a process aimed at assessing collective progress towards GHG emission reduction targets that relies on the implementation of nationally determined contributions (NDCs).[42] In a similar way, NATO member countries can provide data on national GHG emissions linked to NATO operations around the world that can then be combined in a cloud computing platform and transformed in a map, like the one in Figure 1.

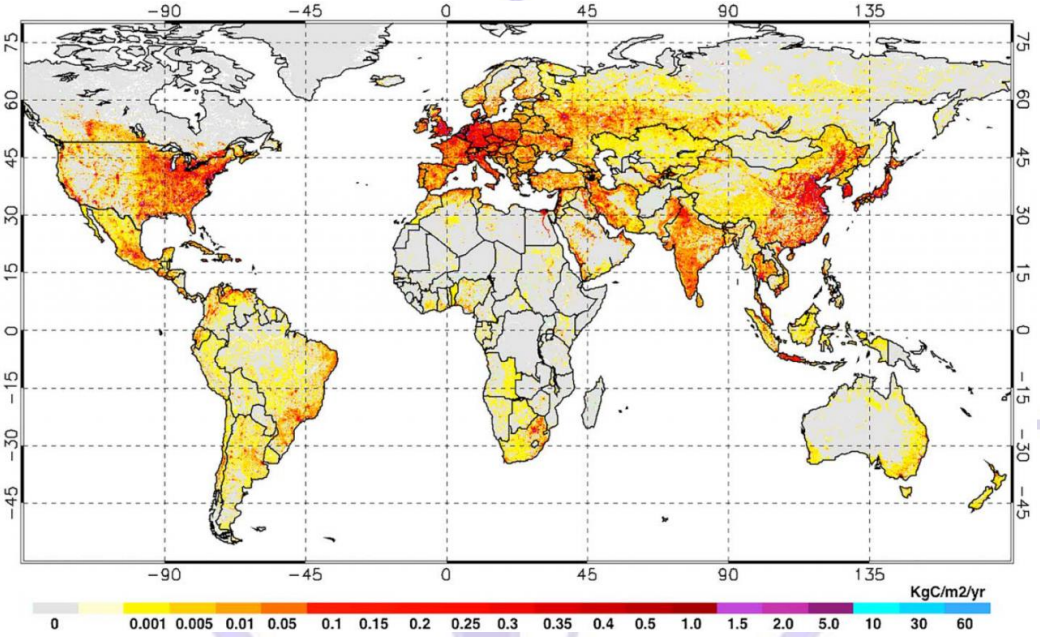


Figure 1. Total carbon dioxide emissions from fossil fuels in 2010 (Credit: Asefi-Najafabady et al.)[43] (Picture provided by the author)

The information on this map would facilitate the creation of a sample table, to be expanded upon in greater detail in a second phase, which contains variables such as mission name, location, technical details (e.g., number of military vehicles, etc.), current emission levels and target emission levels.

The final result of Phase 1 therefore involves the development of a preliminary impact assessment that can guide policy-makers to better evaluate

<https://www.ucsusa.org/resources/satellite-database >. The number of EO satellites belonging to NATO member states was obtained through the analysis of data filtered by country and type of satellite.

[41] GEO, *supra note* 29.

[42] United Nations Climate Change, 'Global Stocktake' (*United Nations Climate Change* 2022) <https://unfccc.int/topics/global-stocktake#eq-1> accessed April 2022.

[43] JGR Atmospheres, *supra note* 34.

strategic options that can both reduce the environmental impact of operational activities and also improve them.

Following the findings of Phase 1 of the roadmap, in Phase 2, for each mission listed in the table, the potential countermeasures to be adopted should be assessed and specified. The table will then be shared with the main stakeholders involved and updated periodically, specifying which of the proposed countermeasures have been adopted. A periodic check will then be carried out after a medium-long term period to re-evaluate emission levels and assess whether the target objective defined in Phase 1 has been achieved. If necessary, fine-tuning activities should be carried out, such as further evaluation and adoption of new, more effective countermeasures that can guarantee the achievement of the objective.

**Promoting best practices for sustainable space activities**

The critical reliance of NATO on the integration between space and earth-based capabilities suggests the development of coordinated best practices aiming at increasing the sustainability of its activities in both domains.

Given the crucial role of space technology in assessing and monitoring climate change, in 2008 the UN General Assembly decided the inclusion of a new agenda item specifically dedicated to space and climate change[44] for consideration of the UN Committee on the Peaceful Uses of Outer Space (UNCOPUOS).[45] As evidenced by relevant discussions in UNCOPUOS, states have increasingly recognized the importance of the responsible use of space both to reduce the environmental footprint of space itself and how it can contribute to ongoing efforts carried out by other sectors against climate change.[46]

Even though NATO does not own any space-based infrastructure, as discussed previously, it still performs a number of space-related services by combining its ground elements with the space assets of its member states. As a result, NATO acts as an aggregator multiplying the (positive or negative) impact

[44] United Nations General Assembly, 'International cooperation in the peaceful uses of outer space' UNGA A/RES/63/90 (18 December 2008).
[45] UNCOPUOS was set up by the United Nations General Assembly in 1959 to ensure the peaceful exploration and use of outer space. More information on UNCOPUOS can be found at: United Nations Office for Outer Space Affairs, 'Committee on the Peaceful Uses of Outer Space' (2022) < www.unoosa.org/oosa/en/ourwork/copuos/index.html >accessed May 2022.
[46] UNGA, 'Report of the Committee on the Peaceful Uses of Outer Space' (2021) UN DOC A/76/20.

of the individual components and activities of its members. This coordination and integration role puts NATO in the position to play a leading role in the development of best practices targeting a more environmentally conscious use of space.[47]

There are several areas where NATO could lead and support the activities of its member states. A first contribution, as described above, might be the development of a feasibility study on the usefulness of shared, voluntary commitments for reducing the carbon footprint of the space-based infrastructure utilised throughout the five NATO space-related capabilities. In this regard, and in light of the practical significance of NATO's activities in the space sector, a NATO-led approach uniting its member states for the reduction of GHG emissions associated with its operations might be highly impactful.

This leads to the second contribution that might be provided by NATO - exemplary leadership in the global arena. The visibility of NATO and its member states, united with the practical impact of their initiatives, suggests that a NATO-led initiative for the environmental sustainability of space-based capabilities might get significant traction at the international level. In this regard, it is worth noting that an active role in the global arena is also in the best interest of NATO itself. This is because engaging the international community would promote the undertaking of similar commitments by other global players, maximising the overall impact on the planet and reducing the risk that NATO's adversaries might take advantage of its unilateral commitments towards higher standards of sustainability.

In September 2021, the Secretary General of the United Nations released an inspiring Report called "Our Common Agenda", a foundational document providing the Secretary's vision on the future of global cooperation.[48] The Report recognizes climate change as "the defining issue of our time" and acknowledges the vital role of space in the fight for climate action.[49] In order to operationalize the undertaking of concrete actions on the fundamental topics discussed in the Report, the Secretary General has officially proposed

[47] As recognised in the Climate Change and Security Action Plan, *supra note 10*.
[48] More information on "Our Common Agenda", including the Report released by the Secretary General, is available at: United Nations, 'Common Agenda' (*United Nations*) <www.un.org/en/un75/common-agenda > accessed May 2022 (Our Common Agenda).
[49] Report of the Security General, 'Our Common Agenda' (United Nations) 61. The report can be found at <www.un.org/en/content/common-agenda-report/assets/pdf/Common_Agenda_Report_English.pdf> accessed May 2022.

the convening of a "Summit of the Future".[50] This Summit, to be held in conjunction with the annual meetings of the UN General Assembly in September 2023, will be *the forum* for discussing new governance arrangements capable of addressing the key challenges of our time.[51] The release of Our Common Agenda and the convening of the Summit of the Future offer a unique opportunity to develop, showcase and amplify thought leadership initiatives such as those proposed in this paper. By linking its commitments to these global efforts, NATO could increase its prestige and ensure the highest possible impact of its environmental initiatives.

Within the specific domain of outer space, the analysis conducted in this paper is fully aligned with the fundamental principles laid down in the recently enacted UN Long Term Sustainability Guidelines for Outer Space Activities (LTS Guidelines).[52] The LTS Guidelines were officially released in 2019 after almost a decade of negotiations. At present, all stakeholders are working towards the implementation of the recommendations laid down in the LTS Guidelines at the national and regional levels.[53] Recognizing the significant impact of space over the sustainable development of Earth, LTS Guideline D.1 specifically invites states to take into account, in their conduct of space activities for the peaceful exploration and use of outer space, their environmental dimension.[54] Accordingly, states and international intergovernmental organisations should promote the development of technologies that minimise the environmental impact of manufacturing and of launching space assets.[55] The key importance universally recognized to the cross-sectorial and cooperative implementation of the LTS Guidelines[56] confirms the need for thought leadership integrating the individual contributions of states and other stakeholders. Within the security domain, no other entity has currently filled this role nor would it be in a better position than NATO to fulfil it.

## Conclusion

Environmental security and defence is a major focal point that NATO and its member states are focusing on due to their importance for NATO's

[50] More information on the announcement of the Summit can be found at <https://www.nato.int/cps/en/natohq/events.htm > accessed May 2022.
[51] Our Common Agenda, *supra* note 48 at 66.
[52] Report of the Committee on the Peaceful Uses of Outer Space, *supra* note 46 at Annex II.
[53] For a review of the LTS Guidelines and an analysis of their status *see* Peter Martinez, 'The UN COPUOS Guidelines for the Long-term Sustainability of Outer Space Activities', 8 (1) Journal of Space Safety Engineering 98 – 107 (UN COPUOS Guidelines).
[54] UNGA, *supra* note *46*.
[55] *Ibid.*
[56] UN COPUOS Guidelines, *supra* note *53*.

operational activities. Satellite capabilities are and will be in the front line to monitor the totality of GHG emissions from both NATO and member states' operations. This paper analysed the existing capabilities within NATO and its agencies taking special consideration to the JIRS activities that already exploit satellite assets.

The steps followed in the roadmap outlined in this article aim to easily drive policy-makers to better evaluate strategic options that can both reduce the environmental impact of operational activities and improve these capabilities in the coming years.

The best practices identified for sustainable space activities aim at setting concrete targets and drafting guidelines for NATO. These best practices are based on international law, United Nation goals, and NATO agenda and targets.

An open share policy when possible and allowed is essential to grant a better development and resilience in the environmental security and defence field. Common security is the key that keeps NATO the strongest and longest-lasting alliance in history. The same focus needs to be allocated for environmental security as well, which is possible as long as the alliance keeps collaborating and investing in spatial infrastructures deployed for the alliance's security.

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Source: www.nato.int

## SATCOM on the Ice: Arctic Circle Operations Put to the Test with Climate Change[1]

by Laetitia Cesari Zarkan[2]
and Nivedita Raju[3]

## Introduction

Arctic nations worldwide find their economic and military ambitions in the North Pole reshaped by climate change. The significant value of the Arctic's natural gas and oil, estimated at "13% (90 billion barrels) of the world's undiscovered conventional oil resources and 30% of its undiscovered conventional natural gas resources,"[4] fosters rivalries in and outside of the

[1] **DISCLAIMER:** The views expressed in this article are solely those of the author and may not necessarily represent the views of NATO, Allied Command Operations, or Allied Command Transformation, or of their affiliated organizations, SIPRI or Luxembourg University.

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[4] US Energy Information Administration, 'Arctic oil and natural gas resources' (*Energy Information Administration - EIA - Official Energy Statistics from the US Government*, 20 January

region between the different stakeholders, especially the Arctic nations: Canada, Denmark, Finland, Iceland, Norway, the Russian Federation, Sweden, and the United States. China has also manifested a strong interest in the Arctic. The North Pole is a crucial component of these countries' national defence and security. Bridging the entire globe from the North Pole, the Arctic region serves as the location of the Northern fleet second-strike capabilities of the Russian Navy, and of submarine fleets of some other superpowers.[5] As a vector of attack, through the North Pole, for the Arctic nations, it also forms corridors for states' global power projection via the land, the air, and most importantly, the sea.[6]

However, worsening effects of climate change could significantly transform geopolitical and strategic dynamics within the Arctic region. This article considers how the melting of the ice caps could require states to reconsider the nature of legal and strategic limitations on stakeholders and the establishment of Arctic settlements as well as means of transportation and communication. As an initial matter, it will be helpful to set out two questions: "What measures and regulatory requirements are needed to minimise the impact of climate change within the Arctic?", and "How do space-based technologies help contribute to stability in the Arctic region?"

Space-based assets constitute a reliable and accessible tool to develop policies in the Arctic, foster stability between the stakeholders and safeguard the region's environment.

The first part of the article will identify security concerns, and highlight the growing economic and military interests in the Arctic, as impacted by climate change. The second part will discuss how space technologies can be used as a transparency and confidence-building mechanism for Arctic nations by

2012) < https://www.eia.gov/todayinenergy/detail.php?id=4650 > accessed 1 May 2022; USGS 'Circum-Arctic Resource Appraisal: Estimates of Undiscovered Oil and Gas North of the Arctic Circle' (*United States Geological Survey*, 2008). <https://pubs.usgs.gov/fs/2008/3049/fs2008-3049.pdf > accessed 1 May 2022.

[5] Jonas Kjellén, 'The Russian Northern Fleet and the (Re)militarisation of the Arctic' [2022] Arctic Review on Law and Politics vol 13; Matthew P. Funaiole, Joseph S. Bermudez Jr., Colin Wall, 'Russia's Northern Fleet Deploys Long-Range Interceptors to Remote Arctic Base' (*Center for Strategic and International Studies*, 14 April 2021) < https://www.csis.org/analysis/russias-northern-fleet-deploys-long-range-interceptors-remote-arctic-base > accessed 1 May 2022.

[6] Office of the Under Secretary of Defense for Policy, 'Report to Congress, Department of Defense Arctic Strategy' [June 2019] 3.

strengthening both cooperation and coordination between stakeholders to address the issues arising from climate-change-induced activities.

**Security concerns in the region**

Global interest in the Arctic has steadily increased over the last two decades. Multiple states, whether they qualify as Arctic Nations or not, publish an Arctic-related 'Strategy' or 'Roadmap' on a regular basis to expose the interests they identified and their subsequent vision and goals in the region. This is evident first from the recent expression of interest by the People's Republic of China in the strategic importance of the region. In a November 2014 speech, Chinese Communist Party General Secretary Xi Jinping declared that albeit not sharing a border with the Arctic, China would become a Polar great power.[7] In January 2018, China then published a white paper disclosing its national ambitions for the Arctic region, with the establishment of research stations, shipping routes and infrastructure, the laying of submarine cables and pipelines, the development of fishing capabilities and the investment in mining and energy.[8] Designating itself as a 'near-Arctic state', China has drawn a parallel between its territory and the Arctic's climate, environment and ecology[9] and also took an active part in the drafting of the International Maritime Organization's (IMO) Code for Ships Operating in Polar Waters (Polar Code) of January 2017[10] and the Agreement to Prevent Unregulated High Seas Fisheries in the Central Arctic Ocean, signed in Greenland on 3 October 2018.[11] China's Arctic Policy demonstrates priorities for developing a "Polar Silk Road" consisting of regular sea passages in the Arctic region.[12] These collectively exhibit China's expanding focus on the region.

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[7] Anne-Marie Brady, *China as a Polar Great Power*, (Cambridge University Press 2017).

[8] State Council Information Office of the People's Republic of China, *China's Arctic Policy* (White Paper 26 January 2018) http://english.www.gov.cn/archive/white_paper/2018/01/26/content_281476026660336.htm (China's Artic Policy).

[9] Harriet Moynihan, 'China Expands Its Global Governance Ambitions in the Arctic' (*Chatham House*, 15 October 2018), < www.chathamhouse.org/2018/10/china-expands-its-global-governance-ambitions-arctic > accessed 1 May 2022.

[10] International Maritime Organization, *International Code for Ships Operating in Polar Waters (Polar Code)* 2014.

[11] Agreement to Prevent Unregulated High Seas Fisheries in the Central Arctic Ocean (signed October 3, 2018, entered into force on June 25, 2021).

[12] China's Arctic Policy, *supra* note 8.

The Russian Federation also plays an important role in the Arctic due to its vast territory, which allows for broad exploitation of the area and deployment of military facilities and personnel, as well as the conduct of operations such as the Grom strategic nuclear exercise conducted in 2019.[13] Russia reaffirmed its vision of the Arctic in an "Energy Strategy of Russia for the period up to 2030", mentioning its intention to "play the stabilising role in oil and gas production dynamics"[14] and to develop "regulatory requirements [...] pertaining to environment protection."[15]

Climate change and the subsequent shift in dynamics has been noted by NATO as well. NATO's founding treaty enshrines the principle of collective defence,[16] a notion that aims to bind members together to reaffirm the deterrence and defence posture of the Alliance through joint exercises. Some of these exercises, namely, the Trident Juncture 18 and the Exercise Cold Response 2022,[17] took place in the Arctic, "across Norway on land, in air and at sea."[18] The growing presence of NATO signals a recognition of the broader strategic concerns associated with the region.

**Strengthening governance and cooperation**

The first effort to foster cooperation in the region was spurred by the initiative to create an Arctic Council, an intergovernmental forum established by the Ottawa Declaration in 1996, gathering the eight Arctic nations as decision-makers, but also the Inuit Circumpolar Conference, the Saami Council and the Association of Indigenous Minorities of the North, Siberia and the Far East of the Russian Federation as permanent participants, as well as non-governmental organisations (NGOs) and non-Arctic states as observers.[19]

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[13] Franz-Stefan Gady, 'Russia Kicks Off Annual Nuclear Forces Readiness Exercise', (*The Diplomat*, 15 October 2019) <https://thediplomat.com/2019/10/russia-kicks-off-annual-nuclear-forces-readiness-exercise/> accessed 1 May 2022.

[14] Ministry of Energy of the Russian Federation, *Energy Strategy of Russia for the period up to 2030* (approved by decree. N° 1715-r of the Government of the Russian Federation 13 November 20090) 60.

[15] Ibid 88.

[16] The North Atlantic Treaty (1949), article 5.

[17] NATO, 'NATO Exercises' (*North Atlantic Treaty Organization*, 28 March 2022) <https://www.nato.int/cps/en/natohq/topics_49285.htm > accessed 1 May 2022.

[18] NATO, 'Trident Juncture 2018' (*North Atlantic Treaty Organization*, 2018) <https://www.nato.int/cps/en/natohq/157833.htm > accessed 1 May 2022.

[19] Declaration on the Establishment of the Artic Council, (September 19, 1996) (Ottawa Declaration).

Altogether, these stakeholders develop coordination mechanisms and discuss visions on common issues related to the Arctic region's exploitation, scientific research and environmental protection.[20] The process forging the Ottawa Declaration roused interest in other questions which forwarded the adoption of key agreements strengthening cooperation in the fields of aeronautical and maritime search and rescue,[21] marine oil pollution preparedness and response,[22] and enhanced scientific cooperation.[23] With the expanding exploitation of natural resources and military presence within the Arctic region, prospects for cooperation began to require deeper insight into these issues. The Ottawa Declaration and the agreements mentioned above purport to preserve the local population of indigenous people, particularly their culture and livelihood. Yet, expanding economic and military interests highlighted the need for continued cooperative efforts, as such expansion carries a corresponding need for more infrastructure, information networks, traffic, facilities, waste and resource management, and delimitations for better region management.

In particular, these shifting dynamics led to the need for cooperation targeted at maritime activities in the region, to maintain the steady reminder that the Arctic region should be "a zone of peace and stability" under the Law of the Sea framework[24] and committed to the peaceful resolution of disputes.[25] Qualified as a "complicated mosaic,"[26] the framework governing maritime activities in the Arctic is composed of the Convention on the Law of the Sea (UNCLOS),[27] which regulates shipping within the limits of maritime zones of jurisdiction and other more specific laws, guidelines and standards on

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[20] Ibid.

[21] Agreement on Cooperation on Aeronautical and Maritime Search and Rescue in the Arctic (May 2011) (Maritime Search and Rescue Agreement).

[22] Agreement on Cooperation on Marine Oil Pollution Preparedness and Response in the Arctic (May 2013) (Marine Oil Pollution Preparedness and Response Agreement).

[23] Agreement on Enhancing International Arctic Scientific Cooperation (May 2017) (Scientific Cooperation Agreement).

[24] Convention on the Law of the Sea (signed December 10, 1982, entered into force on November 1, 1994) 1833 U.N.T.S. 399 (UNCLOS).

[25] Artic Council, Kiruna Declaration (May 2013).

[26] Artic Council, *Arctic Marine Shipping Assessment 2009 Report* (April 2009) 50 (Arctic Marine Shipping Assessment).

[27] UNCLOS, *supra* note 24.

international shipping, of which implementation is facilitated by the IMO, a specialised agency in the United Nations system.[28]

However, despite the efforts of these legal instruments, the melting ice creates notable changes in the region by facilitating navigation through formally ice-covered waters.[29] Climate change in the Arctic therefore has the potential to initiate further changes in the dynamics, first by enhanced participation of industry lured by the profits of natural resources and maritime transportation, and second, by the increasing deployment of military troops and equipment. These changes may result in weakening the settlement of facilities on the ground and decreasing stability in the region for both civilians and military forces. This new development will require broad and enhanced monitoring capabilities over the region for the main Arctic players to get an accurate situational awareness of the Arctic Circle.

## Growing economic and military interests in the Arctic: treading on thin ice

*Economic Interests*

The melting of ice in the Arctic can trigger a high activity increase. First, there is potential access to two shipping routes, namely the Northern Sea Route (located closer to Russia) and the Northwest Passage (located closer to Alaska).[30] Diminishing ice indicates that these passages may be accessible for longer periods of the year while also presenting opportunities for shorter transit time.[31] In particular, costs for fuel and transit time would reduce by travelling through the Arctic and avoiding the Suez or Panama Canals.[32] These Arctic shipping routes would also allow ships to circumvent the risk of piracy on other more frequently traversed routes. While these routes are presently only accessible for a few months of the year, the impact of climate change coupled

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[28] Arctic Marine Shipping Assessment, *supra* note 26 at 50.

[29] NATO, 'Opening remarks by NATO Secretary General Jens Stoltenberg at the NATO Youth Summit 2022 followed by Q&A' (*North Atlantic Treaty Organization*, 28 April 2022) <https://www.nato.int/cps/en/natohq/opinions_194916.htm?selectedLocale=en > accessed 1 May 2022.

[30] Brandon M. Boylan, Dustin Elsberry, 'Climate Change and Maritime Traffic in the Arctic' (*Center For Arctic Policy Studies, Policy Brief 4, September 2019*) < https://uaf.edu/caps/our-work/policy-perspectives-files/climate-change-and-maritime-traffic-in-the-arctic-pb4-final-12dec2019.pdf > accessed 25 June 2022.

[31] Lindsey Jacobson, 'The Arctic could see ice-free summers by 2035, reshaping global shipping routes' (*CNCB*, 16 February 2022) < https://www.cnbc.com/2022/02/16/arctic-summers-could-be-ice-free-by-2035-enabling-faster-shipping.html > accessed 1 May 2022.

[32] Ibid.

with necessary infrastructure could result in accessible routes throughout the year within the next decade. However, the status of these routes is unresolved, and various states have expressed interest in these routes, with some conflicting territorial claims. Russia laid territorial claims over the entire Northern Sea Route, which is unrecognised by other states since only portions of the route fall within Russian internal waters.[33] Canada claims a portion of the Northwest Passage, which the United States also does not recognise.[34] Given the mass interest in shipping across the Arctic region, these disputed claims require resolution. As mentioned above, other states have also expressed interest in activities in the Arctic region. This interest evidences an increase in stakeholders invested in the region, with a need for technologies and procedures that facilitate coordination, communication, articulation of objectives and information on activities.

Economic activities are not only restricted to the maritime sector. Aviation in the Arctic has similarly transformed over the last few decades.[35] Typically, hundreds of commercial flights are conducted between Asia and over Russian airspace.[36] Air traffic over the North Pole has grown further recently, due to the ongoing Ukraine crisis and the need for some to reroute flights that previously passed over Russian airspace.[37] Both the maritime and aviation industries indicate a need for enhanced coordination and communication to address multi-stakeholder interest in transporting goods and passengers in the region.

Diminishing ice also points to greater accessibility, and increased pursuit of resources in the Arctic. The term "resources" can be used broadly to refer to the deposits of oil and natural gas reserves, the range of available minerals and metals, and even fisheries stocks available in the region.[38] The potential for

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[33] Gabriella Gricius, 'Geopolitical Implications of New Arctic Shipping Lanes' (*The Arctic Institute*, 18 March 2021) < https://www.thearcticinstitute.org/geopolitical-implications-arctic-shipping-lanes/ > accessed 1 May 2022.

[34] Ibid.

[35] Dermot Cole, 'When Boeing proposed the world's largest plane for Arctic shipping' (*Arctic Today*, 11 November 2019), <https://www.arctictoday.com/when-boeing-proposed-the-worlds-largest-plane-for-arctic-shipping/> accessed 1 May 2022.

[36] Jacopo Prisco, 'Polar express: How airlines are plotting a new route to Asia' (*CNN*, 20 March 2022) < https://edition.cnn.com/travel/article/north-pole-air-route/index.html > accessed 1 May 2022.

[37] Ibid.

[38] Lars Lindholt, 'Arctic natural resources in a global perspective' (Arctic natural resources in a global perspective, The Economy of the North, 2006) accessed 25 June 2022.

alternate sources of oil makes the Arctic an attractive region for states, especially those seeking to reduce dependence on imports. Natural gas has already been identified as a key resource by states such as Russia and China, which have initiated a partnership to construct a natural gas pipeline in the region.[39] Arctic fish stocks are additionally viewed as a valuable asset, particularly at a time when population growth is at an all-time high in many states.[40] There are further questions for coordination in this context as well, as climate change could result in species migrating to other regions as Arctic waters grow warm.[41]

*Military Interests*

As economic interests grow, military activities have similarly risen. Over the last decade, Canada, Denmark, Norway, Russia and the US have prominently expanded military capabilities in the region.[42] Military exercises continue to be conducted in these harsh conditions on a large-scale and more frequent basis, noting the Trident Juncture 2018, Cold Response 2022,[43] and Grom 2019[44] exercises mentioned above. The development of capabilities, coupled with increasing weapons tests and conduct of military exercises, indicate growing scope for the risk of escalation or outright conflict. NATO's approach concerning the region is not enshrined in a clear Arctic strategy yet, and the new Strategic Concept focusing on defence and deterrence, disclosed in June 2022 at the NATO Summit in Madrid refers to potential disruptions in the High North, of "the Allied reinforcements and freedom of navigation across the North Atlantic". [45]

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[39] Vita Spivak and Alexander Gabuev, 'The Ice Age: Russia and China's Energy Cooperation in the Arctic' (*Carnegie Endowment for International Peace*, 31 December 2021) <https://carnegiemoscow.org/commentary/86100 > accessed 1 May 2022.

[40] Amber Himes-Cornell and Stephen Kasperski, 'Assessing climate change vulnerability in Alaska's fishing communities' (Fisheries *Research, Volume 162, February 2015*).

[41] Ibid.

[42] Siemon Wezeman, 'Military Capabilities in the Arctic: A New Cold War in the High North?' (*SIPRI*, October 2016) < https://sipri.org/sites/default/files/Military-capabilities-in-the-Arctic.pdf> accessed 1 May 2022.

[43] *Supra* notes 17 and 18.

[44] Matthew Melino and Heather A. Conley, 'The Ice Curtain: Russia's Arctic Military Presence' (Center for Strategic and International Studies, 26 March 2020) <https://www.csis.org/features/ice-curtain-russias-arctic-military-presence > accessed 1 May 2022.

[45] NATO, 'NATO 2022 - Strategic concept' (*North Atlantic Treaty Organization*, June 2022) <https://www.nato.int/nato_static_fl2014/assets/pdf/2022/6/pdf/290622-strategic-

A key concern of some states is that growing economic interests, which are outwardly civilian in nature, may serve as support for states to enhance military presence in the Arctic.[46] In advancing initiatives for infrastructure and access, states are concerned that such activities may be advancing dual interests, wherein the publicly shared objective is presented as benign under the guise of "scientific research" or commercial interest. US annual reports to Congress on the Military and Security Developments Involving the People's Republic of China have raised these concerns, stating that "civilian research could support a strengthened Chinese military presence in the Arctic ocean, which could include deploying submarines to the region as a deterrent against nuclear attacks."[47] The recent 2021 US report notes the growing success of Chinese icebreaking technologies such as the Xue Long 2 (the first such vessel to break the ice while moving both forward and backwards) and observes that Chinese interests in the Arctic have presented possible bilateral friction with Russia overuse of the Northern Sea Route, but also opportunities for further cooperation.[48] Experts have observed the complexities of this relationship with respect to the Arctic, noting Russia's previous position regarding the limited role of non-Arctic states in the region, which has undergone some changes with the evolution of geopolitical dynamics.[49] However, experts noted that there is slow progress on Russian cooperation with China in the Arctic (demonstrated by a reluctance to allow Chinese investment in upstream projects), which may change with China's growing participation in the region.[50]

Russian capabilities are notable among the five littoral Arctic states, especially the second-strike capability of its ballistic missile submarine force (SSBN).[51] Russia houses more than 80% of its sea-based nuclear deterrent,

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concept.pdf > accessed 30 June 2022.

[46] Reuters, 'China mixing military and science in Arctic push: Denmark' (*Reuters*, 19 November 2019) < https://www.reuters.com/article/us-usa-arctic/china-mixing-military-and-science-in-arctic-push-denmark-idUSKBN1Y3116 > accessed 1 May 2022.

[47] Office of the Secretary of Defense, *Annual Report to Congress: Military and Security Developments Involving the People's Republic of China* (*Office of the Secretary of Defense*, 2019) 114 < https://media.defense.gov/2019/May/02/2002127082/-1/-1/1/2019_CHINA_MILITARY_POWER_REPORT.pdf > accessed 1 May 2022.

[48] Ibid 136.

[49] Ekaterina Klimenko, 'Patterns of and Incentives for Entry into the Arctic and South East Asia' in Lora Saalman (ed), *China-Russia Relations and Regional Dynamics: From Pivots to Peripheral Diplomacy*, (*SIPRI*, March 2017) 43 < https://www.sipri.org/sites/default/files/China-Russia-relations-regional-dynamics.pdf > accessed 1 May 2022.

[50] Ibid.

[51] Eric Brewer, Rebecca Hersman and Maxwell Simon, 'Strategic Stability and Competition in

including at least 7 of its SSBNs, along the Kola Peninsula.[52] These capabilities are valuable to Russian forces, especially in the context of rising tensions in Europe between nations. For the same reason, access to Arctic sea routes by the Russian Northern Fleet ensure Russia's ability to continue operating in the North Atlantic and are of significant strategic value. US capabilities in the region are similarly essential to US defence. US bases in Greenland and Alaska house sensors and radars for missile warning and facilitate space surveillance by the US Space Command.[53] The Arctic region therefore forms an integral element of both US missile defence and its space situational awareness (SSA) capabilities. This overall trend towards modernization and military build-up in the Arctic has led to experts questioning the potential for escalation and the need for tailored risk reduction measures that address these scenarios.[54]

*Potential Impact on Arctic communities and environment*

Arctic peoples' dependence on fish stocks points to a need for intervention to equitably and sustainably manage natural resources in the region. Melting ice in the Arctic is closely linked with the potential for food insecurity, especially for indigenous communities, if improperly managed.[55] Notably, increased activity may impact the environmentally-sensitive region and its resident communities in other ways. The "human-induced impacts" associated with increasing activities persistently generate organic contaminants, greenhouse gas pollution, oil pollution, black carbon, heavy metals, noise, radioactivity and acidification.[56] Such impacts will not be

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the Arctic' (*CSIS*, 6 January 2021) 3 < www.csis.org/analysis/deep-dive-debrief-strategic-stability-and-competition-arctic > accessed 1 May 2022.

[52] Ibid.

[53] Air Force Master Sgt. Tsuyoshi Shinzato, 'USSPACECOM command team visits Thule Air Base, site of North American Air Defense, space tracking' (*Space Operations Command, 22 November 2021*) <https://www.spoc.spaceforce.mil/DesktopModules/ArticleCS/Print.aspx?PortalId=4&ModuleId=703&Article=2855313 > accessed on 25 June 2022.

[54] Wilfred Wan, *Nuclear Escalation Strategies and Perceptions: The United States, the Russian Federation, and China* (United Nations Institute for Disarmament Research 22 June 2021) 18-19 < https://unidir.org/escalation > accessed 1 May 2022.

[55] Inuit Circumpolar Council, 'Food Security across the Arctic' (*Background paper of the Steering Committee of the Circumpolar Inuit Health Strategy, May 2012*) <https://www.inuitcircumpolar.com/wp-content/uploads/2019/01/icc_food_security_across_the_arctic_may_2012.pdf > accessed 25 June 2022.

[56] Frank Sejersen, *Rethinking Greenland and the Arctic in the Era of Climate Change*, (Routledge Publishing 2016) 33.

"contained" or restricted to a particular region but are "locally and regionally non-containable due to the wind, the sea currents and the movement of ice".[57] This indicates that increasing activities, including potential pollution, in the Arctic will have substantial effects on other geographical locations as well. These impacts are not easily undone. For example, an accidental oil spill in these waters would irreversibly alter the Arctic ecosystem and is far more challenging to address, given that there is no existing technology to clean oil spills in such harsh conditions.[58] Similarly, the impact of drilling for oil in the region may threaten species in the area and upend the entire ecosystem to the detriment of all stakeholders. For these reasons, due caution must be exercised in undertaking these activities, which has been acknowledged by some states' recent efforts.[59]

Indigenous communities residing in the Arctic have also articulated their concerns about increasing activity as a result of climate change.[60] Studies exhibit the rising safety and security threats associated with national and international marine traffic. These concerns range from pollution and potential accidents that affect the Arctic environment and food sources for the communities, to the lack of notifications regarding the identity of foreign vessels and unclear objectives behind activities.[61] The needs of these communities must be safeguarded in the face of growing activities. Therefore, implementing a precautionary approach through coordination between interest groups in an inclusive manner will be essential.

**Mitigating the impact of climate change in the Arctic: a solution from outer space**

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[57] Ibid.

[58] Stephanie E. Chang, Jeremy Stone, Kyle Demes and Marina Piscitelli, 'Consequences of oil spills: a review and framework for informing planning' (*Ecology and Society, Vol. 19, No. 2, June 2014*).

[59] Rachel Frazin, 'Biden administration shrinks area eligible for drilling at Arctic reserve' (*The Hill*, 25 April 2022) < https://thehill.com/policy/energy-environment/3463023-biden-administration-shrinks-area-eligible-for-drilling-at-arctic-reserve/ > accessed 1 May 2022.

[60] Duane Smith, 'Climate Change In The Arctic: An Inuit Reality' (*UN Chronicle, 24 May 2007*) < https://www.un.org/en/chronicle/article/climate-change-arctic-inuit-reality > accessed 25 June 2022.

[61] Nicolien van Luijk, Jackie Dawson, Natalie Carter, Gloria Song, Colleen Parker, Kayla Grey and Jennifer Provencherl, 'At the Front Lines of Increased Shipping and Climate Change: Inuit Perspectives on Canadian Arctic Sovereignty and Security' in Lassi Heininen, Heather Exner-Pirot and Justin Barnes (eds), *Arctic Yearbook* (2021).

The recent rise of tensions between Arctic nations outside of the region could trigger an escalation and jar the semblance of cooperation between the different stakeholders. In the Arctic, stakeholders are faced with multiple challenges that require predictability of ice movements, and detailed mapping and understanding of the area. For this reason, managing ships requires constant monitoring to ensure quick search and rescue missions if a ship is grounded in water that turned to ice, or in case of a collision with a glacier. Furthermore, with regard to the protection of the Arctic environment, authorities have to be able to mitigate risks (i.e. oil spills) after safety hazards or accidents.[62] In this context, space-based technologies play a significant role in the observation of the sea ice extent,[63] the detection of zones of military and economic interest, the verification of states' compliance with their international obligations, the localisation and tracking of boats, vessels, aircraft and land vehicles, the broad coverage of the region to communicate and more specifically convey distress signals.[64] In addition, space technologies can also be used to monitor negative impacts of safety hazards or accidents, prevent illegal activities and protect the ecosystem, or gather intelligence on a strategic situation for military or security purposes.[65]

Pursuant to Article 57 UNCLOS, a country's exclusive economic zone (EEZ), which extends 200 nautical miles off their shores, within which states have exclusive sovereign rights and jurisdiction over resources and trade.[66] Beyond this area, the high seas are free, under conditions, and reserved for peaceful purposes.[67] Following this line, the North Pole of the Arctic Region is not under

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[62] Arctic Marine Shipping Assessment, *supra* note 26 at 10.

[63] Ibid 25.

[64] US Department of Commerce, National Oceanic and Atmospheric Administration, Search and Rescue Satellite Aided Tracking, Cospas-Sarsat System Overview <https://www.sarsat.noaa.gov/cospas-sarsat-system-overview/ > accessed 25 June 2022; European Space Agency, Applications, 406 Day: how Galileo helps save lives <https://www.esa.int/Applications/Navigation/406_Day_how_Galileo_helps_save_lives > accessed 25 June 2022.

[65] European Space Agency, Enabling & Support, The Contribution of Space Technologies to Arctic Policy Priorities <https://www.esa.int/Enabling_Support/Preparing_for_the_Future/Discovery_and_Preparation/The_Contribution_of_Space_Technologies_to_Arctic_Policy_Priorities > accessed 25 June 2022; Alla Pozdnakova, 'Space Infrastructure for a Sustainable Arctic: Opportunities and Challenges of Spaceport Development in the High North' (*The Arctic Institute, 31 May 2022)*, <https://www.thearcticinstitute.org/space-infrastructure-sustainable-arctic-opportunities-and-challenges-spaceport-development-high-north/ > accessed 25 June 2022.

[66] UNCLOS, *supra* note 24, article 57.

[67] Ibid, article 88.

the sovereignty or jurisdiction of any nation. However, some powers consider parts of the Arctic seas as national waters, on which they can impose rights to passage.[68]

Notably, the delimitation of what constitutes the Arctic region provides an illuminating window into the strategic importance of the zone, often considered as one region, defined as the North of the Polar circle or the zone around the North Pole.[69]

Because of scientific, military and economic projections stemming from human activities in the Arctic region, the demarcation of the zone is subject to political considerations based on the balance of power between the Arctic nations and investments from commercial and financial entities. These activities occur in a very peculiar region that constantly challenges humans to adapt. The melting of the Polar region accelerates the transformation of its environment and tends to reshuffle the cards on the region's exploitation by states and industrial players.[70] Now, the global rise of temperatures is a factor of mutation of the Arctic environment, causing the reduction of the ice floe, the permafrost, and the glaciers with a transformation of the perennial Arctic sea ice.[71] Together with the potential of the region for natural resources extraction and military competition, human-induced climate change is an aggravating factor affecting the Arctic environment and causing weather anomalies which adds to a situation of tension and potential conflict between states by "causing dangerous and widespread disruption in nature and affecting the lives of billions of people around the world."[72]

In 2011, the US Department of Defense recorded the effects of thawing permafrost and erosion of shorelines and riverbanks and observed that these changes threaten defence infrastructure.[73] Climate change therefore poses

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[68] Ibid, article 234; Stanley P. Fields, "Article 234 of the United Nations Law of the Sea: The Overlooked Linchpin for Achieving Safety and Security in the US Arctic?", (*Harvard National Security Journal, 2016*).

[69] Sejersen, supra note 56, 5.

[70] *Ibid* at 7.

[71] NASA, 'The Arctic Perennial Sea Ice Could Be Gone by End of the Century' (*NASA*, 23 October 2003) < https://www.nasa.gov/vision/earth/environment/Perrenial_Sea_Ice.html > accessed 1 May 2022.

[72] IPCC. 'Climate change: a threat to human wellbeing and health of the planet. Taking action now can secure our future' (*Intergovernmental Panel on Climate Change*, 28 February 2022) < https://www.ipcc.ch/2022/02/28/pr-wgii-ar6/ > accessed 1 May 2022.

[73] US Department of Defense, *Report to Congress on Arctic Operations and the Northwest*

direct threats to these very crucial bases, in particular potentially impacting long-range missile warning radar stations.[74] The US Department of Defense released a report in April 2022, which investigates climate-based threats to infrastructure in the Arctic and the need for an approach to adapt facilities to build resilience against these threats.[75] The report observes that climate change has caused heavy flooding, resulting in extensive damage to runway shoulders and aircraft hangars.[76] Out of 79 US military installations overall, more than two-thirds are now vulnerable to worsening flooding, while more than half are vulnerable to increasing drought and wildfire, respectively.[77] The report concludes with recommendations for intensive planning, risk assessments and policy changes that account for climate change adaptation and resilience.[78]

As major regional players recently started to re-develop their presence and capabilities within the Arctic, they must keep in mind the impact of ice melting on their military ambitions. Situational awareness of the area is essential to monitor the rapid transformation of the Arctic landscape and subsequent changes in human operations and movements.

With climate change, the Arctic may also become a less harsh environment for the deployment of new technologies and capabilities. Some nations may see it as an opportunity to develop ambitious strategies. As disclosed in the Russian Maritime Doctrine to 2020 published in 2015 by the Ministry of Defence, the Russian Navy is prioritising "Russia's nuclear SSBN fleet, attack submarines, unmanned systems, and the creation of a general purpose marine force able to provide a long- range, high precision strike, non-nuclear deterrent capability."[79]

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*Passage* ( May 2011, 7-12 <https://dod.defense.gov/Portals/1/Documents/pubs/Tab_A_Arctic_Report_Public.pdf > accessed 1 May 2022.

[74] Ibid, 15.

[75] Inspector General, *Evaluation of the Department of Defense's Efforts to Address the Climate Resilience of US Military Installations in the Arctic and Sub-Arctic* (*US Department of Defense*, 13 April 2022) < https://media.defense.gov/2022/Apr/15/2002977604/-1/-1/1/DODIG-2022-083.PDF > accessed 1 May 2022.

[76] Ibid.

[77] Ibid.

[78] Ibid.

[79] Claire Mills, 'Russia's rearmament programme' (*UK Parliament, Commons Library Briefing*, 24 January 2017) 22 < https://researchbriefings.files.parliament.uk/documents/CBP-7877/CBP-7877.pdf > accessed 1 May 2022; 'Maritime Doctrine of the Russian Federation' (*President of the Russian Federation*, 2015

In 2021, the commander-in-chief of the Russian fleet declared that three Russian nuclear ballistic missile submarines "have surfaced simultaneously breaking the Arctic ice during drills […] for the first time in the history of the Russian Navy."[80] And for a good reason. The ice is becoming so thin that it can now be run through from below, which represents an additional danger for indigenous and non-indigenous people living in the Arctic. Furthermore, the major regional powers regularly fly aircraft over neutral waters in the Arctic region and build military bases. These build-ups can be observed with sensors placed in orbit[81] over the months. For instance, since 2015, the Russian Federation has been upgrading its Arctic-based military facilities.[82] The same process can be noticed in reopening abandoned military bases built during the Cold War and suspected to host the Kinzhal missile, "an air-launched ballistic missile that can be fitted with nuclear and conventional warheads."[83]

Climate change is reshaping an unstable landscape where the major stakeholders need to develop mutual trust and cooperation mechanisms. Space-based technologies allow for more transparency and collaboration. Among the available tools used to verify that all the stakeholders are playing by the rules and comply -or do not comply- with their obligations, Earth-observation satellites can assess a situation over time by collecting information on the nature of the facilities and equipment, the conduct of operations, the type of risks that could occur and provide data to analyse the behaviour of a state or a private actor.

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<http://static.kremlin.ru/media/events/files/ru/uAFi5nvux2twaqjftS5yrIZUVTJan77L.pdf > [in Russian] accessed 1 May 2022.

[80] Reuters, 'Three Russian submarines surface and break Arctic ice during drills' (*Reuters*, 26 March 2021) < https://www.reuters.com/article/us-russia-military-arctic-idUSKBN2BI2RZ > accessed 1 May 2022.

[81] Nick Paton Walsh, 'Satellite images show huge Russian military build-up in the Arctic' (*CNN*, 5 April 2021) < https://edition.cnn.com/2021/04/05/europe/russia-arctic-nato-military-intl-cmd/index.html > accessed 1 May 2022; Matthew Holroyd, 'Russian military presence expanding in the Arctic region, satellite images show' (*Euronews*, 7 April 2021) <https://www.euronews.com/2021/04/07/russian-military-presence-expanding-in-the-arctic-region-satellite-images-show> accessed 1 May 2022.

[82] Malte Humpert, 'New satellite images show the speed and extent of Russia's Arctic development' (High North News, 10 May 2019) < https://www.arctictoday.com/new-satellite-images-show-the-speed-and-extent-of-russias-arctic-development/ > accessed 1 May 2022.

[83] Jyri Lavikainen, 'Strengthening Russia's Nuclear Forces in the Arctic: The Case of the Kinzhal Missile' (*Center for Strategic & International Studies*, 14 September 2021) <https://www.csis.org/analysis/strengthening-russias-nuclear-forces-arctic-case-kinzhal-missile> accessed 1 May 2022.

Diaries and representations of the Polar explorations that took place in the 19th century depict the devastating effects of resource extractions and related activities on the indigenous peoples and cultures, the biodiversity and the environment overall.[84] With the quantity of evidence from the past regarding the detrimental impact of human-led activities on the polar landscape, states will have to take responsibility and not only focus on the promises of a resource-rich zone but consider the consequences of their activities. The state parties to the Ottawa Declaration committed to creating preventive safeguards to activities, including the conservation and sustainable use of natural resources, the protection of the environment, of biodiversity and the full consultation and involvement of indigenous peoples.[85]

For states to comply with mechanisms ensuring stability in the region and reducing tensions, all players have to balance military and economic strategy on one side with confidence-building measures on the other side. Satellite technologies are efficient tools to monitor growth in maritime and aviation traffic and provide an understanding of a situation. Communications and navigation satellites offer extensive coverage over the region to localise, track and connect the operators conducting scientific, economic and military activities[86] and to verify whether they act in accordance with the provisions of the Ottawa Declaration, without causing disruption.

State cooperation in aeronautical and maritime search and rescue is an important component of the stability in the Arctic region and is supported by coordination centres in charge of research and rescue operations.[87] This mutual trust between states is sustained by space-based technologies supporting the exchange of information and the organisation of collaborative response to emergency situations. Among these technologies, state parties to the Maritime Search and Rescue Agreement have to share "real-time meteorological and oceanographic observations, analyses, forecasts, and warnings"[88] and conduct "regular communications checks and exercises, including the use of alternative means of communications for handling communication overloads

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[84] Sejersen, *supra* note 56, 6.

[85] Ottawa Declaration, *supra* note 19, preambles.

[86] Joseph S. Bermudez Jr., 'Ice Curtain: Protecting the Arctic Motherland' (*Center for Strategic & International Studies*, 25 March 2020) < https://www.csis.org/analysis/ice-curtain-protecting-arctic-motherland > accessed 1 May 2022.

[87] Maritime Search and Rescue Agreement, *supra* note 21, articles 2 and 6.

[88] Ibid, article 9,3(b).

during major search and rescue operations."[89] Investment in space-based solutions will therefore facilitate international cooperation through efficient flight management tracking, search and rescue operations, and provide communications for crew and passengers as well as efficient ways to maintain a dialogue between the states.[90]

The Arctic nations recognised the harmful consequences of oil pollution and agreed on preparedness and response operations for the sake of the Arctic residents, people coming to the Arctic and biodiversity in general, above and below the ice layer.[91] With climate change and the quick rise in temperatures, it is more challenging to put in place precautionary measures to avoid oil pollution that could contaminate the marine and coastal environment and its natural resources. Beyond the environment, the effects of pollution can harm military troops, miners, and local communities. Operators can use Earth observation satellites to get complete awareness of the nature, magnitude and seriousness of damage caused by pollution. These technologies can even identify the responsible ship and track its location for the accountability process, and also enable ways of communication in case of life-threatening situations. The exchange of detailed information regarding a situation and its remediation is essential for mutual trust between the states. Indeed, the Scientific Cooperation Agreement also underscores how significant such knowledge is for decision-making, and also highlights the "need for increased actions to mitigate and adapt to climate change."[92]

Scientific research, monitoring and assessment is another building block of state cooperation in the Arctic. Carrying out such activities efficiently requires the exchange of technologies and data between the states as well as the conduct of research in a transparent manner beyond the territories delimited by the Arctic nations. Scientific research is boosted by space applications which give the opportunity to connect access and transmit instantaneously and from remote locations, a pool of valuable information. Since communication satellites enhance connectivity, particularly through

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[89] Ibid, article 9,3(j).

[90] Karen L. Jones, Samira Patel, and Martin N. Ross, 'Closing the Arctic Infrastructure Gap: Existing and Emerging Space-Based Solutions' (*The Aerospace Corporation*, October 2019) <https://csps.aerospace.org/sites/default/files/2021-08/Jones_ClosingArcticGap_10172019.pdf> accessed 1 May 2022 (Closing the Arctic Infrastructure Gap).

[91] Marine Oil Pollution Preparedness and Response Agreement, *supra* note 22, articles 1 and 4.

[92] Scientific Cooperation Agreement, *supra* note 23, preamble.

broadband data coverage in remote areas, they will be essential for military activities, especially since troops require consistent coverage for operations and for emergency responses. Furthermore, civilians and scientists will need such access to connectivity for their daily activities and scientific research. Instantaneous communication can also prevent misperception of threats and is an incentive for reducing conflict, as it enables stakeholders to share information about their activities. This will in turn help address suspicions or accusations from rivals that could escalate the tensions in the region. In this manner, space technologies can minimise security concerns of states' respective capabilities by providing a means to remotely assess each other's strike force and identify the military exercises conducted for new weapons.

In addition to communication satellites, reconnaissance satellites are an efficient means of verification. They provide valuable information, from awareness of the natural environment to forecasting and observation of human activities.[93] Moreover, they allow for mutual understanding as they provide an accurate and reliable mean of verification for states willing to monitor the situation over a specific zone, which could be crucial for the future of peace implementation in the Arctic region. Given that climate change poses threats to all stakeholders, there is a need to adopt new measures for mitigation, of which space-based solutions are critical. Space-based position, navigation and timing technologies, and observation and surveillance sensors have the potential to provide insight into the effects of climate change in the region. This will allow stakeholders to take measures when they see that some operators are acting illegally, particularly those who pollute a specific zone or act in a way that furthers regional instability.

## Conclusion

Space technologies can provide a means of predicting the movements above and beyond the ice layer and tracking maritime routes as well as the deployment of assets and facilities. They can also enable states' mutual compliance with their Arctic-related international obligations. Furthermore, remote sensing systems such as synthetic aperture radar data, microwave radiometers, and multispectral optical sensors measure sea ice drifts, track

[93] Jana K Hettling, 'The use of remote sensing satellites for verification in international law' [February 2003] Space Policy Volume 19, Issue 1, 33, 39 <https://www.sciencedirect.com/science/article/abs/pii/S0265964602000632 > accessed 1 May 2022.

icebergs, and help ensure that shipping passages are clear and safe for navigation.[94] In addition, reconnaissance satellites can verify that public and private entities are acting lawfully and help monitor worrisome situations, especially with regard to environmental protection, illegal activities such as overfishing and military operations that could be wrongly perceived.

Overall, the use of space systems in the Arctic will facilitate discussions across the industry to provide satellite services in available orbits – including collaborating with commercial providers. Increased coverage will improve space domain awareness in polar areas to facilitate greater transparency for state activities, which can be achieved through bilateral and multilateral data-sharing agreements between states. By involving commercial entities in these mechanisms, there can also be multiple sources that contribute to the collection and verification of data, ensuring accurate reports of activities.

Thus, space-based technologies are essential to peace-making processes and stability in the Arctic region. It is imperative to utilize these technologies as a means of furthering cooperative and meaningfully inclusive approaches to mitigate the impact of climate change in the region.

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[94] Closing the Arctic Infrastructure Gap, *supra* note 90.

Source: www.nato.int

# The Principle of Proportionality and the Operational Relevance of Climate Change – a gendered perspective[1]

by Jody M. Prescott[2]

## Introduction

Scientists do not agree whether there is a causal relationship between climate change and armed conflict. Some believe that there are indirect linkages between the two that could be significant,[3] whilst others assess these linkages as too attenuated to be meaningful from a causation perspective.[4]

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[1] **DISCLAIMER:** The views expressed in this article are solely those of the author and may not necessarily represent the views of NATO, Allied Command Operations, or Allied Command Transformation, or of their affiliated organizations, or any U.S. government agency.

[2] Colonel (Ret.), U.S. Army Judge Advocate General's Corps; Lecturer, University of Vermont.

[3] Katharine J. Mach et al., 'Climate as a risk factor for armed conflict' (2019) 571 *Nature* 193, 193-95.

[4] Michael Brzoska, 'Climate Change As A Risk Amplifier: On Links Between Climate Change and Conflict' (2021)1 *Ethics and Armed Forces, Controversies in Military Ethics and Security Policy* 10, 11-12.

Others have noted the difficulties involved in fashioning reliable standards by which to measure climate change's effects in this regard.[5] Given the unsettled state of the scientific literature, what then is the operational relevance of climate change for NATO?

Climate change is likely operationally relevant in civilian-centric NATO missions such as stability and counterinsurgency operations from the perspective of human security. Climate change registering simultaneously with armed conflict in areas that are already marked by high gender inequality could potentially result in compounding negative effects on at-risk women and girls.[6] The sharpened human security needs of these women and girls, if not accounted for and handled in an operational plan, could pose a risk to mission success.[7]

To be fully effective, this risk needs to be mitigated across the entire range of activities that might occur in a stability or counterinsurgency operation. I suggest that these factors need to be considered together in the conduct of the kinetic parts of the operation as well as the parts that lend themselves to a civil-military cooperation approach. This could be done in part by expanding the sorts of damages that a deployed headquarters would use in its targeting analysis, under the principle of proportionality as set out in international humanitarian law (IHL) and specifically in Additional Protocol I (AP I).[8]

## Military Responses to Climate Change Risks

Before launching into a re-examination of the understanding and application of proportionality, however, it is useful to first note that in the 2022 Madrid Summit Declaration, the NATO partners recognised that climate change would have 'a profound effect on Allied security,' and they committed to reducing greenhouse gas emissions from NATO activities.[9] In the next breath, they also committed to further incorporate 'gender perspectives across NATO.'[10] Taking another step forward, the NATO International Military Staff has

[5] Halvard Buhaug and Nina von Uexkull, 'Vicious Circles: Violence, Vulnerability, and Climate Change' (2021) 46 *Annual Review of Environment and Resources* 545, 549-51.
[6] Jody M. Prescott, *Armed Conflict, Women and Climate Change* (Routledge, 2018) 9-10.
[7] Ibid. 83.
[8] Judith G. Gardam and Michelle J. Jarvis, *Women, Armed Conflict and International Law* (Kluwer Law International, 2001) 126.
[9] NATO, Madrid Summit Declaration (29 June 2022), para. 12, <https://www.nato.int/cps/en/natohq/official_texts_196951.htm?selectedLocale=en > accessed 13 July 2022.
[10] Ibid, para. 13.

identified risks posed to the Alliance by what it terms as the 'triple nexus of Climate Change, Gender Perspective and Security,' and the possibility that a gendered analysis of climate change could prove helpful in reducing these risks.[11]

As to dealing with climate change, it is useful to first briefly note the approaches that different militaries in NATO are taking to either mitigate the impacts of climate change or adapt to it. In terms of mitigation, there are numerous examples of programmes to reduce the emission of greenhouse gases in home station facilities. These include efforts to improve the energy efficiency of installations[12] and replacing fossil-fuel generated electricity with power from renewable generators such as wind turbines and solar photovoltaic panels.[13]

There has also been significant progress in efforts to decrease the use of fossil fuels in operations, such as using biofuels for aircraft,[14] and field-testing energy equipment such as solar backpacks and blankets to recharge batteries for communications equipment.[15] It is important to note, however, that the rationale for much of this work is not based primarily on mitigating greenhouse gas emissions. Instead, the impetus behind it is reducing the vulnerable and expensive supply chain that is necessary to keep deployed forces stocked with sufficient energy in remote and austere field locations.[16]

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[11] 'Deep Dive Recap: Understanding the impacts of Climate Change, Gender Perspective and Security' (NATO Newsroom, 22 April 2022), <https://www.nato.int/cps/en/natohq/news_194842.htm > accessed 13 July 2022.

[12] David Vergun, 'Official Details DOD Efforts to Improve Housing, Climate Resilience, Energy Efficiency'( *U.S. Department of Defense News*, 22 June 2021) <https://www.defense.gov/News/News-Stories/Article/Article/2666862/official-details-dod-efforts-to-improve-housing-climate-resilience-energy-effic/ >accessed 5 March 2022.

[13] Michelle Hampson, 'Fort Hood Embraces Renewable Energy, Other Military Posts Follow Suit' (*American Association for the Advancement of Science,* 2019) <https://howwerespond.aaas.org/community-spotlight/fort-hood-embraces-renewable-energy-other-military-posts-follow-suit/> accessed 5 March 2022.

[14] 'RAF sets sights on green targets' (*Biofuels International*, 15 December 2020) <https://biofuels-news.com/news/raf-sets-its-sights-on-green-targets/> accessed 5 March 2022.

[15] Jon Powers and Michael Wu, 'A clean energy agenda for the US Department of Defense' (*Atlantic Council,* 14 January 2021) < https://www.atlanticcouncil.org/blogs/energysource/a-clean-energy-agenda-for-the-us-department-of-defense/#:~:text=Marines%20and%20soldiers%20have%20utilized,to%20extend%20time%20at%20sea.> accessed 5 March 2022.

[16] Alvin Powell, 'Cutting the military's energy tether' (*The Harvard Gazette,* 3 March 2011) <https://news.harvard.edu/gazette/story/2011/03/cutting-the-militarys-energy-tether/> 5 March 2022.

Similarly, efforts to adapt to climate change operationally, that is, changing behaviours and practices to build resilience to climate change impacts in the conduct of missions, seem rooted in practical considerations. The notion of adapting to different climates is not new to militaries—few likely expect to deploy to areas of operation that have the exact same environmental conditions. This means that the effects of climate change are likely being treated as operational facts to which forces simply must adjust, and not as an environmental process to be changed so that adjustment becomes unnecessary.[17]

As to changing the path of climate change, it is obvious that militaries are neither trained nor equipped for the purpose of reversing or even slowing climate change. Further, although there are scientific concerns that the pace of climate change may be accelerating in different areas of the world,[18] the timeline over which these effects would register is probably greater than the expected length of a typical operational deployment. The operational tempo and lifecycle move much more quickly than the effects of climate change can likely register in general. The lengthy NATO experience in Afghanistan might seem contrary to this argument on its face. However, when one considers the constant turnover in headquarters units at both the headquarters level and within the regional commands, it is not unfair to describe the mission as having been composed of numerous short-term deployments of new units in sequence.

This sort of 'business as usual' approach might cause a deployed headquarters to be biased in assuming that the experience of people in a host nation experiencing climate change is similar—everyone is just having to adapt as best they can to the largely gradual changes to the new environmental conditions. From this perspective, dealing with the impacts of climate change drops toward the bottom of the list of priorities that a deployed headquarters needs to deal with. Potentially, climate change only becomes problematic operationally when equipment does not perform like it should, for example, or when different routines are needed in patrolling to reduce troops' exposure to harsher environmental conditions.

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[17] Eric Bonds, 'Challenging Global Warming's new "Security Threat" Status' (2015) 27 *Peace Review* 209, 210.

[18] Rebecca Hersher, 'A Major Report Warns Climate Change Is Accelerating And Humans Must Cut Emissions Now' (*National Public Radio,* 9 August 2021) <https://www.npr.org/2021/08/09/1025898341/major-report-warns-climate-change-is-accelerating-and-humans-must-cut-emissions-> accessed 5 March 2022.

A bias of this nature would be particularly problematic in an area of operations that has pre-existing gender inequality. As set out in the 1949 Geneva Conventions and Additional Protocol I, and amplified in UN Security Council Resolution 1325 on Women, Peace and Security, the international community has recognised that armed conflict has different and more severe impacts upon women and girls in general than it does on men and boys.[19] In general, although they might be less clear cut, the effects of climate change also have a similar gender-differentiated impact.[20] Where the two occur simultaneously, particularly in areas of pre-existing gender inequality, they could then have a compounding negative effect on the security situations of women and girls that is not experienced by men and boys.[21] Further, this compounding effect might not be visible when looking at the population as a whole, rather than through the lens of analysis based on robust sex and gender-disaggregated data.[22]

If a deployed headquarters does not form an accurate common operational picture of human security needs in a mission area because it is taking a gender-blind approach to assessing the non-male half of a host nation population, it is difficult to see how its efforts at winning over a sufficient mass of the population could be completely successful.[23] Some might argue that these conditions are better suited for host nation governmental efforts or the work of the international development community to address. Whilst it is true that militaries are not trained, structured, or equipped to deal with these issues fully, that does not mean that they can reasonably ignore them if these issues are

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[19] UN Security Council Resolution 1325, *On Women, Peace and Security*, UN DOC. S/RES/1325 (31 October 2000).

[20] Chinwe Ifejika Speranza and Edward Bikketi, 'Engaging with Gender in Water Governance and Practice in Kenya' in C. Fröhlich, G. Gioli, R. Cremades, and H. Myrttinen (eds) *Water Security Across the Gender Divide* (Springer International Publishing, 2018) 127; Amelia H. X. Goh, 'A Literature Review of the Gender-Differentiated Impacts of Climate Change on Women's and Men's Assets in Developing Countries' CAPRi Working Paper No. 106 (2012); Emily Hillenbrand, 'Transforming Gender in Homestead Food Production' (2010) 18 *Gender & Development* 411, 413.

[21] *See* Jessica M. Smith, Lauren Olosky, and Jennifer Grosman Fernández, 'The Climate-Gender-Conflict Nexus – Amplifying women's contributions at the grassroots' (*Georgetown Institute for Women, Peace and Security*, 2021) 5-14 <https://giwps.georgetown.edu/wp-content/uploads/2021/01/The-Climate-Gender-Conflict-Nexus.pdf;> accessed 5 March 2022; Mayesha Alam, 'A cross-cutting agenda: Gender, climate change and conflict' (Autumn 2019) 8 *ECDPM Great Insights Magazine* 27, 27-30.

[22] Jody M. Prescott, 'Gender Blindness in US Doctrine' (2020) 50 *Parameters* 21, 25, 31-32.

[23] Ibid. 32.

impacting the achievement of a sustainable mission end state. These conditions are not going to simply vanish from an operational area just because they are awkward for the deploying force to figure out. NATO policies and initiatives, such as the evolving and maturing iterations of Bi-Strategic Command Directive 40-1,[24] and the training and education provided by the Nordic Centre for Gender in Military Operations, provide the beginnings of paths forward in this regard.[25]

The challenge then is to create operational tools that could factor data relevant to the effects of armed conflict, gender inequality, and climate change together in a manner that resulted in actionable intelligence in the absence of complete information. Importantly, these tools will need to be constructed in a new way. The standard PMESII-style analysis[26] used throughout NATO is not well-suited to address the interactive results of these three factors. An effects-based approach to operations (EBAO) method of analysis is probably too complex and hierarchical for such a unique task,[27] although certain EBAO concepts could be applicable.[28] Ordinary military gender analysis is not likely sophisticated enough to capture the results of these factors' interactions in a way that will result in actionable information,[29] or if it does, that it would be easily understood and applied by other headquarters sections. A simplified approach that avoids these pitfalls must be found.

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[24] See, e.g., Allied Command Operations and Allied Command Transformation, *Bi-Strategic Command Directive 40-1, Integrating UNSCR 1325 and Gender Perspectives In The NATO Command Structure Including Measures For Protection During Armed Conflict* (Mons and Norfolk, VA:, NATO, 2009), <https://www.nato.int/nato_static_fl2014/assets/pdf/pdf_2009_09/20090924_Bi-SC_DIRECTIVE_40-1.pdf > accessed 13 July 2022.

[25] Welcome to NCGM: Nordic Centre for Gender in Military Operations,' Swedish Armed Forces, < https://www.forsvarsmakten.se/en/swedint/nordic-centre-for-gender-in-military-operations/ >accessed 13 July 2022.

[26] Civil-Military Cooperation Centre of Excellence, "Planning and assessment," *CIMIC Handbook* (11 February 2020) <https://www.handbook.cimic-coe.org/5.planning-and-assessment/5.3assessment/ >accessed 5 March 2022. PMESII is an operational factor analysis that looks at the political, military, economic, social, economic, information and infrastructure elements of an area of operations.

[27] Jody M. Prescott, 'Lawfare: Softwiring Resilience into the Network' (2017) 32 *The Three Swords* 6, 11-14.

[28] Jody M. Prescott, 'The Development of NATO EBAO Doctrine: Clausewitz's Theories and the Role of Law in an Evolving Approach to Operations' (2008) 27 *Penn State International Law Review* 125, 126-38.

[29] Jody M. Prescott, 'Moving from Gender Analysis to Risk Analysis of Failing to Consider Gender'165 *Royal United Services Institute Journal* 1, 6-11.

**Avoiding Paralysis by Analysis**

For purposes of simplicity in the operational analysis required to create these new tools, two important assumptions need to be made at the outset. First, although the exact amount is unknown, that armed conflict and climate change occurring at the same time in an area marked already by gender inequality will have a compounding negative effect on women and girls. Second, that it is not necessary to know exactly how the relationships between armed conflict and gender, gender and climate change, and climate change and armed conflict work out. Rather than establishing causality, the new tools should instead seek to accurately reflect correlation between the instances of each factor occurring in a geographic area. The higher the degree of correlation, the greater the likelihood that the compounding effect is occurring, and therefore the human security needs of women and girls in these areas are more likely to be different and sharper than those of the men and boys.

A mapping such as this would be a product that an entire staff could look at and understand. First, it would be graphical rather than textual, and similar to other staff products that are commonly used in a headquarters for planning and operations purposes. Second, the underlying methodology is simple and would be easy to explain to other staff members, and it lends itself to the development of a clear intelligence collection plan to gather the data necessary to illustrate and populate the mapping. This would provide an adequate basis upon which initial resource allocation decisions could be made. For example, identifying in which areas deploying force units might best be served by the assignment of scarce assets such as the female engagement teams or provincial reconstruction teams that were used by NATO forces in Afghanistan.

From a civil-military cooperation perspective, this could be one practicable way to account for the operational relevance of climate change. Rather than focusing on climate change itself, this approach would instead correlate it with changes in human security needs that might impact the success of the mission. Stability and counterinsurgency operations, however, are more than just civil-military cooperation endeavours. They can involve significant kinetic operations occurring at the same time, which can have immediate negative effects on host-nation populations. Finding ways to mitigate the gender-differentiated impacts of armed conflict and climate change whilst maintaining kinetic effectiveness will take some work, but one way to approach this might be to expand the types of injuries to civilians and

their property that are considered by commanders when they assess the proportionality of their kinetic actions under IHL.[30]

**Climate Change, Gender and the Principle of Proportionality**

As set out in AP I, an attack would be considered indiscriminate, and therefore prohibited, if it 'may be expected to cause incidental loss of civilian life, injury to civilians, damage to civilian objects, or a combination thereof, which would be excessive in relation to the concrete and direct military advantage anticipated.'[31] Not surprisingly given the age of the treaty, neither its text nor the ICRC commentary on it include in this weighing any notion of gender-differentiated impacts or climate-change related impacts upon civilians or their property as a result of undertaking the military action. Other provisions of AP I are directly related to protection of the environment do provide some consideration of environmental factors, but generally in the context of damages to the environment that pose serious threats to human survival.[32]

Ordinary targeting operations against human or equipment targets would not likely rise to this level, although the ICRC does recognise that attacks would be unlawful if damage to the environment was "excessive in comparison with the direct and concrete military advantage anticipated."[33] As examples, the ICRC notes this could happen 'when the military advantage anticipated is not sufficiently substantial,' or if the incidental environmental damage was 'significant even if not reaching the threshold of wide-spread, long-term and severe.'[34] Importantly, however, the ICRC also recognises that consideration of the environment in this regard is mediated by its significance to people, noting that 'damage to the natural environment in the middle of an uninhabited desert will carry much less weight than damage to a natural water reservoir used by villagers for drinking or irrigation.'[35]

If, however, we assume as we did in the creation of the new graphical staff product for civil-military cooperation purposes that climate change occurring in areas marked by gender inequality has a compounding negative effect with armed conflict upon women and girls, it could be practicable to

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[30] *Armed Conflict* (n 6) 239.
[31] Protocol Additional to the Geneva Conventions of 12 August 1949, and relating to the Protection of Victims of International Armed Conflicts (Protocol I), 8 June 1977, art. 51(5) (b).
[32] Ibid, arts. 35(3) and 55.
[33] ICRC, *Guidelines on the Protection of the Natural Environment in Armed Conflict* (Geneva: ICRC, 2020), 53.
[34] Ibid.
[35] Ibid, 54.

account for this in targeting consistent with the ICRC's consideration of the environment under the principle of proportionality. Given NATO's lengthy experience with operations in Afghanistan, let's look at that country as an example.

A typical military gender analysis of Afghanistan, particularly the poorer, more rural areas, would note that these areas are marked by gender inequality. One aspect of this is that women remain largely to their home compounds.[36] Further, women in these areas are largely tasked with taking care of the children and the infirm, two related groups of people who are particularly at risk of negative changes in their environments. Finally, in many cases, women often grow important subsistence crops in their home compounds to help feed their families, or care for small livestock that provides protein for their diets.[37] When women's home compounds are damaged or destroyed and they must leave them as internally displaced persons or refugees, they are also leaving infrastructure that shelters them from what in many parts of Afghanistan is an austere environment and from the risk of sexual violence committed against them.[38]

Losing the safety and resources of their home compounds can have a tremendous negative impact on rural Afghan women and those whom they take care of. This impact is likely amplified by the climate change effects that Afghanistan is already suffering. The loss to the women is more than just the sum of the physical damages to the structure of their home compound, yet under traditional interpretations and applications of proportionality, it would not ordinarily be considered.

Suppose, however, that the rules of engagement for air strikes by a deploying force, and the special instructions issued to its pilots, prohibited attacks other than in self-defence against home compounds that would result in damage to living areas. Steps like this could be effective ways to account for the potentially compounding effects of war and climate change upon women and girls who are marginalized in their societies even in the kinetic parts of

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[36] Anand Gopal, 'The Other Afghan Women' *The New Yorker* (New York, 6 September 2021) <https://www.newyorker.com/magazine/2021/09/13/the-other-afghan-women> accessed 5 March 2022>; Norad, 'Working with Gender in Rural Afghanistan: Experiences from Norwegian-funded NGO projects' (2014) *Norad Report* 10/2014 5-6 <https://www.cmi.no/publications/file/5299-working-with-gender-in-rural-afghanistan.pdf.> accessed 5 March 2022.

[37] *Norad Report* (n 28) 6.

[38] Farbia Nawa, 'For Afghan Refugee Women, There's No Escape From Violence' (*Foreign Policy,* 5 April 2019) < https://foreignpolicy.com/2019/04/05/for-afghan-refugee-women-theres-no-escape-from-violence/> accessed 5 March 2022.

civilian-centric operations. Importantly, it does not require changes to IHL, just better-informed interpretations and applications of it.

## Conclusion

From a utilitarian perspective, in civilian-centric operations like stabilisation and counterinsurgency operations that include a kinetic component, applications of armed force should have factored into their use considerations of these gender-differentiated harms if deployed forces want to maximise their chances of mission success. From a legal perspective, this would more fully implement the IHL requirement that women and girls not be discriminated against because of their sex under Common Article 3 of the 1949 Geneva Conventions (no adverse distinction in treatment based on sex). In addition, proper consideration of these factors bears directly upon our understanding and application of the IHL principle of proportionality. The different and more severe harms that women and girls would suffer in areas characterized by pre-existing gender inequality and the occurrence of climate change because of military actions should be part of commanders' and planners' assessment of the proportionality of the missions they intend to execute.

There are challenges to developing the common operational picture that would support the consideration of these climate change and gender inequality factors in proportionality analysis that accompanies targeting. Probably the most significant one is the collection of sufficient sex and gender-disaggregated data to illustrate the relative state of gender inequality and the collection of sufficient meaningful data about climate change effects in an area of operations to see where these might be most significantly registering. The Australian Defence Force, for example, has recognised the significance of sex and gender-disaggregated data to the targeting process, and has published pioneering work that lays the groundwork for further research and study in this area.[39]

Today, however, even in the absence of definitive information, a thoroughly prepared gender analysis coupled with an overall climate change impact assessment could allow certain reasonable operational assumptions to be made regarding how the factors of armed conflict, gender inequality, and climate change together affect at-risk women and girls. These factors could combine to place a compounded, perhaps even multiplied, burden upon

[39] Australian Defence Force, *Air Force Doctrine Note 1-18, Gender in Air Operations* (Air Power Development Centre, 2018) 13-14.

women and girls who might already be suffering from marginalization in their communities. Ignoring this risk in planning and operations would not only be inconsistent with the democratic values of the NATO partners, it would also potentially jeopardise mission success in civilian-centric operations. On this basis, targeting procedures could be developed that would tailor the use of force accordingly. Steps such as these would more fully meet the goal set out in UN Security Council Resolution 1325 by fully implementing "international humanitarian and human rights law to protect the rights of women and girls during and after conflicts."[40]

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[40] UNSCR 1325 (n 16).

Source: www.nato.int

## Exercising the Climate Change Most Likely Scenario in NATO[1]

by LTC Michael Lipkin[2]

### Introduction

Climate Change has emerged as a significant, if not existential threat to global security. The United Nations Framework Convention on Climate Change (UNFCC) could not have sounded the alarm any more clearly in its 2021 annual report:

"The science is clear. Human-induced climate change is affecting weather and climate extremes, causing more, and more severe, heatwaves, heavy precipitation, droughts and cyclones. Unless swift and deep reductions

[1] **DISCLAIMER:** The views expressed in this article are solely those of the author and may not necessarily represent the views of NATO, Allied Command Operations, or Allied Command Transformation, or of their affiliated organizations.

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in greenhouse gas emissions are delivered in this decade, temperatures of 2°C will be exceeded, bringing climate catastrophe."[3]

The planet has already warmed 1.1°C since pre-industrial times.[4] At 2°C, it is predicted that the ice sheets will begin their collapse; that 400 million more people will suffer from water scarcity; that major cities in the equatorial band of the planet will become unliveable; and that heat waves, even in the northern latitudes, will kill thousands each summer.[5]

The Intergovernmental Panel on Climate Change (IPCC), the United Nations (UN) body for assessing the science related to climate change, is in the process of finalizing its Sixth Assessment Report, with working groups releasing reports in February and April 2022. The IPCC is regarded as "the gold standard" for climate change projections, largely because it is conservative, only integrating research that passes the threshold of inarguability.[6] In its February report, the Impacts Adaptation, and Vulnerability Working Group found that there is at least a greater than 50% likelihood that global warming will reach or exceed 1.5°C from pre-industrial temperatures in the near-term (before 2040). This is under the best-case, or "very low greenhouse gas emissions" scenario, which presumes the world will successfully adopt a "sustainable" approach to Green House Gas (GHG) emissions.[7] The highest emissions scenarios in the literature result in global warming of >5°C by 2100, based on assumptions of rapid economic growth and pervasive climate policy failures.[8] These levels would of course be beyond catastrophic.

Despite the commitments of the 197 signatories to the 2016 Paris Agreement,[9] representing 55% of the world's greenhouse gas emissions, emissions continue to rise, and we are already seeing the results of a changing

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[3] (2022) *United Nations Climate Change Annual Report 2021*. Available at: <https://unfccc.int/sites/default/files/resource/UNFCCC_Annual_Report_2021.pdf> (Accessed: December 1, 2022).

[4] IPCC Sixth Assessment Report Impacts, Adaptation and Vulnerability, *Climate Change 2022: Impacts, Adaptation and Vulnerability Full Report*.

[5] Wallace-Wells, D. (2019) *The Uninhabitable Earth: Life After Warming*. Tim Duggan Books.

[6] See, e.g. ibid; Hayhoe, K. (2022) *Saving us: A climate scientist's case for hope and healing in a Divided World*. New York, NY: One Signal Publishers / Atria Books, an imprint of Simon & Schuster, Inc.

[7] IPCC Sixth Assessment Report Impacts, Adaptation and Vulnerability, *Climate Change 2022: Impacts, Adaptation and Vulnerability Summary for Policymakers*.

[8] IPCC (n3).

[9] *The Paris Agreement*. Available at: < https://unfccc.int/process-and-meetings/the-paris-agreement/the-paris-agreement> (Accessed: December 1, 2022).

climate. The North-Atlantic is no exception. One issue of concern involves refugees. Beginning in 2011, a million Syrian refugees fled to Europe as a result of a civil war enflamed by climate change and drought, significantly affecting the political landscape. Migration of thousands of Latin Americans seeking refuge in the United States has had significant political impact as well. There is, in fact, a striking overlap between currently vulnerable states and future areas of extreme warming.[10] The World Bank projects climate change could cause as many as 216 million climate migrants by 2050.[11] A UN study indicates that the number of migrants in the context of droughts could increase by approximately 22 million in Africa, 12 million in South America and 10 million in Asia by 2059 when compared with the 2000–2015 period.[12] Migrant projections vary widely depending on the actions undertaken to reduce GHG emissions, and experts project climate migrants will flee to nearby cities before attempting inter-continental travel. But, drought, famine, and dangerous heat waves will only exacerbate risk of conflict, and the migrant situation in the North Atlantic will likely be magnitudes worse in the future than that seen in the recent past.

Increased extreme weather events, climate migration, and associated increased (violent) extremism, and fleeing refugees are likely to significantly affect NATO operations, including the increased need for disaster response, peacekeeping efforts, and similar missions. But, there are likely to be secondary effects as well. The Syrian migrant crisis of 2011 produced nationalist, nativist sentiments in Europe. One can project a similar but more fervent result should current migration projections come to fruition. It is foreseeable that, at a time when alliance cohesion and global climate response will be most critical, powerful, isolationist dynamisms will be a challenge to solidarity. Consequently, Allies should plan for, and practice coping with this likely dichotomy.[13]

## The Policy Mandate

[10] Kemp, L. *et al.* (2022) "Climate Endgame: Exploring catastrophic climate change scenarios," *Proceedings of the National Academy of Sciences*, 119(34). Available at: <https://www.pnas.org/doi/10.1073/pnas.2108146119> .
[11] Clement, V. *et al.* (2021) *Groundswell Part 2: Acting on Internal Climate Migration*. Washington, D.C.: The World Bank.
[12] *Addressing the Land Degradation – Migration Nexus: The Role of the United Nations Convention to Combat Desertification*. Available at: <https://www.unccd.int/sites/default/files/2019-08/IOM%20UNCCD%20Desertification%202019%20FINAL.pdf> (Accessed: November 30, 2022).
[13] (2021) *The Refugee Crisis and Right-Wing Populism: Evidence from the Italian Dispersal Policy*. Bonn, Germany. Available at: < https://docs.iza.org/dp14084.pdf > (Accessed: November 30, 2022).

The United States' National Security Strategy (NSS) warns of the security challenge of climate change. It declares climate effects and humanitarian emergencies will worsen in the years ahead, including flooding in Europe, rising sea levels in Oceania, water scarcity in the Middle East, melting ice in the Arctic, and drought and deadly temperatures in sub-Saharan Africa.[14]

The strategy highlights the current global competition and the importance of being the partner of choice for those nations with shared values. It also acknowledges that people all over the world are struggling to cope with the effects of shared challenges, including climate change and food insecurity. The NSS projects that tension will intensify as countries compete for resources and energy advantage—increasing humanitarian need, food insecurity and health threats, as well as the potential for instability, conflict, and mass migration. The strategy emphatically states that these shared challenges are "…at the very core of national and international security and must be treated as such."[15]

Global competition and climate change security are not "stove piped", independent issues. They are interrelated security challenges, and must be viewed that way. In September 2022 the White House codified the "President's Emergency Plan for Adaptation and Resilience (PREPARE)."[16] The plan acknowledges "[t]he climate crisis is fundamentally and increasingly a national security crisis," and as a result, the United States seeks to direct resources to assisting vulnerable nations and localities in adapting to the effect of climate change.[17] When the Allies invest in climate change mitigation in at-risk locations, they also ensure they remain the partner of choice, preventing a desperate reach for aid to those competitors who may not have the recipient's best interests in mind. This investment in adaptation also reduces the likelihood

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[14] *2022 National Security Strategy.* Available at: <https://www.whitehouse.gov/wp-content/uploads/2022/10/Biden-Harris-Administrations-National-Security-Strategy-10.2022.pdf> (Accessed: November 30, 2022).

[15] Ibid.

[16] *President's Emergency Plan for Adaptation and Resilience (PREPARE)*. Available at: <https://www.whitehouse.gov/wp-content/uploads/2021/10/Full-PREPARE-Plan.pdf> (Accessed: November 30, 2022).

[17] The recently released National Defense Strategy echoes concerns regarding Climate Change Security: Insecurity and instability related to climate change may tax governance capacity in some countries while heightening tensions between others, risking new armed conflicts and increasing demands for stabilization activities. *2022 National Defense Strategy of the United States of America*. Available at: <https://media.defense.gov/2022/Oct/27/2003103845/-1/-1/1/2022-NATIONAL-DEFENSE-STRATEGY-NPR-MDR.PDF> (Accessed: November 30, 2022).

of violence and mass migration resulting from the disorder likely to be seen in desperate circumstances.

NATO also has a clear mandate to actively prepare for the climate change threat. Both the 2021 Brussels Summit Communique and NATO Strategic Concept 2022 refer to climate change as a defining challenge of our times, and as a "threat multiplier" with a profound impact on Allied security.[18] The stated aim is for NATO to become the leading international organisation when it comes to understanding and adapting to the impact of climate change on security as the policy calls for NATO to forecast the effects of climate change on the peace and security in the North-Atlantic, and to prepare to martial the most effective response possible.[19] To do so, we must incorporate climate change security into our warfare development efforts, and conduct rigorous collective training to prepare for the threat.

## Warfare Development and Exercising Climate Change

Warfare development may be summarized as the analysis and adaptation needed to ensure the Alliance remains relevant in current and future operational environments.[20] Much of this analysis, including lessons identified, develops from the execution of NATO exercises. At their core, NATO exercises are practice. Practice working together as an alliance, and practice addressing today's operational threats.[21] But, exercises serve another function. They provide a mechanism to test and develop organizational changes in the face of the most likely and most dangerous threats.[22]

The Brussels Summit Communique, the NATO Climate Change and Security Action Plan, and the June 2022 Secretary General's Climate Change & Security Impact Assessment all call for adapting our training and exercises to

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[18] *Strategic concept - NATO*. Available at: <https://www.nato.int/nato_static_fl2014/assets/pdf/2022/6/pdf/290622-strategic-concept.pdf> (Accessed: November 30, 2022).
[19] Ibid.
[20] Millet, J.-M. *NATO, JWC*. Available at: <https://www.jwc.nato.int/newsroom/warfare-development-focus/warfare-development-relevance-risks-and-making-it-real> (Accessed: November 30, 2022)
*NATO's Warfare Development Command*. NATO Allied Command Transformation. Available at: <https://www.act.nato.int/application/files/5716/3215/3810/FACTSHEET_210914.pdf> (Accessed: November 30, 2022).
[21] *Exercises & training* (no date) *shape.nato.int*. Available at: <https://shape.nato.int/exercises> (Accessed: November 30, 2022).
[22] Millet (n17).

the impacts of climate change.[23] This is a clear mandate to incorporate climate change into NATO's exercise program.

The good news is that NATO already has an exercise in place that addresses some of the problems we're likely to encounter as a result of the climate crisis. The *Steadfast Jackal* series of exercises prepares and certifies a NATO deployable Corps and supporting components as a Joint Task Force ready for deployment as part of the NATO Response Force. The current *Steadfast Jackal* scenario focuses on political and security instability, including political factions, organized armed groups, piracy, and humanitarian crisis in NATOs Strategic Direction South. By more specifically tailoring *Steadfast Jackal* as a climate crisis response exercise, NATO has an opportunity to continue training and certifying key elements of the NRF while developing the alliance's preparedness for the impending climate crisis. A secondary benefit would be to spotlight the substantial security risk of climate inaction. *Steadfast Jackal* is designed as a Small Joint Operation (SJO), limiting its ability to reflect the global nature of the climate challenge. However, the alliance must adapt to the idea that the threats to be faced by climate change security in the North Atlantic are interrelated with global competition, and will affect the cohesiveness of the Alliance at a time when that cohesion is most needed. To do so, it must practice. Steadfast Jackal is not a bad place to start.

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[23] NATO (2021) *Brussels Summit Communiqué issued by NATO heads of state and government (2021)*, *NATO*. Available at: <https://www.nato.int/cps/en/natohq/news_185000.htm?selectedLocale=en> (Accessed: November 30, 2022).

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