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In conjunction with an Academic Seminar

Foreword

Building on the success of last year's Review, 2024's Review is themed 'Climate Change, Security and Defence.' This is a global issue but one which is important for Ireland and the Irish Defence Forces. As the impacts of climate change have become clearer in the last few years there has been a growing debate around the implications of climate change and security as well as the implications for climate change for defence policies and armed forces and the roles of militaries in responding to climate change. This year's 'Review' continues the tradition of past editions in providing a focus for intellectual debate within the wider Defence Community on matters of professional interest.

My thanks to the Editors of the Defence Forces Review for 2024, Lt Cdr Stuart Armstrong and Comdt Gavin Egerton. Despite a very busy schedule working on the staff of the Command and Staff School, they shouldered this editorial burden with energy, commitment and enthusiasm.

For this year's edition, they have had the pleasure of working in academic collaboration with University College Cork. A special word of gratitude to their fellow editor, Professor Andrew Cottey, for his expert insights and invaluable contributions in making this collaborative effort a success. Additionally, a team of expert academics from University College Cork contributed to the peer review process, thus enhancing the academic quality of the publication.

I would also like to thank the staff of the Defence Forces Printing Press for the detailed and painstaking work they undertook in editing and formatting the articles incorporated within the Review.

Again, many thanks to all our contributors without whose commitment and generosity the production and publication of this year's Review would not be possible.

Further copies of the Review are available from the Defence Forces Public Relations Branch at info@military.ie or online at http://www.military.ie/info-centre/publications/defence-forces-review.

James Sharkey
Lieutenant Colonel
Officer in Charge
Public Relations Branch

Ag cur leis an rath a bhí ar Athbhreithniú na bliana seo caite, is é 'An tAthrú Aeráide, an tSlándáil agus an Chosaint' téama Athbhreithniú na bliana 2024. Is ceist dhomhanda í seo ach ceist atá tábhachtach d'Éirinn agus d'Óglaigh na hÉireann. De réir mar atá tionchair an athraithe aeráide ag éirí níos soiléire le blianta beaga anuas, tá méadú ag teacht ar an díospóireacht faoi na himpleachtaí atá ag an athrú aeráide agus ag an tslándáil, chomh maith leis na himpleachtaí atá ann don athrú aeráide, do bheartais chosanta agus d'fhórsaí armtha agus faoi na róil atá ag fórsaí míleata sa fhreagairt don athrú aeráide. Leantar in 'Athbhreithniú' na bliana seo den traidisiún a bhí sna leaganacha a bhí ann roimhe seo béim a leagan ar dhíospóireacht intleachtúil laistigh den Chomhphobal Cosanta i gcoitinne ar ábhair a bhfuil leas gairmiúil ag baint leo.

Gabhaim buíochas le hEagarthóirí Athbhreithniú Óglaigh na hÉireann 2024, an Leifteanant-Cheannasaí Stuart Armstrong agus an Ceannfort Gavin Egerton. In ainneoin sceideal an-ghnóthach a bheith acu le linn dóibh a bheith ag obair ar fhoireann na Scoile Ceannais agus Foirne, thug siad faoin an t-ualach eagarthóireachta seo le fuinneamh, tiomantas agus díograis.

Do leagan na bliana seo, bhí sé de phléisiúr acu a bheith ag obair i gcomhar acadúil le Coláiste na hOllscoile, Corcaigh. Tá focal buíochais speisialta le tabhairt dá gcomheagarthóir, an tOllamh Andrew Cottey, as a léargas saineolach agus as an méid luachmhar a rinne sé chun go n-éireodh leis an gcomhiarracht seo. Ina theannta sin, chuir foireann sainacadóirí ó Choláiste na hOllscoile, Corcaigh leis an bpróiseas piarmheasúnaithe, rud a chuir feabhas ar cháilíocht acadúil an fhoilseacháin.

Ba mhaith liom buíochas a ghlacadh le foireann Chlóphreasa Óglaigh na hÉireann as tabhairt faoin obair chúramach agus mhionsonraithe a bhí i gceist chun na hailt atá in Athbhreithniú a chur in eagar agus a leagan amach.

Arís eile, gabhaimid buíochas lenár rannchuiditheoirí uile, ní fhéadfaí Athbhreithniú na bliana seo a tháirgeadh agus a fhoilsiú gan a dtiomantas agus a bhflaithiúlacht.

Is féidir tuilleadh cóipeanna de 'Athbhreithniú' a fháil ó Bhrainse Caidreamh Poiblí Óglaigh na hÉireann ag info@military.ie nó ar líne ag http://www.military.ie/info-centre/publications/defence-forces-review.

James Sharkey
Leifteanantchoirnéal
Oifigeach I GCeannas
An Brainse Caidreamh Poiblí

Editor's Notes

Climate change is one of the defining issues of the 21st century. It is impacting not only the climate system and the earth's physical environment, but also human societies, economies and politics. In recent years, there has also been debate about the impact of climate change on security and defence and the nature of the relationship between climate change on the one hand and security and defence on the other. The European Union and NATO have adopted formal policy documents on climate change, security and defence and the issue has been discussed within the United Nations Security Council. The relationship of climate change, security and defence is complex and involves a number of dimensions. If security is considered in terms of human security – the survival and well-being of human beings and human societies – the impacts of climate change may be viewed as major threats to human security, ranging from extreme weather events, to worsening food security situations, to mass displacement. These impacts of climate change are already being felt across the world, but the impacts are often most severe in poorer countries. Even in more traditional national security terms, the impacts of climate change may threaten the stability of states. There is also debate about so-called 'climate wars': the possibility that the impact of climate change may increase the likelihood of armed conflict, primarily civil wars within states. Climate change is also impacting militaries in other ways. More extreme weather is altering the conditions in which armies, air forces and navies operate, putting new demands on militaries and sometimes creating circumstances in which it is extremely difficult, even impossible, for militaries to deploy. Environmental, humanitarian and mass displacement crises arising from climate change are also increasing the range of circumstances in which armed forces may be asked to play a role, both domestically and internationally – for example, in terms of rescuing people, providing assistance to civilian authorities or delivering humanitarian aid. At the same time, armed forces are also major producers of the greenhouse gas (GHG) emissions that drive climate change. As a result, armed forces are now being asked to reduce the GHG emissions arising from their day-to-day activities, the procurement of weapons systems and overseas operations.

The articles in the Defence Forces Review 2024 are a contribution to on-going debate on this subject. The articles cover a wide range of issues, from broad questions of what role Ireland can play in addressing the security dimensions of climate change to more specific issues, such as the development of technologies which may allow armed forces to reduce their GHG emissions. As some of the articles in Defence Forces Review 2024 show, the Irish Defence Forces are already actively engaged with these issues. Whether in terms of domestic assistance to civilian authorities in response to events such as severe storms or floods, deployment overseas in the context of humanitarian crises arising from climate change or efforts to reduce military GHG emissions, the issue of climate change seems likely to be an important one for the Defence Forces for years to come.

This Review also publishes abstracts from the research thesis completed by Irish and international students from the 6th Joint Command and Staff Course, who completed an MA in Leadership, Management and Defence Studies, taught in partnership between Maynooth University and the Command and Staff School in the Irish Military College.

This partnership has developed over two decades and has seen hundreds of students from the DF graduate with masters degrees. Each year the Command & Staff School publish dozens of thesis on defence related topics promoting professional military education in accordance with international best practice and helping frame and progress the defence organisation's future in an ever uncertain and challenging defence environment.

Defence Forces Review 2024 is published in collaboration with University College Cork. The joint editorial team was Professor Andrew Cottey, of University College Cork, and Commandant Gavin Egerton and Lieutenant Commander Stuart Armstrong from the Defence Forces. The writing and production of this volume would not have been possible without the efforts of all who have contributed to it, including the authors, the (anonymous) peer reviewers and the team from the Defence Forces Printing Press, especially Private Chris Brennan. The editors would like to thank them all for their hard work.

Editorial Team

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Comdt Gavin Egerton, Command & Staff School DFTC
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Editor's Biographical Statements

Andrew Cottey is a Professor in the Department of Government and Politics, University College Cork. He was Head of UCC's Department of Government and Politics 2013-18. He has been a NATO Research Fellow, a Research Associate at the International Institute for Strategic Studies (IISS), a Visiting Researcher at the Stockholm International Peace Research Institute (SIPRI) and Chair of the Royal Irish Academy (RIA) Standing Committee on International Affairs. He is a member of the Security and Defence Working Group of the Institute of International and European Affairs, Dublin. His books include Security in 21st Century Europe (Bloomsbury, 3rd edition forthcoming 2025), The European Neutrals and NATO: Non-aligned, Partnership, Membership? (Palgrave Macmillan), Understanding Chinese Politics: An Introduction to Government in the People's Republic of China (Manchester University Press) and Reshaping Defence Diplomacy: New Roles for Military Cooperation and Assistance (Oxford University Press/IISS). His work has been published in journals including International Affairs, Journal of Common Market Studies, British Journal of Politics and International Relations, Contemporary Security Policy, European Security, European Foreign Affairs Review, Armed Forces & Society and Journal of Strategic Studies.

Lieutenant Commander Stuart Armstrong is an instructor in the Command and Staff School, Military College. He is a Naval Officer with over 25 years' service and a proud graduate from Munster Technical University and the International Warfare School HMS Collingwood. He has held a variety of operational, logistical, training and headquarters appointments. His most recent appointment at sea was in command of LÉ Niamh and he has served overseas with EUNAVFORMED Operation Sophia. He is a graduate of the 5th Joint Command & Staff Course where he was awarded an MA in Leadership, Management & Defence Studies. He also has an MSc in Strategy and Innovation from the Business School in Maynooth University.

Commandant Gavin Egerton is an infantry officer with twenty-two years of service in the Irish Army. He commenced his career with 3 Infantry Battalion and later served in a variety of command, staff, and training appointments in infantry units, DFHQ, and The Infantry School. Comdt Egerton has deployed on operations overseas on four occasions: once each with MINURCAT in Chad and EUTM Mali; and twice with UNIFIL. He holds an MA in Political Communication from Dublin City University and he is currently completing a PhD at University College Cork where his thesis title is *"The Application of Mission Command in Multinational Forces."* Comdt Egerton is a graduate of the Command and General Staff Officer Course, Fort Leavenworth, Kansas, USA. He is currently serving as an instructor at the Command and Staff School, Military College.

Contents

Running on Empty towards a Mad Max World? Climate Change and the "Western Way of War" in Question

Dr Brendan Flynn

Abstract

This paper engages with the recent scholarship on 'low carbon warfare' (Depledge, 2023) and the overreliance of western militaries on fossil fuels, energy intensive high-tech weapons, and electricity hungry data networks. This mode of warfare will become, literally unsustainable, if faced with disruptive climate change or should decarbonised energies and fuels become more expensive. Yet, while climate change will alter how Western militaries conduct operations, there will also be continuities with legacy technologies that rely on fossil fuels. Three future scenarios are offered here: optimistic, realistic, and pessimistic as regards the availability of decarbonised energy alternatives. It is argued that hybridity will be a key feature in the mix of future fuel, weapons, and platforms. Doctrinally, there may be a return to older modes of warfare with less emphasis on energy-intensive rapid manoeuvre, and more focus on slower attritional strategies, fortification, sieges, or raiding.

Introduction: Climate Change and Military Futures.

Professional militaries increasingly take climate change seriously, both as a 'threat multiplier' that exacerbates conflict, but also as a constraint that shapes long term planning. By 2050, climate change policies will likely reduce the ubiquity of cheap energy, mobility and logistics, a theme which has been dubbed the rise of 'low carbon warfare.'[1]

This paper is concerned with how militaries will adapt their operations and doctrine. Given that predictions about warfare have been littered with errors and omissions,[2] there is a need for caution. Nonetheless, three scenarios are offered here which correspond to optimistic, realistic, and pessimistic views.

Drawing on the energy transitions literature,[3] this contribution argues that fully decarbonised high-tech militaries are unlikely to emerge in the near future (2030s). It seems safer to expect that there will be ongoing military dependency on fossil fuels into the 2050s. In particular, some militaries who geographically face remote enemies, and therefore require long-distance force projection through maritime and aviation forces, may find decarbonisation especially challenging compared to small states who are oriented towards internal or proximate threats.

Therefore the future of warfare is likely to be hybrid. This is firstly as regards the mix of energies used by militaries. Secondly, hybridity will probably emerge in combinations of novel, energy-intensive, high-tech systems with less energy-intensive, sometimes lower-tech and often legacy equipment.[4] Finally, hybridity may occur at the level of doctrine. The 'Western way of war' currently privileges energy-intensive manoeuvre combined with high

1 Defined as: *"the pressures that are building on armed forces to decarbonize, as well as what the implications might be for where, when, with whom, with what and for what ends those forces are deployed,"* Duncan Depledge, "Low-carbon warfare: climate change, net zero and military operations," *International Affairs* 99, no. 2 (February 2023): 668.
2 Lawrence Freedman, *The Future of War: A History* (London: Allen Lane, 2017).
3 Vaclav Smill, *Grand Transitions: how the modern world was made* (Oxford: OUP, 2021).
4 Some legacy equipment can be fuel-guzzling and by the 2050s may still require fossil fuels. Yet simpler, less energy demanding, legacy systems abound in today's armies- mortars, recoilless rifles, land and sea mines, and these will likely endure.

technology. Future energy constraints may encourage operational concepts for prevailing in slower, attritional, conflicts.

The military response to climate change is urgent given the growing awareness of the huge scale of defence sector emissions.[5] In 2022 NATO announced that its military forces would reach 'net zero' by 2050 and achieve 45% reductions by 2030.[6] Moreover, while climate change may not directly cause civil or inter-state wars, it can make conflict more likely and the humanitarian consequences worse, with militaries increasingly pulled into 'stability operations' as much as traditional war-fighting.[7]

Depledge (2023) notes how the defence sector is no longer exempt from Paris Agreement commitments. As a result, the peacetime carbon 'boot-print' of Western militaries will be under pressure for reduction, typically through ambitious barracks management. However, it is less clear how military operations can be decarbonised.

One obvious objection is that decarbonising military forces may quickly reach practical technology limits, or exacerbate already high procurement costs. The result could be a major reduction in the size,[8] mobility, flexibility, and effectiveness of Western forces.[9] It is also possible that some states' militaries could simply choose to stubbornly remain carbon intensive because of political choices or if they face large-scale threats that make any transition unwise.

Optimism about Decarbonising the "Western Way of War"?

In the last decades, the Western way of war has arguably delivered strategic failure in Iraq, Afghanistan, Libya, and Mali.[10] It also remains utterly dependent on fossil fuels.[11] One estimate suggests an annual fuel bill of USD$20bn for US operations in Iraq and Afghanistan.[12] Without fossil fuels, it is questionable whether these operations would even have been feasible.[13]

5 Stuart Parkinson, "How big are global military carbon emissions?," *Responsible Science Journal*, no.5 (July 2023): 23-24; See also Zoë Schlanger, "Military Emissions Are Too Big to Keep Ignoring: The world is finally talking about them," *The Atlantic* (17 January 2024), https://www.theatlantic.com/science/archive/2024/01/military-emissions-climate-cop28/677151/
6 NATO, "NATO releases its Climate Change and Security Impact Assessment," *NATO News* (28 June 2022), https://www.nato.int/cps/en/natohq/news_197241.htm
7 K.M. Sudkamp et al., *Defense Planning Implications of Climate Change for U.S. Central Command* (Santa Monica, CA: RAND, 2023).
8 Alejandro de la Garza, "To Take Climate Change Seriously, the U.S. Military Needs to Shrink," *Time Magazine*, (17 February 2022).
9 Alan Howard and Brenda Shaffer, "The Hidden Dangers of a Carbon-Neutral Military," *Foreign Policy* (12 August 2021), https://foreignpolicy.com/2021/08/12/the-hidden-dangers-of-a-carbon-neutral-military/
10 Frans Osinga, "Strategic underperformance: The West and three decades of war," in Rob Johnson, Martijn Kitzen, and Tim Sweijs (Eds.) *The Conduct of War in the 21st Century: Kinetic, Connected and Synthetic* (London: Routledge, 2021).
11 Oliver Belcher et al., "Hidden carbon costs of the 'everywhere war': Logistics, geopolitical ecology, and the carbon boot- print of the US military," *Transactions of the Institute of British Geographers* 45 no. 1 (2020): 65-80.
12 Peter Lehner, "The Burden: New Documentary Illustrates Impacts of Fossil Fuels on the U.S. Military," *Natural Resources Defense Council* (NRDC), (30 March 2015), https://www.nrdc.org/bio/peter-lehner/burden-new-documentary-illustrates-impacts-fossil-fuels-us-military.
13 It is an interesting counterfactual question, beyond the scope of this paper, if much smaller and lighter logistical footprint operations had been necessitated because of energy constraints, whether these might actually have been more effective.

US Marines re-installing a gas turbine engine from an M1A1Abrams tank-an example of western military gas guzzling.

Airpower, so central to Western operations, remains enormously carbon-intensive. Although the RAF has officially adopted a goal to become a 'net zero airforce' by 2040,[14] and even flew an Airbus A330 transporter on 100% sustainable fuel in 2022,[15] more generally there are only a few examples of fast-mover air support, vital helicopters, or heavy lift platforms that can run on green fuels.[16] Several air forces have plans for 'drop-in' replacements, but these are usually blends of fossil and non-fossil fuels. While there are emerging electric and hydrogen hybrid propulsion solutions, these seem more applicable for military training, transport, and patrol aircraft.[17]

Combat vehicles and heavy trucks, which are still the backbone of military logistics, remain dependent on diesel engines. Again one big hope here is synthetic 'drop-in' replacement fuels working like artificial hydrocarbons[18] or some type of fuel cells.[19] Biofuels have historically attracted attention and can power ships or tanks,[20] although suitability for aviation has usually been regarded as more doubtful and biodiesels have had storage reliability/contamination concerns.[21] Moreover, biofuels have problems with cost,

14 Ministry of Defence, "Defence Aviation Net Zero Strategy," (2023), https://assets.publishing.service.gov.uk/media/64abc-181112104000cee6540/Defence_Aviation_Net_Zero_Strategy.pdf
15 Royal Air Force, "Royal Air Force completes world-first sustainable fuel military transporter flight," (18 November 2022), https://www.raf.mod.uk/news/articles/royal-air-force-completes-world-first-sustainable-fuel-military-transporter-flight/
16 BPFuel have co-operated with the RAF to trial a Eurofighter, Hercules, and an NH90 helicopter on a blend that is 80% waste oils/kerosene. Current USAF plans appear to be mostly conservative: jet fuel blends that will remain 90% fossil fuel, DSEI, "Why the Military is Turning to SAF," (18 August 2023), https://www.dsei.co.uk/news/military-turning-saf
17 James Domone, "How can sustainable fuels support the future of military aircraft?," *Open Access Government*, (3 August 2021), https://www.openaccessgovernment.org/how-can-sustainable-fuels-support-the-future-of-military-aircraft/116708/
18 Wsewolod Rusow, (2024) "Unlocking Potential: Synthetic Fuels in Modern Military Operations," NATO *Energy Security Centre of Excellence* (25 April 2024), https://www.enseccoe.org/publications/synthetic-fuels/
19 *Fuel Cells Works*, "Germany's Military Tanks to Embrace Hydrogen Power in the Shift to Climate Neutrality," Fuel Cells Works (10 July 2023).
https://fuelcellsworks.com/news/germanys-military-tanks-to-embrace-hydrogen-power-in-the-shift-to-climate-neutrality/. For a wider discussion on future tank propulsion see: https://www.theengineer.co.uk/content/in-depth/the-future-of-military-tanks.
20 Atul Grover et al., "Biofuels for defence use: past, present and future." *Defence Life Science Journal* 4, no. 1 (December 2018): 3-11.
21 For an overview and details of problems with biodiesels, see European Defence Agency/EDA, "*The Use of Alternative and Synthetic Fuels in the Military-Fact Sheet*," EDA (23 October 2017), https://eda.europa.eu/docs/default-source/events/eden/phase-i/information-sheets/cf-sedss-information-sheet-use-of-alternative-and-synthetic-fuels.pdf

and scalability and they have, depending on their feedstock, strategic trade-offs if diverting valuable agricultural land.[22] Therefore the pathway to cheap, reliable, energy-dense, and fully decarbonised 'drop-in' replacements, is far from straightforward.[23]

In some cases the approach being explored is *"energy agnostic."* For example, the European Defence Agency (EDA) has funded an electric drivetrain transmission system to the wheels, which could be powered by either a hybrid fossil fuel engine combined with a battery or a hydrogen fuel cell. The latter is being explored for a German Leopard 2 main battle tank[24] and the US Army has experimented with hybrid diesel-electric Bradley fighting vehicles and Joint Light Tactical Vehicles.[25] Hybrid pathways then, combined with greater fuel efficiency, undoubtedly offer one relatively simple, quick, and affordable way to reduce emissions, yet ultimately they merely delay decarbonisation.

While drones usually rely on small, efficient, fossil fuel or lithium battery propulsion, they are part of a wider ISTAR network that is currently very carbon-intensive, weaving together satellites, data, and computing networks. Artificial intelligence technologies probably exacerbate this dependency by relying on mostly static server farms.[26] Internet networks are vulnerable to interdiction at sea given that a significant amount of web traffic moves by fixed sub-sea cables, which are relatively easy to identify.[27] In theory, ISTAR networks' electricity needs could be decarbonised, but relying on civilian electricity grids is not ideal for militaries.

A Dose of Realism? Why Decarbonising Militaries Cannot Simply Follow Civilian Pathways.

We should recall that militaries require fuels that have very high energy density; are 'risk-manageable' under combat conditions; have easy portability to frontlines; and exhibit very robust security of supply. Solar panels and wind turbines could provide rear areas with some of their energy needs but they have lower energy densities and suffer from variable generation. Nonetheless, small solar panels are being used by Ukrainian soldiers in front-line positions[28] and there is considerable innovation in wearable batteries and charging

22 Trakimavi- ius (2023), Ibid.
23 Yasmin Tadjdeh, "Electric Vehicles for the Military Still a Pipedream," *National Defence-NDIA Business and Technology Magazine* (6 October 2021).
24 EDA, "EDA projects point to greater use of alternative power sources in military applications," *EDA* (23 February 2023), https://eda.europa.eu/news-and-events/news/2023/02/23/eda-projects-point-to-greater-use-of-alternative-power-sources-in-military-applications
25 Jen Judson, "Oshkosh unveils hybrid electric Joint Light Tactical Vehicle," *Defense News* (25 January 2022), https://www.defensenews.com/land/2022/01/25/oshkosh-unveils-hybrid-electric-joint-light-tactical-vehicle; and Nancy Jones-Bonbrest, "Army advancing first hybrid electric Bradley," *U.S. Army* (18 February 2022), https://www.army.mil/article/254124/army_advancing_first_hybrid_electric_bradley
26 Kate Crawford, "Generative AI's environmental costs are soaring—and mostly secret," *Nature* 626, (20 February 2024): 693.
27 Alex Capri, "The New Geopolitics of undersea cables," *Hinrich Foundation Blog* (30 April 2024), https://www.hinrichfoundation.com/research/wp/tech/the-new-geopolitics-of-undersea-cables/#:~:text=The%20geopolitics%20of%20undersea%20cables%20is%20marked%20by,cables%20translates%20to%20economic%20power%20and%20intelligence%20advantages.
28 Lisa Cohn, "Ukranian and German-Made Solar Microgrids Warm Newborns and Serve Military, Trauma Centers in Ukraine," *Microgrid Knowledge* (15 December 2023), https://www.microgridknowledge.com/government-military/article/33016475/ukrainian-and-german-made-solar-microgrids-warm-newborns-and-serve-military-trauma-centers-in-ukraine.

systems.[29] It is likely that in the near future militaries will try to replace ubiquitous diesel electric generators with compact fuel cells and portable solar and wind arrays.[30]

Yet these solutions will not fully decarbonise mobile forces-whether in tanks, helicopters, or supporting fast-mover air cover. A hydrogen economy may emerge to complement renewables and electrification, however, hydrogen has demanding safety requirements for special storage tanks and cooling.[31] For these reasons synthetic fuels based on methanol or ammonia are promising.[32] Methanol, although it requires much larger fuel tanks and performs poorly at high temperatures, is being used by commercial shipping companies.[33]

Lithium-Ion (Li+) batteries and other rare earth elements have been central to how civilian grids integrate electric vehicles and renewables, but they require significant safety procedures and perform poorly at extreme temperatures.[34] Nevertheless, a recent EDA project has argued that *"the benefits of utilising lithium-ion batteries in military operations far outweigh the risks."*[35] It is plausible they will become a feature of military energy needs over the coming years, although probably not for larger vehicles.[36] Only Japan's Navy currently operates submarines with a large-scale Li+ battery assembly.[37] At the strategic level, one country (China) dominates the supply of lithium and indeed many other rare earth elements.[38] This has produced a clear trend of 'reshoring' battery and renewable technologies back to states which are not potential geopolitical rivals.

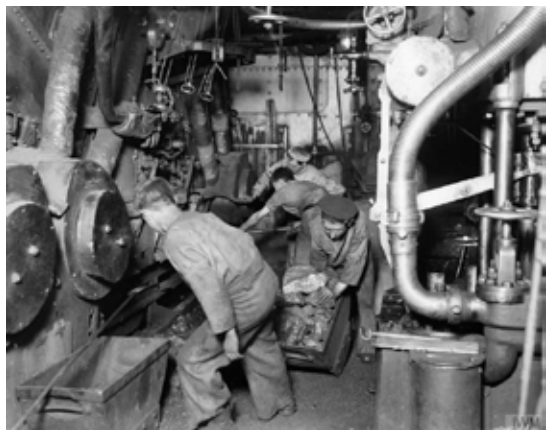
In summary, while emerging green energy technologies will be very useful to militaries, many are fundamentally unsuitable. In particular, batteries and electrification approaches that are reliant on static grids could be easily undermined by sabotage, aerial interdiction, or cyber-attacks.

Insights from *Past* Military Energy Transitions.

For much of history, the fuel of war has been quite literally rooted in cereals and grasses, to feed marching soldiers, horses, and pack animals. Only by the latter half of the 19th century were navies and armies innovating with coal and steam. One instructive military

29 Stephen W. Miller, "More Power to Your Elbow," *Armada International* (9 June 2020).
30 For already emerging examples see Sgt. Richard Andrade, "Alternative energy solutions encourage military self-sustainment," *Defence Visual Information Distribution Service* (22 May 2012), https://www.dvidshub.net/news/88985/alternative-energy-solutions-encourage-military-self-sustainment
31 Trakimavi- ius (2023) Op.Cit., 18-19.
32 Technologies for ammonia are less developed than methanol and it would require compression or cooling, unlike methanol. It also produces nitrogen oxide pollutants when burned and is even more toxic than methanol. See the discussion by Trakimavi- ius (2023), Op. Cit., 25-30.
33 Trakimavi- ius (2023) Op. Cit., 21-22.
34 For an overview of lithium ion batteries see Trakimavi- ius (2023), Op. Cit., 9-16. For strategic and operational level insights, see Joseph Webster, "Batteries as a Military Enabler," *War on the Rocks Blog* (20 June 2024).
35 EDA, "EDA projects point to greater use of alternative power sources in military applications," *EDA* (23 February 2023), https://eda.europa.eu/news-and-events/news/2023/02/23/eda-projects-point-to-greater-use-of-alternative-power-sources-in-military-applications.
36 Vaclav Smil, "Waiting for Superbatteries-They are still a long way from matching the energy density of liquid fuel," *IEEE Spectrum*, (29 November 2022).
37 The main energy source for these submarines remains a diesel engine. See Luca Peruzzi, "Developments in Lithium-Ion Batteries and AIP systems for submarines," *European Security and Defence Magazine*, (1 December 2023).
38 André Månberger and Bengt Johansson, "The geopolitics of metals and metalloids used for the renewable energy transition," *Energy Strategy Reviews* 26 (2019).

energy transition was the shift from coal to oil which the British and American navies embraced at the end of the 19th century.[39]



Royal Navy stokers shovelling coal into the boilers of a WW1 British battleship.

While this was a relatively fast transition, it was still not in place by the First World War: the Battle of Jutland was mostly coal-powered.[40] Moreover, this transition required parallel technological developments in turbine design and also new threats (submarines) which pushed navies toward higher speeds.[41] Today, navies continue to use a combination of heavy diesel fuel and gas turbines with some nuclear power for aircraft carriers and submarines.[42]

The general lesson from most energy transitions is that they are multi-casual in their origins and typically slow[43]. Older forms of energy often remain important: Germany entered WW2 pioneering Panzer tactics but also employed over half a million supply horses.[44] Moreover, we should note that admirals only agreed to the shift because of the superior energy density of oil over coal which conferred combat advantages in speed and weight, required less manpower, and could be replenished quickly. Today, alternatives to fossil fuels are significantly less energy-dense offering inferior energy performance. The tactical or operational military benefits of decarbonised fuels are few[45] and the drawbacks

39 Stephen Gray, "Fuelling mobility: coal and Britain's naval power, c. 1870–1914," *Journal of Historical Geography*, Vol. 58 (2017): 92-103.
40 James Goldrick, "Coal and the Advent of the First World War at Sea," *War in History* 21, no. 3 (2014): 322–37. The major exception was submarines.
41 Goldrick (2014) Op. Cit.
42 Some 160 naval vessels are in service with nuclear propulsion, Lukas Trakimavi- ius, (2021) "The Future Role of Nuclear Propulsion in the Military," *NATO Energy Security Centre Of Excellence Energy Highlights*, (18 October 2021): 8.
43 Vaclav Smil, *Grand Transitions: How the Modern World Was Made.* (Oxford: OUP, 2021), 151; and see discussion at 271-279.
44 Richard L. DiNardo and Austin Bay, "Horse-Drawn Transport in the German Army," Journal of Contemporary History, 23 no. 1 (1988): 129-143.
45 Lithium-ion batteries on submarines appear to be (for now) quieter than other existing technologies. Nuclear propulsion used already for some aircraft carriers and submarines confers logistical independence at the cost of considerable engineering risk and cost. Battery-powered vehicles and UAVs may also be quieter and this could be important for reconnaissance. However, noise is just one parameter of detection apart from visual, electromagnetic and IR signatures. Air forces are interested in synthetic fuels and newer engines if they give increased range, albeit for higher cost.

are often significant. Much greater resistance is therefore likely to ditching existing proven fossil fuels.

It is also worth considering that many of the military platforms that are being procured today will remain in service by the 2050s. While some military equipment becomes quickly dated and replaced, it is striking that many Cold War platforms remain in service. Fig.1 below shows this phenomenon for the US military which implies a significant legacy carbon footprint.

Figure 1.
THE LONGEVITY AND CARBON LEGACIES OF MAJOR US COMBAT PLATFORMS
(photo credits: all images are open source from Wikipedia)

Pessimistic Scenarios: Going Nuclear Amid a Dystopian "Mad Max" Future?

One controversial decarbonisation pathway is nuclear energy. Although nuclear propulsion for aircraft or land vehicles seems implausible,[46] the navies of Brazil, Australia, and India plan to procure nuclear-powered subs.[47] While other states may consider this, becoming

46 For an overview of the challenges facing nuclear propulsion see Trakimavi- ius, (2021) Op. Cit. Russia appears to have some plans for nuclear powered cruise missiles and submersibles but their status is unclear.
47 *Le Monde* with AFP, "France to help Brazil develop nuclear-powered submarines," Le Monde (27 March 2024), https://www.lemonde.fr/en/international/article/2024/03/27/france-to-help-brazil-develop-nuclear-powered-submarines_6659812_4.html; Australian Submarine Agency, "Australia's nuclear-powered submarines," *Australian Government* (2 Oct 2024), https://www.asa.gov.au/aukus/australias-nuclear-powered-submarines; Indian Defence Research Wing, "India Dives Deep: Unveiling Plans for Next-Gen Nuclear Attack Submarine, *IDRW* (25 January 2024), https://idrw.org/india-dives-deep-unveiling-plans-for-next-gen-nuclear-attack-submarine/. Note India has already four nuclear-powered *Arihant* class SSBNs in commission.

a nuclear navy is an expensive and slow process. Moreover, the experience of Ukraine's Zaporizhzhia plant reminds us that in future wars, civil nuclear infrastructure cannot be left unprotected without risk of strategic blackmail. For many states, nuclear decarbonisation could be simply more trouble than it's worth.

Finally, an important unknown here is the possibility of catastrophic climate change producing a violently disordered future.[48] In such scenarios, militaries might abruptly face technological disruptions, such as the need to suddenly reduce fossil fuel use while simultaneously being dragged into disaster response and perhaps war-fighting, all under extreme weather conditions. When trying to envisage such dystopian scenarios, some military planners have drawn insights from science fiction.[49]

In *Furosia*, the latest *Mad Max* franchise, rival warlords, tribes, and gangs fight over what little freshwater and greenery they can find. And they do so with what's left of the gas, oil, and diesel. Set in a despoiled earth of 2154, the movie *Elysium* (2013) provides a more sophisticated view. Legacy weapons abound but are modified with futuristic aiming devices and munitions, alongside more speculative gadgets: battle droids, chemical 'rail guns', and exoskeleton suits.

A future military vehicle, as imagined by Sci-Fi

The designers for these movies were surely just aiming for cool aesthetic effects, but their props raise an important observation; what if the future is likely to feature a mix—*a conjuncture*—of the old and new, low-tech and high-tech weapons and energies, each enjoined in quite unpredictable ways?

Conclusion. Still the Era of High-Carbon Warfare?

There is growing speculation that recent technologies have shifted advantages towards the defender.[50] In this context, it is an open question whether Western military doctrine, which privileges fossil fuel-intensive hypermobility can remain viable. What could tip the balance against today's hypermobile, energy-hungry, military forces, may well be whether

48 Luke Kemp et al., "Climate Endgame: Exploring catastrophic climate change scenarios," *PNAS* 119, no. 34 (2022).
49 Elina Hiltunen and Aki-Mauri Huhtinen, "Science fiction in military planning—Case allied command transformation and visions of warfare 2036," *Futures Foresight Science* 6, no. 3 (2024).
50 Thomas X. Hammes, (2021) "The Tactical Defense Becomes Dominant Again," *Joint Force Quarterly* 103 (14 October 2021).

decarbonisation ends up making their energy needs more costly or inefficient. Technological breakthroughs are certainly possible, perhaps as regards battery or fuel cell technology. However, it seems more plausible to expect hybridity.

By the 2050s then we'll likely see militaries manoeuvre tactically on hybrid fuels, but possibly with less overall operational mobility, and therefore less strategic investment in manoeuvre doctrines. They will likely employ combinations of old and new, low and high-tech weapons reflecting a hybrid mix of legacy fossil fuels, nuclear, batteries, fuel cells, etc.

This does not mean militaries will return to the pace of Roman legions, but the future may well look more like the past. For much of history, military mobility was usually costly and limited because energy was scarce and inefficient.[51] Attritional siege warfare was the dominant mode of warfare combined with raiding and low-intensity insurgencies. We already see similar patterns of fighting in Ukraine, Syria, and Mali.

The idea that future battlefields will be simply decarbonised within twenty-five years also seems hopelessly naïve when we consider how all sides in the Russo-Ukraine war are dependent on fossil fuels.[52] While direct gas imports from Russia have dramatically declined for most EU states between 2021 and 2024 (from 40% to 15%), there are nonetheless a lot of re-branded Russian gas and oil exports that are indirectly routed through intermediary countries and then resold within EU markets.[53] This means that the real level of dependency remains surprisingly high. Russian oil and gas exports bizarrely continue to flow through Ukraine to Czechia, Slovakia, and Hungary.[54] Russian LNG exports by ship to Belgium, Spain, and France remain quite healthy: as of June 2024, the EU was the largest purchaser (54%) of Russian LNG.[55] Even US military bases in Europe remain fuelled with Russian gas.[56] And all these fossil fuel exports are critical in generating hard currency which keeps Putin's war economy funded. Carbon emissions on both sides are soaring then in what has become in reality slow, attritional, 'high carbon' warfare.[57]

Undoubtedly, there will be many welcome innovations that reduce fossil fuel dependency. However, if the overall cost and complexity of energy rises, then some characteristics of current warfare may well change, notably the prevailing assumption of hypermobility. Moreover, human nature and the essential brutality of war will likely endure. Low-carbon warfare then, if and when it ever emerges, will not make warfare any less common, nor less cruel.

51 A significant exception were the 'horse armies' raised by the Huns and the Mongols. However, their logistics were terrain/grass-limited. See Stephen Morillo, "Cavalry through the Longue Durée," 41-58 in Jeremy Black, (ed.). *Cavalry Warfare From Ancient Times to Today* (Rome: Società Italiana di Storia Militare, 2024).
52 For details see: https://energyandcleanair.org/financing-putins-war/
53 Armida van Rij, "Russian gas could jeopardize its foreign policy goals," *Expert Comment-Chatham House* (17 June 2024), https://www.chathamhouse.org/2024/06/eus-continued-dependency-russian-gas-could-jeopardize-its-foreign-policy-goals and Mohi Narayan and Nidhi Verma "Fuels from Russian oil gets backdoor entry into Europe via India," *Reuters* (6 April 2023), https://www.reuters.com/business/energy/fuels-russian-oil-gets-backdoor-entry-into-europe-via-india-2023-04-05/
54 Arthur Sullivan, Arthur, "War in Ukraine: Russian oil still flowing into the EU," *DW* (1 August 2024), https://www.dw.com/en/war-in-ukraine-russian-oil-still-flowing-into-the-eu/a-69826039
55 Petras Katinas, "June 2024 — Monthly analysis of Russian fossil fuel exports and sanctions," *CREA/Centre for Research on Energy and Clean Air* (12 July 2024), https://energyandcleanair.org/june-2024-monthly-analysis-of-russian-fossil-fuel-exports-and-sanctions/
56 David Roza, "DOD Still Has No Plan To Stop Using Russian Gas in Europe," *Air & Space Forces Magazine* (17 April 2024), https://www.airandspaceforces.com/dod-russian-gas-in-europe/
57 Parkinson (2023) Op. Cit.

Is Climate Change a Driver of the Far-Right?

Comdt Paul O'Callaghan

Introduction

The political spectrum in Ireland, like many parts of Europe and further afield, has been challenged by many issues, two prominent ones include environmental crises arising from climate change and a growing challenge to liberal democracy exemplified by a growth in right-wing politics.[1] This article, whilst acknowledging that there are many reasons for the growth in the latter, seeks to explore if there is a relationship between the two trends and perhaps identify if climate change is a driver of a wider rekindling of far-right politics in liberal democracies.

Recently, Irish politics has seen the genesis of a far-right wing or even a far-right extremist element, albeit with limited political success but significant localised disruption and protest. The rise of a far-right element across the European political spectrum has caused some concern and prompted some to consider the securitisation of far-right extremist elements. Political parties with far-right ideologies are in power or share power in countries like Italy, Finland, Slovakia, Hungary, Croatia, and the Czech Republic; while France, Netherlands and Sweden have seen far-right parties surge to the point of being lead players in their respective opposition.[2] Perhaps counterintuitively, the growth in support for far-right elements has been most evident in younger populations.[3]

There were much-heralded fears of a far-right surge in the 2024 European Parliament elections, however, far-right candidates saw a modest growth of 4% in seat holdings across the EU.[4] Unlike some of our European neighbours, who have had a longer and perhaps more turbulent history with right-wing politics, Ireland has not; with the brief exception of the 'Blueshirts' in the 1930s. Centre-right and centre-left parties have instead dominated Irish politics.

Ireland is one of the few European countries where the far-right has struggled to gain a foothold and mobilise the electorate,[5] with Irish protest votes tending to go to harder left parties and independents. Ireland has no elected far-right members of national parliament (TD) or proscribed violent far-right extremist movements.[6] The recent (June 2024) Local and European elections saw a debatably unbalanced level of focus on a number of new parties and candidates running on mandates that could be considered explicitly or implicitly on the far-right albeit with very limited success, failing to have any representatives elected to the European Parliament and four (out of 949) elected to local councils.[7] The emergence of new entities on the political spectrum can be destabilising, particularly so in Ireland where incumbent TDs have the fourth largest rate of re-election globally with a

1 Bernhard Forchtner, "*Climate Change* and the Far Right." Wiley Interdisciplinary Reviews. Climate Change 10 no. 5 (2019): 1-11.
2 Giovanni Coi, "Mapped: Europe's rapidly rising right." *Politico.eu*, (24 May 2024).
3 Ngaire Woods, "Why young Europeans are embracing the far right," *Voices, University of Oxford* (28 June 2024), Accessed 03 November 2024, https://www.bsg.ox.ac.uk/blog/why-young-europeans-are-embracing-far-right.
4 Gilles Ivaldi, "EU elections: far-right parties surge, but less than had been expected," *The Conservation*, (10 June 2024).
5 Katherine Kondor and Mark Littler, *The Routledge Handbook of Far-Right Extremism in Europe*, ed. Katherine Kondor and Mark Littler. 1st ed. Vol. 1 (New York, NY: Routledge, 2023).
6 Shaun McDaid and Jim McAuley, "Radical Right-Wing Politics on the Island of Ireland," In *The Routledge Handbook of Far-Right Extremism in Europe*, edited by Katherine Kondor and Mark Littler. 1st ed. Vol. 1 (New York, NY: Routledge, 2023), 244-257.
7 Cormac O'Keeffe. 2024. "No 'revolution' but landmark result for four far-right candidates in local elections." *Irish Examiner* (10 June 2024).

mean rate of return of 81.9%.[8] Alternatively, this incumbent entrenchment may provide a buffer against destabilisation and account for the far-right's heretofore exclusion in Irish politics. New entities can reconfigure political landscapes and increase focus or attention on what were previously niche issues, arguably exemplified by issues such as Brexit and the political turmoil in US presidential elections since 2016.

Before progressing, we need to define what far-right politics are. A universally agreed definition of far-right politics eludes, with policies differing across cultures, borders, and timelines, however, enough of a trend exists that allows scholars to consider the following to be defining but not limiting characteristics: xenophobia, racism, nationalism, desire for a strong state and anti-democratic attitude.[9] A polarising, rhetorical strategy dividing society into antagonistic elements through the creation of an 'us' and 'them' narrative is a defining characteristic associated with far-right entities. The 'us' are typically a self-identifying group defined along ethnic, racial, cultural, or religious lines. The 'others' are demonised and scapegoated for perceived grievances. In the context of this article, the transnational phenomenon of far-right extremism as proposed by Kondor & Little may vary by national culture and context to include exclusionary nationalism, authoritarianism, and anti-democratic attitudes, while being accompanied by characteristics such as xenophobia, racism, and populism.[10]

The far-right moniker or it's slightly softer "*populist*" synonym has divisive overtones and it may be reasonable to consider whether it's use has a derogatory connotation, being weaponised to undermine parties and political actors and movements that espouse some or all of these terms. In the Irish context, some political leaders have attempted to shake off far-right branding as such, either due to blindness in their self-identification or due to a desire to avoid the weaponisation associated with the term.[11]

This article will seek to explore how climate change could be a possible driver in far-right populism, sowing political and social discord, reflecting a complex and evolving relationship between ideology, science, and environmental policy.

Climate Change and the Far-Right

As governments seek to tackle the climate change challenge, they risk alienating populations that may have more traditional, conservative viewsets. This is not to say that all conservatives are right-wing or are against action on climate change, but that those that

8 Paul Redmond and John Regan, "Incumbency Advantage in a Proportional Electoral System: A Regression Discontinuity Analysis of Irish Elections," *European Journal of Political Economy* 38 (2015): 244-256.
9 Shehzad Ali Syed, "Far-Right Extremism in Europe," *Journal of European Studies (Karachi)* 37, no. 1 (2021): 119; Cas Mudde, *The Ideology of the Extreme Right* (England; Manchester University Press, 2000); Matthew Lyons, "Ctrl-Alt-Delete: The origins and ideology of the Alternative Right," (2017), Accessed 09 September 2024, https://politicalresearch.org/2017/01/20/ctrl-alt-delete-report-on-the-alternative-right#sthash.pyfXkALX.uO2xtz0b.dpbs
10 Katherine Kondor and Mark Littler, *The Routledge Handbook of Far-Right Extremism in Europe*, ed. Katherine Kondor and Mark Littler. 1st ed. Vol. 1 (New York, NY: Routledge, 2023).
11 Paul Connolly, "Episode 1 Inside Ireland's Rising Right," Aired on *Newstalk*, (30 April 2024), 45:36, https://www.newstalk.com/podcasts/inside-irelands-rising-right.

are politically disenfranchised by liberal policies may seek to mobilise others of a similar mindset or may become susceptible to other anti-government sentiments.

This article proposes considering the following loose groupings of grievances related to climate change as drivers for far-right agitation and popularity in Ireland

Climate Denialism and Far-Right Ideology

Overwhelming scientific consensus supports the premise that human factors are causing changes to the climate and many far-right groups and figures have aligned themselves with climate change denial or skepticism.[12] Laughary notes that in an American context, significant quantities of research documents the connections between climate denialism and conservative beliefs.[13] Political orientation is a major factor in the acceptance of climate change, accounting for double any other demographic variable.[14] One factor influencing this denial may stem from a desire to protect conservative and traditional values and rejection of changes to the status quo; conservatives and by extension proponents of far-right views are particularly sensitive to the notion of loss and maintenance of the status quo.[15] Fear of change or loss may thus be a driver of populism with stability sought in those rejecting progressive policies. Furthermore, it is argued that fear and uncertainty are centrally linked to the core convictions of political conservatives to resist change and justify inequality, especially to the extent that the status quo breeds inequality.[16]

Climate change denial could thus reflect an effort to protect the existing societal practices that serve wealthy and powerful nations and individuals, regardless of the negative effects that future generations may be facing.[17] This is addressed below.

The long history of climate change denialism on the right is likely to have unexpected, complicated effects on the future nature politics;[18] when those on the far-right review their stance on climate change, an (over)reaction is likely to result in an ecofascist (environmental fascist) stance as a means of overcorrection or as an asset to be exploited. This is covered in more detail in the next section.

It might be reasonable to argue that the resistance to change or maintenance of the status quo is linked to broader cynicism of government intervention, globalism, and scientific elites. Far-right politicians and movements in countries like the U.S.,[19] Brazil,[20] and parts

12 Matthew J. Hornsey, Emily A. Harris, Paul G. Bain, and Kelly S. Fielding, "Meta-Analyses of the Determinants and Outcomes of Belief in Climate Change," *Nature Climate Change* 6, no. 6 (2016): 622-626.
13 Danny Laughary, *Far-Right Environmentalism and it's Dangers* (Carlsbad: Uloop, Inc., 2022).
14 *ibid*
15 John T. Jost, Jack Glaser, Arie W. Kruglanski, and Frank J. Sulloway, "Political Conservatism as Motivated Social Cognition." Psychological Bulletin 129 no. 3 (2003): 364.
16 *Ibid*, 362.
17 Kirsti M. Jylhä and Kahl Hellmer, "Right- Wing Populism and Climate Change Denial: The Roles of Exclusionary and Anti- Egalitarian Preferences, Conservative Ideology, and Antiestablishment Attitudes," Analyses of Social Issues and Public Policy 20, no. 1 (2020): 317.
18 Sam Moore and Alex Roberts, *The Rise of Ecofascism Climate Change and the Far Right* (Polity, 2002), 5.
19 Millman, Oliver. 2023. "Trump falsely claims wind turbines lead to whale deaths by making them 'batty'". The Guardian. 26 Sept 2023. Available: https://www.theguardian.com/us-news/2023/sep/26/trump-whale-wind-turbine-renewable-energy-misinformation.
20 Sam Moore and Alex Roberts, *The Rise of Ecofascism Climate Change and the Far Right* (Polity, 2022), 54-56.

of Europe[21] have frequently rejected mainstream climate science, viewing it as a threat to national sovereignty or as a pretext for expanding government control over industry and the economy. Some far-right figures have close connections to fossil fuel industries, which see climate action as harmful to their profits. This economic interest drives political rhetoric downplaying the urgency of climate change.

Eco-Fascism and Environmentalism

Paradoxically, while many far-right groups deny climate change, others have embraced a form of *"eco-fascism."* This is an extremist ideology that merges far-right nationalism with environmental concerns but in a highly exclusionary and often violent manner.[22] Key features of eco-fascism include population control and exclusionary policies linked to nature and purity.

Some far-right extremists argue that overpopulation, particularly in the Global South, is a primary cause of environmental degradation leading to xenophobic and racist ideas about limiting immigration and population growth among certain ethnic groups. The fascist British National Party, for instance, declares itself the *"only true Green party"* in Britain based on it's conviction *"that overpopulation—whose primary driver is immigration . . . is the cause of the destruction of our environment."*[23]

Eco-fascists romanticise the connection between race and land, advocating for ethno-nationalist states that are supposedly better stewards of their environments[24] leading to violent rhetoric about preserving *"pure"* national environments from outsiders or migrants.

Some on the far-right have weaponised climate change as a motive for their extremist actions. Both the 2019 Christchurch Shootings and 2022 El Paso Texas Walmart mass killing cited environmental concerns alongside white nationalist beliefs before committing acts of far-right terrorism motivated by ecofascism, driven by a desire to rid their locale of unwanted invasive species[25] (immigrants).

Like many iterations of fascism, where authoritarian diktats are considered the norm and conducted for the *"good of the state"* regardless of effects elsewhere ecofascism as a kneejerk reaction to climate change would result in significant challenges for geopolitics. Former Brazilian President Jair Bolsonaro saw the Amazon as an asset for exploitation regardless of the impact on indigenous populations or global climate and saw external environmental activism as impacting Brazilian sovereignty. Populist leaders such as Donald Trump and

21 Elana Giordano and Karl Mathiesen, "Beset by fire and heat, Meloni's government flirts with climate denial," *Politico*, (2 Aug 2023), https://www.politico.eu/article/bgiorgia-meloni-italy-heat-summer-wildfires-climate-change-climate-denial/.
22 Sam Moore and Alex Roberts, *The Rise of Ecofascism Climate Change and the Far Right* (Polity, 2022).
23 Danny Laughary, *Far-Right Environmentalism and it's Dangers* (Carlsbad: Uloop, Inc., 2022).
24 *Ibid.*
25 Eszter Szenes, "Building Resiliency to Ecofascist Radicalisation: Preventing an Emerging Threat," *International Centre for Counter-Terrorism* (16 November 2023): 2.

Bolsonaro have played political football with the Paris Agreement, demonstrating disregard for the environmental impact of their decisions favouring economic and political gains.[26]

Opposition to Green Policies and Globalism

Far-right movements often frame international efforts to combat climate change, such as the Paris Agreement, as part of a broader "*globalist*" conspiracy to weaken nation-states, viewing global climate initiatives as infringing on national sovereignty. They argue that climate treaties are tools for transferring wealth and control from powerful nations to poorer ones, which feeds an anti-globalist and anti-immigrant rhetoric. Hess and Renner conclude

moderate conservative parties generally remain committed to climate-mitigation policy and renewable energy and energy efficiency policy, but there are some roll-backs of support, and there is variation in their support for fossil-fuel development. Far-right parties tend to show evidence of rejection of climate science, opposition to decarbonisation in general, support for natural gas hydraulic fracturing technologies, support for continued use of coal, and opposition to some types of policy favourable to renewable energy and energy efficiency.[27]

However, we should not assume an automatic linkage between far-right parties and opposition to energy-transition policies and assume that far-right parties will oppose all types of energy-transition policies.[28]

It may be reasonable to surmise that far-right political leaders and parties frequently oppose environmental regulations that they see as harmful to traditional industries. This opposition is part of a broader populist critique of the economic elites who benefit from globalisation at the expense of working-class citizens.

Migration and Xenophobia

Climate change is expected to lead to large-scale displacement, as people flee areas affected by extreme weather, droughts, and rising sea levels. Far-right groups often seize on the issue of migration, including climate-led migration to fuel anti-immigrant sentiment.

Far-right narratives may focus on the fear that increased immigration including that caused by climate change will strain resources such as water, food, and housing, leading to social unrest or conflict as evidenced in Ireland where the housing crisis is feeding vitriolic xenophobia.

26 Chris Saltmarsh, "How Real Is the Threat of Eco-Fascism?," *Tribune* (16 April 2022), https://tribunemag.co.uk/2022/04/eco-fascism-far-right-environmentalism-fossil-fuels.
27 David J. Hess and Madison Renner, "Conservative Political Parties and Energy Transitions in Europe: Opposition to Climate Mitigation Policies," *Renewable & Sustainable Energy Reviews* 104 (2019): 419.
28 Ibid.

Through the construction of a narrative, extremists claim that climate migration will lead to an influx of refugees, which they frame as a threat to national identity, security, and resources. Concurrently, we observe xenophobic narratives portraying migrants as opportunistic invaders rather than victims of climate disasters, with slogans like *"Ireland is full"* becoming utilised.[29]

Far-right populism exploits societies where the integration of migrant populations has been unsuccessful as a failure of migration rather than of government integration policies.[30]

Social and Economic Grievances

Far-right populism has also tapped into grievances around economic transitions associated with climate policies, such as the *"just transition"* from fossil fuels to renewable energy.

Vulnerable elements of society may embrace right-wing ideologies under some circumstances to reduce fear, anxiety, dissonance, uncertainty, or instability.[31] For example those employed in lower-skilled labour may find that there is increased competition from migrant populations for their work, thwarting upward mobility. Far-right movements exploit these fears by promising to preserve traditional industries and livelihoods, contrasting their positions with those of *"green elites"* advocating for climate action. Not all opposition to climate lead initiatives should be considered as emanating from the far-right, Ireland has seen resistance to the establishment of wind farms in various parts of the country ostensibly on the grounds of protecting natural beauty but there is no credible evidence that links these protests to far-right activism.

Climate change denial could thus reflect an effort to protect the existing societal practices that serve wealthy and powerful nations and individuals, regardless of the negative effects that future generations may be facing.[32] Similarly, progressive climate change policies may add economic costs to those already financially burdened and thus cause disenfranchisement of socio-economic groups, feeding a narrative that climate change is something that only the wealthy can afford. Climate science is seen as part of an elite agenda that restricts freedom and imposes environmental regulations. Far-right groups reject expert opinion in favour of populist narratives where it does not suit preconceived views or challenges their traditional views.[33]

As states face the challenges of addressing a threat from climate change and the far-right, it may seem reasonable to consider a binary position of *"winners"* and *"losers"*. The cost

29 *The Irish Times*, "Far-Right Ideas Creep into Irish Political Mainstream: Phrases Like 'Ireland is Full' were Once the Preserve of Fringe Elements. Now they are Everywhere," The Irish Times (23 December 2023).
30 Piotr Zagórski, Laura Díaz Chorne, and Javier Lorenzo Rodríguez, "A Virtuous Cycle? Migrant Integration Policies, Attitudes Toward Immigration, and Populist Radical Right Voting in Europe," *International Journal of Comparative Sociology* (2024).
31 John T. Jost, Jack Glaser, Arie W. Kruglanski, and Frank J. Sulloway, "Political Conservatism as Motivated Social Cognition," *Psychological Bulletin* 129 no. 3 (2023): 342.
32 Kirsti M. Jylhä, and Kahl Hellmer. 2020. "Right-Wing Populism and Climate Change Denial: The Roles of Exclusionary and Anti-Egalitarian Preferences, Conservative Ideology, and Antiestablishment Attitudes," *Analyses of Social Issues and Public Policy* 20, no. 1 (2020): 317.
33 Ibid, 319.

of failing to deal with a far-right, climate change denial threat is multi-faceted, ultimately with no actual winners, merely perceived benefactors. The growing split in voting preferences between younger and more mature electorates[34] is oxymoronic. The younger voters, grappling with the challenges of a cost-of-living crisis, voting for climate change skeptical far-right politicians have more to lose than the potentially more financially secure older demographics.

The far-right may also be seen as a source for venting frustration with government policies. In Germany, large far-right protest groups have regular rallies to *"vent their fury at immigration, coronavirus restrictions and military aid to Ukraine... The Greens are our main enemy; we don't want to tell people how to heat their homes. We don't want to tell people what kind of engine should be in their car."*[35] In that context, the linkage is clear, unfavourable government policies that may seem completely unrelated may become melded together in the minds of the politically disenfranchised who are seeking alternative routes to voice their concerns.

As green policies become more realised, impacting the lives of the already politically disenfranchised, governments may fear a 'greenlash' (backlash against green policies) further feeding far-right sentiment. The European Commission rolled back on much of it's Common Agricultural Policy (CAP) reforms for fear of a greenlash in the June 2024 elections. Ireland capitulated on water charges in 2017 after experiencing a greenlash. Traditionally, 'green' policies are strongly associated with liberal governments, hence as the contrary perspective, they can be seen as something that the far-right will rile against. Germany's AfD has benefited disproportionately, partly because it opposes the Greens' climate policies, which have become a growing source of voter resentment in the face of higher energy costs and a broader economic downturn,[36] a sentiment that Irish far-right parties have sought to replicate.[37]

The Far-Right Threat to Ireland

Having described the far-right and it's linkage to climate change, this article will now seek to establish what the threat of this far-right movement is to Ireland. As per the Introduction, the far-right is characterised by xenophobia, racism, nationalism, desire for a strong state, and an anti-democratic attitude coupled with a polarising, rhetorical strategy dividing society into antagonistic elements.

A polarised and divided society challenges Irish societal cohesion and tears at the fabric of our society. The far-right scapegoating of the other, the immigrant is at odd with much of Ireland's history. Domestically, Ireland throughout much of it's history since Independence, was a relatively homogenous society, typified by white Christians and net

34 Ngaire Woods, "Why young Europeans are embracing the far right," *Voices, University of Oxford* (28 June 2024), Accessed 03 November 2024, https://www.bsg.ox.ac.uk/blog/why-young-europeans-are-embracing-far-right.
35 Ajit Niranjan, "How climate policies are becoming focus for far-right attacks in Germany," *The Guardian* (30 April 2024).
36 Sheri Berman, "How Serious Is Europe's Anti-Democratic Threat?" (2024), Accessed 18 September 2024, https://www.project-syndicate.org/magazine/europe-right-wing-populist-parties-understanding-their-appeal-and-the-implications-by-sheri-berman-2024-06.
37 Irish Freedom Party, "Principles," Accessed 19 September 2024, https://www.irishfreedom.ie/principles/; Irish National Party. 2024, "National Party Principles," Accessed 18 September 2024, https://nationalparty.ie/principles/.

emigration. Much of that homogeny changed in the early to mid-2000s, when at the peak of the Celtic Tiger, coinciding with the May 2004 expansion of the European Union, Ireland became a destination country for new populations seeking to improve their opportunities in life. Ireland saw a net immigration of 320,000 people from 2004-2008 before seeing a net emigration of 107,800 from 2010-2014.[38] Ireland has since experienced another significant rise in net migration from 2021-2023 where some 208,600 people migrate to Ireland.[39] There are a number of drivers for the current wave of net migration, some of which may be accountable to a strong Irish economy attracting a return of Ireland's wild geese, a significant number of people seeking international protection from the ongoing conflict in Ukraine and elsewhere, and UK's hardened stance on immigration post-Brexit.

The ongoing levels of migration significantly challenge available resources such as housing,[40] feeding far-right anger and protest in line with the Climate Change and Xenophobia section above. However, can those seeking refuge from a war on Europe's doorstep be held liable for failed government policies in recent decades? Ireland, as a liberal democracy, must abide by it's international obligation, including the rights afforded under Article 14 of the 1948 Universal Declaration of Human Rights and the 1951 Refugee Convention.[41] Calls for unilateral rejection of these rights are in line with far-right concepts of authoritarianism and rejection of democratic values. There are hugely significant risks associated with shirking these obligations; failing to abide by international commitments would see a significant denigration of Ireland's reputation internationally and make other deals for economic or political gain more challenging and costly.

If far-right politics become increasingly popular in Ireland, it may become a threat to the liberal democratic values that have been the cornerstone of Irish civil values. Irish far-right parties are explicitly hostile to the EU, Ireland's foremost liberal alliance. The Irish Freedom Party *"believe that an exit from the European Union will permit the Irish People to take back control,"*[42] while the Irish National Party espouses *"an adversarial approach to the EU."*[43] Both narratives laden with disinformation, threaten Ireland's position in the centre of the largest economic and political alliance in our geographic region. Such a position would be detrimental to Irish economic success.

Conclusion

The relationship between far-right extremism and climate change is multifaceted. While many far-right groups engage in climate denialism and oppose environmental policies, others embrace eco-fascist ideas, blending nationalism and environmentalism in exclusionary and dangerous ways. Climate change has become a tool for far-right extremists

38 Central Statistics Office, "Ireland and the EU at 50," (2023), Accessed 17 September 2024, https://www.cso.ie/en/releasesandpublications/ep/p-ieu50/irelandandtheeuat50/society/migration/#:~:text=2000s,net%20migration%20can%20be%20observed.
39 *Ibid.*
40 Ian Curran and Jack Horgan-Jones, "Ireland's housing crisis 'on a different level' with population growing at nearly four people for every new home built," *The Irish Times* (15 August 2024).
41 Amnesty International, "The right to asylum," (2024), Accessed 19 September 2024, https://www.amnesty.org.uk/right-asylum#:~:text=These%20include%20the%20right%20not,to%20seek%20and%20receive%20asylum.
42 Irish Freedom Party. 2024, "Principles," Accessed 19 September 2024, https://www.irishfreedom.ie/principles/.
43 Irish National Party, "National Party Principles," Accessed 18 September 2024, https://nationalparty.ie/principles/.

to amplify xenophobia, anti-globalism, and anti-immigrant rhetoric, capitalising on fears of migration, economic insecurity, and resource scarcity. This dangerous mix of ideologies requires close attention as both climate change and far-right extremism continue to shape global politics.

This article has argued that climate change is but one of many factors driving the growth of far-right in Ireland and Europe. While Europe previously dealt with the fallout of far-right extremism in the 20th Century, the current far-right threat is different; stemming from different grievances and with differing objectives but left unchecked could tear European cohesion apart. There is a risk that the failure of governments to implement policies that address grievances of the far-right (where they are valid) may lead to a further rise in the far-right and the denigration of Ireland's hard-won liberal democracy.

The June 2024 Local and European elections saw a lot of media attention devoted to small numbers of candidates who largely failed to secure the mandates required to legitimise their politics. The impending Irish General Election will be a litmus test for the popularity of the far-right and will allow a further evaluation of the status of their political mandates and assess government progress on addressing the challenges of an emergent far-right.

Climate Stress and Human Security in Ireland's *Global Ireland* Foreign Policy Narrative

Dr Liam Coakley

Introduction

There has been a surge of interest in the impact that climate stress has on the international security landscape.[1] Academics from a range of disciplinary positions and policy-makers active in many different contexts have been exploring how climate-stress impacts on the conceptualisation and provision of security, in the 'real world'. There is a geography to this, of course. This engagement tends to feature more commonly in policy discourses emanating from privileged positions in the 'global north' than in equivalent narratives from the 'global south', and 'Western' states tend to link climate stress and territorial security more commonly than states in 'developing contexts.[2] Nevertheless, narratives of 'climate danger' have penetrated into the 'everyday' international security discourse and the 'climate stress – climate security' nexus is a common trope in many geopolitical policy domains.[3] This focus is not necessarily a uniformly positive development and an interest in 'climate security' does not always equate with a concomitant commitment to 'human security' but, as matters stand, 'climate stress – climate security' is a well-established theme in both the academic and applied policy literatures.[4]

Climate stress is particularly conceptualised as a physical threat-multiplier – most often in the realms of territorial security, resource management, human mobility, and political instability.[5] However, more complicated and contingent discourses are common as well. Many researchers and policymakers accept that climate stress cannot be effectively ameliorated by a simple discourse of territorial defence and security alone and Deudney's (1990) foundational caution against the unproblematised linkage of climate stress and state 'security' remains pertinent in 2024.[6] Unsurprisingly, many current engagements with 'climate security' are often nested in wider understandings of the necessary long-term "*complexity, preparedness, decentralisation and empowerment*" that is needed to combat notions of geographical inequality, at different scales – from the local to the global–and the impact of climate change is now commonly adjudged to extend far beyond the realm of the classically territorial actor, and to have longer-term consequences that cannot be easily offset by an immediate place-based 'securitisation-impulse'.[7]

This is complex conceptual territory and there is no clear consensus about the timescales involved. But, this conceptual framing highlights the scalar disconnect that exists in the policy space between primary conceptualisations of climate stress as a global process,

1 Judith Hardt, et. al., "The Challenges of the Increasing Institutionalisation of Climate Security," *PLOS-Climate* 3, no. 4 (April 2024): 1. See also, Ben Coxon. "The Big Ask – Is Climate Change the Most Fundamental Threat to British Interests"(2024) www.councilongeostrategy.com who considers climate stress to be a fundamental threat to the UK's security interests.
2 Alex Arnall, "Climate change and Security Research: Conflict, securitisation and human agency," *PLOS-Climate* 2 no.3 (2024). See, also D. McLaren and O. Corry "Our way of life is not up for negotiation!": Climate Interventions in the Shadow of 'Societal Security,' *Global Studies Quarterly* 3. 1-14. (2023): 10 for a further consideration of some North-South divergences.
3 Trung Thah Nguyen et. al., "Security Risks from Climate Change and Environmental Degradation: Implications for sustainable land use transformation in the Global South," *Current Opinion in Environmental Sustainability* 63 (2023).1.
4 Rita Floyd, "Global climate security governance: a case of institutional and ideational fragmentation," *Conflict, Security and Development* 15 no. 2 (2015): 120. See also, for example, Jurgen Scheffran et.al.'s, comprehensive volume on *Climate Change, Human Security and Violent Conflict* (2012) which includes many papers on the topic.
5 See, for example, Carol Farbotko, "Climate Change and National Security: An Agenda for Geography," *Australian Geographer* 94 no. 2 (2017): 248
6 Daniel Deudney, "The case against linking environmental degradation and national security," *Millenium-Journal of International Studies* 13 no. 3 (1990): 461
7 IJC Boas and Delf Rothe "From Conflict to Resilience? Explaining recent changes in climate security discourse and practice," *Environmental Politics* 25 no.4 (2016): 614.

beyond borders, and the ability of essentially territorial entities to respond. Yet much transnational climate 'danger' still tends to elicit a territorial response from states.[8] Current Irish foreign policy projection is no different. It frames climate danger as an existential threat beyond territorial security, whilst, at the same time, deploying an essentially place-based response-imaginary.

Despite an engagement with some *"genuinely progressive, laudable climate policies,"*[9] Ireland is generally deemed to have a poor climate-animation record, at home. Torney and O'Gorman, two respected commentators on matters of climate stress, certainly hold this to be true, when they state that Ireland has been *"consistently a climate laggard."*[10] As Fitzgerald et.al. state, impactful climate policies often tend to be stifled underneath an overall narrative projection and Ireland has been slow to enact transformative change, locally.[11] That said, Ireland has been active in the international sphere. For example, Ireland has called for the recognition of *"climate-related security risks in the maintenance of international peace and security"* at the UNSC.[12]

This short note reports on one aspect of this national projection–the current *Global Ireland* policy platform—and points to some relevant tensions in the narratives being presented.[13] Human-induced climate stresses are referenced in a range of different policy modules and Ireland is discursively constructed as a potential partner for countries grappling with the realities of climate change. Whilst an ecosystem of related geo-locational conceptual devices is deployed in the service of this discursive positioning, Ireland's self-presentation includes, surprisingly, a projected ability to assist other 'small states' in fostering greater adaptation and resilience in the face of climate stress.[14] Irish military experience/expertise is sometimes harnessed in this narrative projection but *Global Ireland* treats of climate stress as a long-term ecosystem of 'soft-threats', going forward, rather than as an easily definable short-term 'hard-threat' that can be addressed using conventional security/defence inputs alone, and Ireland adopts a conceptually forward-facing disposition in support of human security in the global commons.[15]

8 Magnus Benzie and Asa Persson, "Governing Borderless Climate Risks: Moving Beyond the Territorial Framing of Adaption," *International Environmental Agreements* 19 (2019): 381

9 https://www.irishtimes.com/environment/climate-crisis/2023/11/06/climate-change-the-great-contradiction-in-irelands-response-to-a-warming-world/

10 Diarmuid Torney and Roderic O'Gorman, "A laggard in good times and bad? The limited impact of EU membership on Ireland's climate change and environmental policy," *Irish Political Studies* 34 no.4 (2019): 589.

11 Louise Fitzgerald, Paul Tobin, Charlotte Burnes, and Peter Eckersley, "The Stifling of New Climate Politics in Ireland," *Politics and Governance* 9 no2. (2021). 47.

12 United Nations Security Council, Open debate on Climate Change, Peace and Security, (13th June, 2023). https://www.ireland.ie/en/un/newyork/news-and-speeches/security-council-statements/united-nations-security-council-ministerial-open-debate-on-climate-change-peace-and-security/

13 '*Global Ireland—Ireland's Global Footprint to 2025'* is Ireland's current national policy projection into the global commons. Initially launched in 2018, this integrated policy platform includes a variety of different policy modules and aims (somewhat hubristically) to "double the scope and impact of Ireland's global footprint to 2025." See https://www.ireland.ie/en/global-ireland-strategies/global-ireland-irelands-global-footprint-to-2025/

14 See Liam Coakley, "Irish Diaspora and soft power projection," *Space and Polity*—early assess (2024). https://doi.org/10.1080/13562576.2024.2412579 and Liam Coakley, "The Global Ireland Policy Platform, Small Island Developing States and the geopolitics of an interstitial Ireland," (under review). Submitted to *Irish Geography* (2 October 2024).

15 Of course, one could argue that this construction of climate stress as a factor in long-term human 'soft-security' rather than as a factor in more immediate territorial 'hard-security' concerns simply reflects the Government of Ireland's recognition of our relative inability to yield hard power, internationally. Ireland's military apparatus certainly has only a limited projective 'joint force' capability. Academic literature does support the view that an actor's self-perception of weakness (in any arena of action) does determine the types of discourses adopted. But, Irish policy projection is consistent across a number of current domains and it is reasonable to suggest that Ireland is adopting this posture proactively, on foot of a real conceptual investment, rather than reactively, as a function of self-perceived weakness.

The 'Global Ireland' Policy Platform and Climate Stress

Irish foreign policy projection has historically presented Ireland as a well-networked and active member of the international rules-based order but Ireland's current *Global Ireland* policy platform also finds traction for Irish geopolitical positioning in a wide range of geographical markets beyond the dominant trans-Atlantic axis of influence commonly associated with Ireland and Irish interests. For example, the *Global Ireland* policy platform contains regionally-dedicated modules targeting the Asia-Pacific 'mainland', the continent of Africa, the Middle East, and the group of small states commonly grouped under the 'SIDS' heading. Whilst the EU has been engaged in a none-too-subtle reach-out to many small places, more generally[16] and whilst Irish geopolitical potentialities remain very firmly anchored in it's status as an EU member of long-standing and as a strong supporter of the 'rules-based global order', here the Government of Ireland is seeking to project a positive national image in contexts beyond it's core constituency and 'earth-bound' state.

This policy projection is impressive. Ireland presents itself as an experiential/thought leader for many other small states, at the level of the globe. Articulated positions are presented fuzzily and include differential narratives of i) small open economy and networked trading partner in the neo-liberal economy, ii) EU member and experienced insider in the rules-based economy, iii) 'honest-broker' in world of international relations, predicated on a non-coercive history, iv) post-colonial/post-conflict small state actor, v) peripheral edge-Island in the global north, vi) diasporic hub at the heart of a global emigrant community. Ireland is, in this, imagined as an interstitial location in the global commons. At once, a country with locational power encapsulated in it's membership of the rules-based order and a peripheral free-actor capable of independence of thought and action as a consequence of it's small size, 'real-time' political marginality from the core states of the global north and it's non-coercive post-colonial/post-conflict experience of geopolitical 'weakness'. It is a fluid 'narrative of self' that enhances Ireland's ability to act in different geographical contexts and an impressively performative political geography.

A meta-level narrative of climate danger is presented, across the Global Ireland policy platform. Some illustrative examples include The Global Ireland—Ireland's strategy for Africa *to 2025*' module—which is replete with references to both climate stress and security need. Indeed, this module neatly frames the development of Ireland's relations with countries in Africa in terms of *"challenges"* complicated by *"major issues such as conflict, fragility and climate change"* before going on to outline an integrated ecosystem of inputs designed to support and sustain human security on the continent.[17] Illustrative statements are made under the United Nations Sustainable Development Goals (UN SDG) heading. Here, the government of Ireland commits, variously, to focus on *"reducing fragility"*, *"ensure resources to tackle climate change are made available"* and developing regional approaches to *"climate change mitigation and adaptation."*[18] Whilst these strategies are anchored in civil

16 Erwan Lannon, "The European Union and Small Island Developing States: The Geo-political/legal, Trade and Cooperation Dimensions," *Oasis* 37 (2022).139-169.
17 Government of Ireland, *Global Ireland—Ireland's strategy for Africa to 2025* (2019), 3 and 9. https://www.ireland.ie/en/global-ireland-strategies/irelands-strategy-for-africa-to-2025/.
18 Ibid 13.

society organizations, some mention is made of Ireland's defense forces. For example, under the module's 'effective EU partnership' heading, *Global Ireland* commits to support *"peace operations through contributions of civilian and Defense Forces personnel."*[19]

Global Ireland–Ireland's strategy for Latin America and the Caribbean to 2025 – which contains a range of similar constructions, particularly in modules focused on countries in the Caribbean. The language of global threat and challenge is common here as well and Ireland commits to support countries in this region to address matters of conflict resolution, migration, food security, and the blue economy. Emphasis is placed on the particularities of extreme weather events. For example, the Government of Ireland commits to support and develop financial instruments and agreements such as the Caribbean Catastrophe Risk Insurance Facility (CCRIF) and wider financial services that will impact a country's ability to respond to *"climate change."*[20] Overall, Ireland is presented as a country willing to partner with others to address the impacts of climate stress and the blue economy.

Global Ireland: Ireland's second strategy for partnership with Small Island Developing States to 2026 – which variously references Ireland's: i) partnership with SIDS on matters of *"climate and security and the protection of civilians during armed conflict"*, ii) *"role in international discussions on climate"* that is deemed to have had a particularly impactful influence and iii) support for *"SIDS global leadership on climate action and sustainable ocean development."*[21]

This policy module is particularly illustrative of the Government of Ireland's engagements with what it terms it's *"international climate diplomacy"* priorities: specifically – under the headings of adaptation and loss and damage, oceans and biodiversity, and tellingly, climate and security.[22] *Global Ireland* particularly recognizes the fact that many oceanic environments are now moving beyond the limits of their ability to adapt to climate change and that many SIDS and big ocean states are likely to bear the significant consequences, as a result.

Global Ireland: Delivering for the Asia Pacific Region to 2025- where Ireland is presented as a country with experience in matters of climate risk and resilience, particularly for the consumption of people in countries in the wider Pacific Zone. Initiatives such as the Government of Ireland's 'Trust Ireland Fund' specifically seek to assist impacted countries develop their own resilience to *"climate change and natural disaster."*[23]

In no part of this projection is Ireland presented as a country with an internationally operational reach in matters of security policy.[24] Ireland's experience in the provision of

19 Ibid 14.
20 Government of Ireland, Global Ireland—Ireland's Latin America and Caribbean Strategy to 2025 (2022). 11 https://www.ireland.ie/en/global-ireland-strategies/lacstrategy
21 Government of Ireland, Global Ireland—*Ireland's second strategy for partnership with Small Island Developing States (2023).*
22 Government of Ireland, Global Ireland—*Ireland's second strategy for partnership with Small Island Developing States (2023).*
23 Government of Ireland, *Global Ireland—Delivering for the Asia Pacific Region to 2025 (2020).* 6. https://www.ireland.ie/en/global-ireland-strategies/delivering-in-the-asia-pacific-region-to-2025/
24 That said, the Defence Forces have a clear role to play, as is illustrated, for example, during the Naval Service's operational 'military-disaster-response' role in the Mediterranean (see Vogler, "On (in)secure grounds: How Military forces interact with global environmental change," *Journal of Global Security Studies* 9 no. 1(2024): 1.

UN-mandated peace-keeping does occasionally feature in this narrative construction but Ireland has never been a coercive state and is not presented as such. In any case, the ability to project such 'hard power' is not central to the wider broadly security-focused message being sent here. With Global Ireland, the Government of Ireland recognizes that, for many in the global south, particularly amongst the group of countries termed SIDS and 'large ocean states', the prospect of continuing climate change does not prompt a simple issue-specific security stress but rather much more fundamental awareness of climate stress as an existential threat to life. Ireland's current engagement with the prospect of climate stress therefore eschews any narrow definition of climate stress as mere security-multiplier. It is seen to be much bigger than that and, in Global Ireland, climate security is couched in a wider ecosystem of long-term awareness rather than in a narrow definition of climate action as a strategy of 'future threat-reduction'. In this, Ireland's posture reflects a strong engagement with the prospect of climate change beyond a simple territorial framing of the 'problem'. Pre-emptive anticipatory inputs are valorised here, over a reactive securitisation, in the hope of supporting currently climate-vulnerable states' resiliences and avoiding any future, downstream destabilizations, internationally.

If we imagine that national security is best defined, in realist terms, as *"the territorial preservation of the state and the protection of it's sovereignty,"* it might be possible for a country such as Ireland to remain disengaged from these threats, in it's territorial context.[25] However, the extra-territorial nature of environmental change and it's impacts necessitates a different posture – one that extends beyond the specificities of a country's geo-location, and Ireland is well served by a foreign policy projection that extends far beyond our immediate position in the global north.

We are well-positioned to deploy such a global vision. Emigration from Ireland has bestowed a huge potential human resource base and Ireland's diasporic footprint extends into almost every region in the world. Sensibilities of Ireland are concomitantly 'stretched' across the globe and we can reasonably consider ourselves to be an international presence, in this regard. Ireland's ability to harness what elements in the UK government used to (but not anymore) disparagingly refer to as 'shamrock diplomacy' is illustrative of this experiential reach and Ireland can, with some confidence, hold itself as an effective soft power in this regard—largely on foot of our diasporic penetration beyond our historically dominant foundational norm in the trans-Atlantic zone. In this way, many key agents of Ireland's national security extend beyond the Defence Forces, per se, to include the range of actors leveraged in *Global Ireland* and their projections of thought leadership in support of Ireland's current reach out, into the global commons.[26]

25 Matt MacDonald, "Fit for Purpose: Climate Change Security and IR," *International Relations*—online first (2024). https://journals.sagepub.com/doi/epub/10.1177/00471178241268270. Of course, accepting that current predictions of imminent AMOC collapse would likely impact the nature of life in Ireland (see, for example, Ditlevsen and Ditlevsen, "Warning of a forthcoming collapse of the Atlantic meridional overturning circulation," *Nature Communications* 14 (25 July 2023). file:///C:/Users/liamc/Downloads/s41467-023-39810-w.pdf
26 Matt MacDonald, "Discourses of Climate Security," *Political Geography* 33 (2013): 42.

Conclusion

With *Global Ireland*, Ireland seeks to leverage it's international experience in it's self-presentation as a viable experiential/thought leader for other 'small states'—most particularly in the global south. This foundational breath structures the issues-based narratives that are presented and a wide thematic pallet is referenced. Despite having a relatively poor record of climate engagement itself, climate stress reduction is a commonly included theme. However, whilst presented as a pressing issue-set, in itself, it is given increased axiological meaning through it's repeated narrative scaffolding by matters of geopolitical fragility, insecurity, and conflict, in different parts of the world. The meta-level message is clear. Climate security and human security are indivisible.

Of course, this primary recognition brings a core tension into relief. Specifically, how can an extra-territorial motive force be ameliorated effectively in a spatially-bounded manner, at the territorial scale? This is, perhaps, too big an issue to be addressed by a small state such as Ireland. There have been few effective attempts to foster a borderless pattern of climate governance, globally. It is, "*perhaps a step too far*" in 2024.[27] But, countries such as Ireland do continue to impact positively in this space, through the support offered to countries at more immediate risk, albeit in a classically place-based manner.

27 Benzie and Persson, "Governing borderless climate risks: Moving beyond the territorial framing of adaptation," *International Environmental Agreements* 19 (2019): 386.

Securitising Food: Hunger As a Defence Requirement

Siena Cicarelli

Abstract

From the war in Ukraine to impending famine in Gaza to pastoralist violence in West Africa, food insecurity is increasingly recognised as a *"threat multiplier"* and core national security challenge. While many of these current dynamics are driven by the deliberate weaponisation of food, a larger challenge is looming: the impacts of climate change on the world's already fragile agri-food systems—and the role of defence forces in addressing them. This article assesses the risks and challenges related to a securitised food system, the implications for military operators, and how actors in the U.S. and Europe—including the Irish Defence Forces—can better respond to the national security implications of hunger.

Introduction

From the collapse of global supply chains after Russia's invasion of Ukraine to severe food insecurity in Gaza, food security—and the potential weaponisation of food—is more firmly on the minds of policymakers than ever before. Food has long been an underlying factor in conflict and instability, but recent statistics about global hunger are staggering in context. The United Nations (UN) currently projects that *"583 million people will be chronically undernourished at the end of the decade and that more than half of them will be in Africa,"* and recent reporting further highlights the prevalence of acute food insecurity in conflict zones and the billions in multilateral resource gaps needed to address these trends.[1]

Despite a growing body of research about the hunger-climate-conflict nexus[2], and the increase in military responses to climate hazards[3] defence institutions have historically struggled to both understand the security implications of food access and consider the issue as an operational requirement. Furthermore, even amongst the most climate-literate Joint Forces, an underlying fear of mission creep and political prioritisation of *"hard"* national security challenges have further stymied climate action. For the United States in particular, the legacy of failed missions, such as the 1992-1994 intervention to prevent famine in Somalia that ultimately led to the death of dozens of American soldiers, further supports a largely hands-off military approach to food insecurity.[4]

Indeed, past responses to climate change and hunger have been dominated by development and diplomatic institutions, with the defence sector serving in a predominately ad-hoc, logistics-focused support role. Despite an increasingly dangerous operating environment,[5]

1 Food and Agriculture Organization of the United Nations (FAO), et al., "The State of Food Security and Nutrition in the World 2024–Financing to End Hunger, Food Insecurity and Malnutrition in All it's Forms," (24 July 2024), https://www.wfp.org/publications/state-food-security-and-nutrition-world-sofi-report-2024.
2 Ellen Messer and Marc J. Cohen, "Understanding and Responding to the Links between Conflict and Hunger," *Development in Practice* 21 (2011): 481–87, doi:10.1080/09614524.2011.562281.
3 Center for Climate and Security, "Military Responses to Climate Hazards (MiRCH) Tracker–the Council on Strategic Risks," councilonstrategicrisks.org, May 31, 2023, https://councilonstrategicrisks.org/ccs/mirch/.
4 United States Army Center of Military History, "United States Forces, Somalia after Action Report and Historical Overview: The United States Army in Somalia, 1992–1994," (Washington, D.C.: Department of the Army, 2003), https://www.history.army.mil/html/documents/somalia/SomaliaAAR.pdf
5 "On World Humanitarian Day, a More Dangerous World for Humanitarians | Statement by Administrator Samantha Power," U.S. Agency for International Development, (19 August 2024), https://www.usaid.gov/news-information/press-releases/aug-19-2024-world-humanitarian-day-more-dangerous-world-for-humanitarians#:~:text=The%20United%20Nations%20recently%20described.

these development and diplomatic institutions have been reticent to broaden their programming and increase military involvement in humanitarian or civilian-centred missions, largely due to concerns about securitising food, exacerbating local instability dynamics, or losing their humanitarian neutrality.

However, there is now an unavoidable demand signal from governments and affected populations for militaries to step up their planning, training, and response to interrelated climate factors such as food insecurity. In today's securitised food environment, planners and policymakers must move beyond the *"so what"* (how hunger threatens stability) and grapple with the *"now what"* (how planning and resourcing should evolve). This article attempts to define the *"now what"*, identifying the challenges in transitioning toward a whole-of-government food security approach as well as implications for military resourcing, training, and force posture.

The Nexus of Food and National Security

Before examining the implications for policy making, resourcing, and force requirements, it is important to briefly define the *"so what?"*—how the nexus between food, climate, and conflict affects military actors, and why food should be at the centre of future policy responses.

There is a clear—and increasingly well-documented—connection between food insecurity and conflict. Conflict is the main driver of modern food insecurity, and the two often exist in a vicious feedback loop, with conflict straining fragile supply chains and damaging agricultural resources, and hunger driving civilians to engage in ad-hoc violence or formally align with armed non-state actors as a means of survival.[6] Reports from the UN World Food Programme in 2023 emphasise this connection, identifying a few consistent patterns in the food-conflict nexus that include the links between drivers of hunger (such as crop yields) and types of instability and conflict (such as protests and civil war), and the central role of the climate crisis in modern conflict and food insecurity.[7]

On the ground, the latest UN reports support the body of academic research, identifying the overlap between the top countries in terms of population affected by acute food insecurity (Afghanistan, Democratic Republic of Congo, Ethiopia, Nigeria, Syrian Arab Republic) and those in protracted conflict.[8] While the strongest case studies on the food-national security nexus centre on spikes in farmer-herder conflict as a result of droughts in Central Africa, other oft-cited examples studied include increased violence by the government and rebels in Syria during dry growing seasons ahead of the Arab Spring,[9] and

6 Chase Sova and Eilish Zembilci, "Dangerously Hungry: The Link between Food Insecurity and Conflict," *Center for Strategic and International Studies (CSIS)*, (21 April 2023), https://www.csis.org/analysis/dangerously-hungry-link-between-food-insecurity-and-conflict.
7 Chase Sova et al., "Dangerously Hungry: The Link between Food Insecurity and Conflict" (Washington, D.C.: World Food Programme USA, 2023), https://www.wfpusa.org/wp-content/uploads/2023/04/Dangerously_Hungry_WFPUSA_Digital_Report.pdf.
8 FAO, et al., "The State of Food Security and Nutrition."
9 Femia, Sternberg and Werrell, "Climate Hazards, Security and the Uprisings in Syria and Egypt," *Seton Hall Journal of Diplomacy and International Relations* XVI, no. 1, (Fall/ Winter 2014): 71-84, https://climateandsecurity.org/wp-content/uploads/2012/04/femia_sternberg_werrell_seton-hall-journal-of-diplomacy.pdf.

the relationship between more valuable export crops and insurgency in the Philippines.[10] In all these examples, food serves as a so-called "*threat multiplier*", exacerbating other instability factors like socioeconomic inequality, ethnic tensions, and weak institutions. Left unchecked, volatility in food availability and pricing can serve as the tipping point for political violence and conflict. Furthermore, today's increasingly divided geopolitical environment, demonstrated by the food price fallout from Russia's invasion of Ukraine, only amplifies the correlation between food and instability.[11] Food therefore sits at the centre of any whole-of-government policy response to manage the impacts of climate change and prevent instability—a shift from the current status quo.

For defence departments, food security requirements will only increase as supply chains and traditional growing patterns are strained and fractured by extreme weather events. Militaries are already being called upon as ad-hoc food security actors in climate-vulnerable Asian countries, with Indonesia's military helping farmers plant rice amidst a severe El Niño drought,[12] Pakistan's army taking over more than 1 million acres of farmland to grow food,[13] and an entire regiment of China's military planting trees to combat air pollution.[14] Coalitions of Western militaries have been part of a global food security response as well, with the most recent example being air drops of aid to support Palestinians facing a food crisis in Gaza.[15]

Even now, policymakers and military planners can see the role that hunger plays in their Area of Responsibility (AOR). For example, in Central Africa and the Sahel, shifts in farmer-herder dynamics can have implications for counter-terrorism efforts, peacekeeping deployments, and resourcing to regional military structures like the United States Africa Command (USAFRICOM). The cascading effects of food security touch upon nearly every national security dimension, dimensions that fall squarely within the mission and responsibilities of defence forces. This increased attention has resulted in more high-level climate and food security policy than ever before, as exemplified by myriad strategies on climate from the U.S. Department of Defense,[16] as well as a comprehensive climate security approach[17] and report on food insecurity[18] from NATO.

10 Chase Sova et al., "Dangerously Hungry: The Link between Food Insecurity and Conflict" (Washington, D.C.: World Food Programme USA, 2023), https://www.wfpusa.org/wp-content/uploads/2023/04/Dangerously_Hungry_WFPUSA_Digital_Report.pdf.
11 Caitlin Welsh, "Russia, Ukraine, and Global Food Security: A Two-Year Assessment," *Center for Strategic and International Studies (CSIS)*, (27 February 2024), https://www.csis.org/analysis/russia-ukraine-and-global-food-security-two-year-assessment.
12 Lipika Pelham, "Indonesia Asks Military to Help Farmers Plant Rice," BBC News (14 December 2023), https://www.bbc.co.uk/news/world-asia-67714637#:~:text=Indonesia%27s%20president%20has%20ordered%20the.
13 "From Tanks to Tractors: Pakistan Army Taking over 1 Million Acres of Land to Grow Food," The Times of India, (25 September 2023), https://timesofindia.indiatimes.com/world/pakistan/from-tanks-to-tractors-pakistan-army-takes-over-1-million-acres-of-land-to-grow-food/articleshow/103931334.cms.
14 Laura Oliver, "China Has Sent 60,000 Soldiers to Plant Trees," World Economic Forum, (16 February 2018), https://www.weforum.org/agenda/2018/02/china-army-soldiers-plant-trees/.
15 UK Ministry of Defence, "UK Forces Airdrop over 10 Tonnes of Food Supplies to Civilians in Gaza," GOV.UK, (26 March 2024), https://www.gov.uk/government/news/uk-forces-airdrop-over-10-tonnes-of-food-supplies-to-civilians-in-gaza#:~:text=UK%20Forces%20airdrop%20over%2010%20tonnes%20of%20food%20supplies%20to%20civilians%20in%20Gaza.
16 U.S. Department of Defense, "DOD Climate Resilience Portal," accessed (14 August 2024), https://www.climate.mil/.
17 North Atlantic Treaty Organization (NATO) , "Environment, Climate Change and Security," NATO, (18 July 2024), https://www.nato.int/cps/en/natohq/topics_91048.htm.
18 Julie Dzerowicz, "Food Security and Conflict: Harvesting Resilience in the Face of a Global Crisis" (North Atlantic Treaty Organization (NATO) , (7 October 2023), https://www.nato-pa.int/download-file?filename=/sites/default/files/2023-10/016%20CDS%2023%20E%20rev.%202%20fin%20-%20FOOD%20SECURITY%20-%20DZEROWICZ%20REPORT.pdf.

There is a clear national security interest in consistently addressing food insecurity, climate change, and instability together—and a role for the military in this policy response moving forward.[19] It is only a matter of time before ad hoc food security response becomes a core military requirement—either via increased hunger amongst the Joint Force, increased operational requirements abroad, or cascading effects on other national security mission sets like counterterrorism and peacekeeping.

Barriers for Governments and Their Armed Forces

Despite a growing recognition of the food-conflict nexus, critical barriers remain in translating existing rhetoric and high-level doctrine into action. For armed forces in particular, military leaders face three core challenges in meaningfully addressing the national security implications of hunger and food insecurity.

The primary challenge is internal to the Joint Force. While most military actors understand the role that food and climate plays in their mission set, the current hurdle is reaching the "*now what?*"—identifying ways that militaries are affected and what steps they can take to mitigate this impact. For example, if a famine is affecting the stability of a key partner, what should the military do to complement the work of other actors on the ground? Can existing military-military training programs and security arrangements be expanded to incorporate these challenges? Should the military plan for more HADR deployments? From where can additional resources be borrowed and what is the end state that they'd be looking to achieve with these missions? These questions are complicated by the fact that climate issues are still relatively deprioritised in most national security enterprises, with internal critics arguing that they fall outside the military mandate and set of authorities. Changing this dynamic will require more top-down direction, clearer case studies on the "*now what?*" for military actors, and a concerted effort to build a climate-literate Joint Force.

The second challenge for armed forces is existential, centred on the broader securitisation debate. As seen in other issue sets like migration and gender, critics have warned against the over-securitisation of climate change and it's impacts. These critics rightfully point to the potential harmful effects of a military charged with protecting agricultural assets and natural resources, particularly the likelihood that their involvement might hamper access to what has been defined in international law as a fundamental human right[20] and unnecessarily ratchet up tensions with non-state actors in already vulnerable contexts. However, others involved in the debate have highlighted that, particularly in the Western context, securitisation drives political attention and resources, and simply reflects an inevitable trend in the current HADR environment. For military actors, there is a clear benefit to understanding this debate and working to mitigate any negative effects of their presence during civilian-centred missions. Certainly, climate impacts such as extreme

19 "Feeding Resilience: Climate Change and Food Insecurity Impacts on U.S. National Security," The Council on Strategic Risks—Anticipating, Analyzing, and Addressing Systemic Risks, (17 July 2023), https://councilonstrategicrisks.org/ccs/feedingresilience/.
20 "About the Right to Food and Human Rights," Special Rapporteur on the Right to Food (United Nations Human Rights Office of the High Commissioner), accessed (16 August 2024), https://www.ohchr.org/en/special-procedures/sr-food/about-right-food-and-human-rights.

weather events and droughts are first and foremost a humanitarian challenge. The international response has therefore been civilian-led, with the humanitarian sector in a symbiotic—albeit contentious—relationship with military and security actors. However, humanitarian support to many emergency and disaster situations relies on military capabilities such as strategic air and sealift, engineering, and supply chain logistics. As humanitarian workers are increasingly the explicit targets for violent actors, security sector actors are also leveraged to create an environment that is safe to deliver aid in. As humanitarian needs and instability continue to increase, so will the demand for HADR-related military capabilities and support to local populations.

Finally, once the issue has traction within defence departments, the third (and potentially most daunting) challenge to navigate will be aligning any military action with the existing policies in the broader interagency bureaucracy–and generating the necessary funding and authorities to implement a response. Actors in the U.S. and Europe already have ambitious food security agendas in place, including efforts like Feed the Future[21] and Food Vision 2030.[22] However, these agendas are often implicitly or explicitly disconnected from the defence and security sectors, further reinforcing the silos between the institutions that address food insecurity and HADR, and those working on *"hard"* security issues like inter- and intra-state conflict. For example, Feed the Future, the U.S. government's flagship food security initiative, doesn't count the U.S. Department of Defense or U.S. Intelligence Community amongst it's interagency partners, leaving out a significant portion of the government's resources and strategic foresight capabilities.[23] Similarly, food security policy efforts such as Ireland's Feed the Future 2030, G20 Matera Declaration, and EU Agricultural Policy initiatives, remain siloed to the development, diplomatic, and agricultural sectors.

Overall, the growing recognition of food as a national security issue is a critical first step. But this recognition must be paired with a whole-of-government effort to shift resource allocation and planning processes. Unless governments can navigate this transition, food security considerations will remain under-integrated into national security planning and siloed between different agencies.

While Ireland's Defence Forces will likely be less impacted by these dynamics than resource-rich militaries in the U.S. and mainland Europe, two of it's core competencies are directly tied to climate change and food security: peacekeeping and humanitarian relief operations and civil duties such as natural disaster response. Furthermore, given the persistent recruitment and manning deficits within the Defence Forces,[24] further contributions to peacekeeping or humanitarian relief operations may be simply prevented by limited resources. Absent changes to the recruitment structure, the Defence Forces

21 "Feed the Future | Improving Food Security & Nutrition around the World," Feed the Future, February 23, 2018, https://www.feedthefuture.gov/.
22 "Food Vision 2030 – a World Leader in Sustainable Food Systems" (Department of Agriculture, Food and the Marine, (2 August 2021), https://www.gov.ie/en/publication/c73a3-food-vision-2030-a-world-leader-in-sustainable-food-systems/.
23 "Our Partners–U.S. Government," Feed the Future, (24 February 2022), https://www.feedthefuture.gov/partnership/us-government/.
24 Eoin Micheál McNamara, "Ireland's Defence Deficit," The Royal United Services Institute for Defence and Security Studies, (21 December 2022), https://www.rusi.org/explore-our-research/publications/commentary/irelands-defence-deficit.

may find themselves without the manpower to carry out food and climate-related missions. Their ad-hoc contributions to natural disaster response within Ireland's borders will face the same challenges, as climate change is expected to intensify heavy rainfall and coastal flooding[25] and change Ireland's ability to both import and produce food.[26] Beyond these immediate-term impacts, most core competencies of the Defence Forces will be affected in the long term, such as changing requirements for fisheries management or other civil support activities. All of these require immediate planning for how climate change and food insecurity will affect missions and begin shifting resources, recruiting, global partnerships, and training accordingly.

Long-Term Implications for Operational Demand

Today's complex crises require more civil-military coordination than ever before, as seen in the interagency support during hurricanes and earthquakes in the Bahamas and Haiti, and in managing large numbers of refugee inflows in Australia and Europe.[27] A record 300+ million people[28] need assistance, straining the financial and people resources of humanitarian actors.[29] Food security efforts are not exempt from these patterns. In 2023, the World Food Programme had an unprecedented funding shortfall, raising just $7.5 billion of it's $23.5 billion projected operating costs,[30] and broader global hunger funding gaps reached 65%, a 23% increase from the previous year.[31] In comparison, despite domestic budget challenges, military expenditures increased across all geographic regions, reaching the highest levels ever recorded.[32] In short, military actors increasingly have the competencies and financial resources that humanitarian actors need to support those most in need. While these dynamics won't shift the balance of power away from civilian agencies,[33] they indicate a stronger role for militaries in a whole-of-government food security response.

From a resource perspective, requirements for manning will shift as extreme weather events continue to impact global stability. As discussed above, this could include more HADR deployments, but may also change peacekeeping requirements as a direct result of spiking hunger, particularly on the African continent. Many of today's active peacekeeping

25 Colin Manning et al., "Compound Wind and Rainfall Extremes: Drivers and Future Changes over the UK and Ireland," *Weather and Climate Extremes*, (1 April 2024), 100673–73, https://doi.org/10.1016/j.wace.2024.100673.
26 Andi Wilson, "Can Ireland Feed Itself? Options for Greater Food Security in a Climate Changed World," The Sustainability Institute, (15 November 2019), https://assets.gov.ie/136224/c6ad4361-5569-4772-9d58-e2a1730d9d87.pdf.
27 Myriame Bollen and Jori Pascal Kalkman, "Civil-Military Cooperation in Disaster and Emergency Response: Practices, Challenges, and Opportunities," *Journal of Advanced Military Studies* 13, no. 1 (26 April 2022): 79–91, https://doi.org/10.21140/mcuj.20221301004.
28 United Nations Humanitarian Affairs, "Record Numbers of People Need Humanitarian Assistance" (United Nations: Information Service Vienna, 2023), https://unis.unvienna.org/unis/en/topics/related/2023/humanitarian-need.html#:~:text=One%20in%2022%20people%20around.
29 United Nations Office for the Coordination of Humanitarian Affairs, "Global Humanitarian Overview 2024," www.unocha.org, (11 December 2023), https://www.unocha.org/publications/report/world/global-humanitarian-overview-2024-enarfres.
30 WFP Staff, "2023 in Pictures: Ration Cuts Threaten Catastrophe for Millions Facing Hunger," World Food Programme, (19 December 2023), https://www.wfp.org/stories/2023-pictures-ration-cuts-threaten-catastrophe-millions-facing-hunger.
31 Meril Cullinan, "Global Hunger Funding Gap Hit 65% for Neediest Countries," Action Against Hunger, (16 January 2024), https://www.actionagainsthunger.org/press-releases/global-hunger-funding-gap-hit-65-percent-for-neediest-countries/.
32 Nan Tian et al., "Trends in World Military Expenditure 2023," *Stockholm International Peace Research Institute* (April 2024), https://www.sipri.org/sites/default/files/2024-04/2404_fs_milex_2023.pdf.
33 UN Office for the Coordination of Humanitarian Affairs, "Guidelines on the Use of Military and Civil Defence Assets in Disaster Relief–'Oslo Guidelines,'" ReliefWeb, (November 2006), https://reliefweb.int/report/world/guidelines-use-military-and-civil-defence-assets-disaster-relief-oslo-guidelines.

deployments have a food security dimension, from peacekeepers teaching sustainable agricultural practices under the UN Mission in South Sudan (UNMISS)[34] to supporting water security via the United Nations Stabilization Mission in the Democratic Republic of the Congo (MONUSCO).[35] As the impacts of climate change accelerate, these dimensions will become more central to other peacekeeping or stabilisation missions as well. For example, climate change has the potential to exacerbate tensions along the border between India and Pakistan or further exacerbate the acute food security and political tensions in Lebanon.[36] This could require injections of peacekeepers and related experts, as well as shifts in how these missions are resourced.

From a training perspective, military education will need to shift to build a more food and climate-literate Joint Force. While climate security-related coursework certainly exists, it will need to be mainstreamed into more programs and prioritized as a core component of pre-deployment training when mission-relevant. For example, courses like the U.S. Army's Agricultural Development for Armed Forces Pre-Deployment Training (ADAPT)[37] serve as a model for explicitly addressing food security considerations. ADAPT provides "*fundamental training in basic agricultural systems in regions where troops are going to deploy and mobilize,*" from the Middle East to the Indo-Pacific.[38] Alternatively, food can be integrated into the human security training already widely deployed to instruct operators on the protection of civilians, gender in conflict, and cultural property protection, such as those led by NATO[39] or by individual militaries like the United Kingdom's.[40] Military education will be a key factor in supporting troops in understanding the food security environment and interacting with the local population when appropriate.

From a doctrine perspective, most of the current policies and principles underpinning military forces will need to better incorporate not just climate change, but it's cascading effects on hunger, energy security, migration, and more. At both the policy and operational level, policy leads and planners will need to examine the ways that the military could respond to these challenges and potential operating contexts, while building in flexibility for those plans to shift should local conditions evolve. This ensures that forces take forward the key lessons from the Somalia response, whilst shedding some of the biases that continue to hinder action on food security today.

34 Roseline Nzelle Nkwelle, "UNMISS Peacekeepers Help Farmers in Agok Increase Food Security by Teaching Agricultural Skills," United Nations Peacekeeping, (24 August 2023), https://peacekeeping.un.org/en/unmiss-peacekeepers-help-farmers-agok-increase-food-security-teaching-agricultural-skills.
35 "Four Ways Conflict Affects Water Resources and How UN Peacekeeping Helps," United Nations Peacekeeping, (22 March 2023), https://peacekeeping.un.org/en/four-ways-conflict-affects-water-resources-and-how-un-peacekeeping-helps#:~:text=In%20October%20last%20year%2C%20the.
36 "Lebanon: Acute Food Insecurity Situation for October 2023–March 2024 and Projection for April 2024–September 2024," IPC–Integrated Food Security Phase Classification, (7 December 2023), https://www.ipcinfo.org/ipc-country-analysis/details-map/en/c/1156728/#:~:text=In%20the%20current%20period%2C%20between.
37 Sgt. 1st Class Lisa M. Litchfield, "ADAPT and Overcome," U.S. Army Reserve, (11 February 2021), https://www.usar.army.mil/News/News-Display/Article/2501577/adapt-and-overcome/.
38 Ibid.
39 SHAPE Public Affairs Office, "NATO-Led Human Security Training Kicks off in Romania" NATO Supreme Headquarters Allied Powers Europe (SHAPE), (8 November 2022), https://shape.nato.int/news-archive/2022/natoled-human-security-training-kicks-off-in-romania.
40 Defence Academy of the United Kingdom, "Defence Human Security Advisor Course," 2024, https://www.da.mod.uk/courses/defence-human-security-advisor-course.

Finally, foresight capabilities and early warning systems will need to be both expanded and better integrated to absorb climate security indicators such as famine, crop failures, staple good price spikes, supply chain vulnerabilities, biodiversity loss, and extreme weather patterns. Early warning systems can be better leveraged to mitigate the impacts of climate-driven risks–reducing the operational and resourcing demands at the same time. These systems have the potential to reduce losses by $3-16 billion, with even a 24-hour warning reducing the damage from a disaster by 30%.[41] At the same time, broader strategic foresight tools such as scenario exercises, wargames, and anticipatory action support governments as they plan for and respond to food security crises.[42] These capabilities exist across governments and agencies but are often poorly integrated across defence institutions. A securitised food environment will challenge this status quo, requiring more coordination between development, meteorological and agricultural systems, and intelligence and strategic foresight capabilities.

The challenge with these shifts, for both military and other international actors, is that food security gaps (and climate risks more broadly) are not a homogenous problem with a one-size-fits-all solution. Where in one context a supporting role is sufficient, another may require a leading role as conflict and risk to aid workers escalates. Likewise, where in one emergency response military involvement may be welcomed by local actors, another's history and relationship with the military makes such a symbiotic role impossible. Militaries have historically struggled to plan for such uncertainties, but a broader suite of tools, doctrine, and a climate-literate joint force will make these contexts easier to navigate.

Conclusion

Over the next several decades, climate change will dramatically affect the future operating environment for military and humanitarian actors alike—including those in the Irish Defence Forces. In addition to spikes in HADR requirements, threats to military installations, and changes to the operating environment, food will increasingly become a central national security factor both at home and abroad. Former U.S. Senator Pat Roberts (R-KS), and Chair of the Committee on Agriculture, Nutrition and Forestry, once famously remarked, *"Show me a nation that cannot feed itself, and I'll show you a nation in chaos."*[43] Recognising these impacts and potential challenges now is a critical first step but must be followed by changes to force education and training, planned deployments, and engagements with interagency partners. Otherwise, leaders and policymakers will increasingly face a hot, hungry, and unstable world.

41 "Early Warning System," *World Meteorological Organization*, (7 March 2023), https://wmo.int/topics/early-warning-system#:~:text=Early%20warning%20systems%20are%20put.
42 Shiloh Fetzek et al., "Why and How to Use Foresight Tools to Manage Climate Security Risks," *Planetary Security Initiative and The Center for Climate and Security*, (April 2017), https://www.planetarysecurityinitiative.org/sites/default/files/2017-04/PB_Why_and_how_to_use_foresight_tools.pdf.
43 United States Senate Committee on Agriculture, Nutrition and Forestry, "Chairman Roberts Examines U.S. Agriculture Programs Combating Global Hunger," *www.agriculture.senate.gov*, (2 December 2015), https://www.agriculture.senate.gov/newsroom/press/release/chairman-roberts-examines-us-agriculture-programs-combating-global-hunger.

Ireland As a Risk Society in the Age of Climate (In-) Security

Dr Kenneth Houston

"I would hazard I can do more damage on my laptop sitting in my pyjamas before my first cup of Earl Grey than you can in a year in the field."

Q (to James Bond), *Skyfall (2012)*

Ireland's position on the hinterland of Europe is considered below from the perspective of Ulrich Beck's Risk Society and it's associated insights. Ireland's security policy since the formation of the state has, in effect, relied primarily on it's geographic isolation. However, the advent of globalisation, regional integration, trade, technology, and even diseases, have all rendered the island much less isolated than in the past. With respect to the stress of climate change the risks to national security are likely to proliferate and extend into the non-traditional security sphere. This may well render the distinction between 'security' and wider socio-economic policy moot. The proliferation of risk is not only a question of how climate change will impact Ireland directly, but also how the impact of climate change elsewhere will affect Ireland's security *indirectly*. Ireland's response to these problems will invariably be part of an integrated European and wider global one. Climate change will not respect national borders, nor will the problems it creates be resolved through national effort alone. Nevertheless, while not sufficient in itself, a clearly thought-through national response, attuned to a wider array of risks associated with global disruption and even partial 'de-globalisation', is necessary if the state is to weather an uncertain future. Ireland's recent National Risk Assessment (published September 2024) is cognisant of some of these challenges.[1] The examination below elaborates on other important aspects.

Climate As Change and (In-) Security

Q's pithy remark to Bond perfectly captures the newer concept of 'risk' in the post-Chernobyl age. When Beck published his work in 1986[2] it rolled off the press just as the world was grappling with the terrifying reality of a hazard that did not respect *national* borders. Chernobyl was a catastrophic technical failure, which could have had continent-wide consequences. Yet, it was an event that would have been inconceivable only fifty years before – because such technology did not exist. So it is, as Beck pointed out, with all modern risk. Chernobyl was a crisis brought on by human technology, not natural events. The spectre of radioactive contamination across Europe, conveyed invisibly across the continent by weather patterns, starkly highlighted that globalisation – then arguably not yet in full flight – was a double-edged sword. In the age of global telecommunications, where glitches in computer code, intentional or otherwise, can ground airplanes, cripple government departments, and even put lives at risk, there is little doubt about the limitations of national borders as protectors of populations.[3]

1 Department of the Taoiseach, "National Risk Assessment 2024: Overview of strategic risks," *Gov.ie*, Accessed 31 October 2024 https://www.gov.ie/en/policy-information/448eb-national-risk-assessment-2024-overview-of-strategic-risks/
2 Ulrich Beck, *Risk Society: towards a new modernity*.(London: Sage, 1992).
3 Rosie Frost, "UK air traffic control meltdown caused by error with a '1 in 15 million' chance," *EURONEWS* (6 June 2023), https://www.euronews.com/travel/2023/09/06/uk-air-traffic-control-meltdown-caused-by-error-with-a-1-in-15-million-chance; Brian O'Donovan, "HSE impacted by cyber attack involving external provider," *RTE News* (9 June 2023), https://www.rte.ie/news/2023/0609/1388385-hse-ey-cyberattack/.

Yet the effective and legitimate governance and management of populations remains primarily and stubbornly within the purview of national political apparatuses.[4] Even in the context of Europe, where the supra-national apparatus of the EU melds with national decision-making, nation-states still exercise primary authority over many domains of life, not least that of security.[5] They do so in a world whose humanly constructed borders are increasingly perforated by migration patterns, trade and capital flows, and communication networks. Above all, there is the impact of our collective activity on our environment.

Urry, for example, highlights the five main types of 'mobility' that have been normalized in our late modern period:

- The physical travel of people for purposes such as work or leisure
- The physical movement of objects to producers, retailers, and consumers
- Imaginative travel through media and entertainment
- Virtual travel
- Communicative travel through traditional mail and now fibre optic cable and satellite[6]

What exactly will Ireland be exposed to relative to climate change? Can we isolate our vulnerabilities in any meaningful sense, thereby providing national political authority with the power to mitigate their worst effects? We are caught, in a real sense, between the imposition of extraterritorial problems on a national territorial space, which in Ireland's case is relatively isolated geographically from the rest of Europe. Yet it remains simultaneously dependent on connectivity with it. Without doubt, these factors present significant security implications. This analysis contends that not only is climate change a very real and consequential 'security' issue but that the framework of security as normally understood needs broadening if we are to fully grasp the implications of such change. Beck's 'risk society' concept, and the broader framework of risk analysis it inspires, will help to widen our critical aperture and bring into view not only those acute and immediate implications of climate change for Ireland's security but also the *indirect* consequences resulting from his concept of 'manufactured risk' that will pose questions for Ireland's future security posture.

Below, we consider the concept of risk and it's Beckian variant along with it's relevance to our analysis of Ireland's predicament relative to climate change. We include a widening of security away from narrow, traditional concepts towards the newer sphere of 'non-traditional' (sometimes 'human') security (hereafter NTS).[7] As will be apparent, this opens a more oblique perspective on the implications of climate change for Ireland's security into the future. This is not to say that the role of traditional security instruments such as

4 Stephan Leibfried, Evelyne Huber, Matthew Lange, Jonah D Levy, and John D Stephens, *The Oxford Handbook of Transformations of the State* (Oxford: Oxford University Press, 2015), 1.
5 Antonina Bakardjieva Engelbrekt, Karin Leijon, Anna Michalski, and Lars Oxelheim, *The European Union and the Return of the Nation State* (Cham: Palgrave Macmillan, 2020).
6 John Urry, "Mobilities." In *Mobilities, Networks, Geographies*, by Jonas Larsen, John Urry and Kay Ashausen, (Aldershot: Ashgate, 2006), 47-49.
7 Anthony J. Masys, Exploring the Security Landscape: Non-Traditional Security Challenges (Switzerland: Springer, 2016).

military and policing agencies is irrelevant. On the contrary, their role is arguably more important, but for additional reasons.

Ireland As a Risk Society: Widening the Apertures

Risk

Beck's concept of risk, which he defined as a 'systematic way of dealing with hazards and insecurities induced and introduced by modernization itself'[8] has obvious relevance to climate change and it's impact. It forces us to think beyond the question of managing overt and immediate effects. Obvious impacts might include rising sea levels around the coast of an island economy, disrupted weather patterns, the collapse of the Atlantic Meridional Overturning Circulation (AMOC), increases in extreme weather events and related pressures on infrastructure and agricultural production. Capacity building of state agencies to deal with such issues, including crisis response, is merited. After all, in Weber's famous phrase, the government must have a monopoly on the legitimate use of force. Below we consider the deeper issues that the risk society framework throws into relief.

To crudely summarize Beck's thesis, he contended that in our contemporary age, we had moved beyond the first form of risk such as natural disaster and resource scarcity into a second type of 'manufactured' risk.[9] Like Q's laptop example, we live in a world where – for most of the global north – modernization has alleviated our acute risk exposure to the first form through increased efficiency, production, and convenience in most domains. Modernity, in short, has made our lives much less precarious. We have achieved this through the development and mass deployment of technology and complex networks, infrastructures and political systems. Developed economies in particular have moved from a Hobbesian state of nature to a civilized society. We expand this concept of technologically contrived risk to include other aspects of modernization, such as the construction of complex socio-political institutions. Our institutional contrivances, such as nation-states, social networks, and international and regional organizations, have provided us with even greater security. It has made life routinized, relatively more predictable, and safer.

However, for Beck, 'risk' has not gone away. It has now shifted, and it has moved to a point where we potentially face serious or even catastrophic levels of risk *because* of our technological achievements and socio-political contrivances. Precisely through these technologies, we have conjured new dangers for ourselves, which are – like Chernobyl's radiation – much harder to detect. It goes beyond mere dependence. Our social and economic systems are now *coextensive* with our technology, our modern institutions, and our economy. To suffer a loss of access to our technology, or for it to suffer catastrophic or even partial failure, is to place our system at substantial risk. The distribution of these dangers is initially uneven, in so far as the creation and use of these technologies are not

8 Beck, *Risk Society*, 21.
9 Anthony J. Masys, "Manufactured Risk, complexity and non-traditional security; from world risk society to a networked risk model," In *Exploring the security landscape non-traditional security challenges*, by Anthony J Masys (Switzerland: Springer, 2016), 313-325.

always connected to those most exposed to the risks they inhere. This is especially true of technology that is causing climate change – hydrocarbons and combustion engines. The US military is one of the largest single carbon emitters.[10] Yet it is the small islands of Oceania who bear the brunt of the initial impact.[11] The risk is displaced. However, as Beck highlights in his concept of the 'boomerang effect', the serious long-term impact of such risks is universal. They will affect everyone eventually. Whether this is a radiation cloud or – aptly – other forms of environmental damage, it will not discriminate between those affected. Beck also highlights the risk of human artifice in the form of institutionalized protections for populations, such as welfare provision, healthcare, labour protections and political enfranchisement.[12]

Security

There is little doubt that an improved security apparatus, particularly a military one, is a *sine qua non* for any discussion on security. Improved military capacity will provide an essential backbone to meet the challenges of a future of disruptive weather patterns and related problems. The deployment of military personnel following Spain's 2024 flooding is a case in point. Yet the narrow, *traditional* view of security fails to fully capture the nature of the issues the state will face. A resourced military is, in short, necessary but not sufficient to meet the challenge. NTS offers additional angles of analysis that will prove relevant.[13] NTS highlights the fact that more humans die as a result of non-combat factors than traditionally understood militarized conflict.[14] Poverty, disease, food insecurity, water scarcity, and environmental degradation claim more lives annually than battle deaths. Cybercrime has also emerged as a significant threat to societal functioning. If erroneous lines of code can cause substantial airline delays at a major international hub like Heathrow, or cause aircraft to malfunction mid-flight, then intentional cyber disruption could do much worse. Without doubt, violent conflicts often cause or at least exacerbate such problems, but just as often the obverse is also true. NTS issues such as poverty and inequality are potential breeding grounds for militancy. NTS is a form of 'creeping crisis.'[15] The consequences of non-traditional security problems can morph into traditional security issues. As Boin highlights, 'creeping crises' can lie dormant for extended periods, subsumed beneath 'development' or economic problems; urgent problems that are never addressed because they fail to make it to the top of the political agenda, until it's too late.

Below, we provide a reflective overview of three indirect consequences of climate change that may have implications for Ireland's security, drawing on Beck's principles and the framework of NTS. The first is the problem of food security, which includes, but is not limited to, the question of food production in Ireland. The second is energy security

10 Oliver Belcher, Patrick Bigger, Ben Neimark, and Cara Kennelly, "Hidden carbon costs of the 'everywhere war': Logistics, geopolitical ecology, and the carbon boot-print of the US military," *Transactions of the Institute of British Geographers* 45, no. 1 (2019): 65-80.
11 Simon Albert, Javier X Leon, Alistair R Grinham, John A Church, Badin R Gibbes, and Colin D Woodroffe, "Interactions between sea-level rise and wave exposure on reef island dynamics in the Solomon Islands," *Environmental Research Letters* 11 (2016).
12 Beck, *Risk Society*, 21.
13 Anthony J. Masys, *Exploring the Security Landscape: Non-Traditional Security Challenges* (Switzerland: Springer 2016).
14 Dattani, Saloni, Fiona Spooner, Hannah Ritchie, and Max Roser. 2023. *Causes of Death*. Our World in Data. Accessed September 25, 2024. https://ourworldindata.org/causes-of-death#introduction
15 Boin, Arjen, Magnus Ekengren, and Mark Rhinard, "Hiding in plain sight: conceptualizing the creeping crisis," *Risk Hazards Crisis Public Policy* 11, no. 2 (2020): 116-138.

and our exposure to risk from domestic energy production capacity and potential deficits. Third, there are the risks emanating from population displacement through climate change and the potential pressures of inward migration to Ireland as a result. While not exhaustive, these elements highlight the need for policy planners to include a wider array of elements in response preparation. The 'risk society'/NTS nexus is arguably a useful framework in considering such issues.[16]

Oblique Security & Climate Change: Risk Domains

Beck's concept of risk society combined with an NTS framework allows us to consider the tangential impact of climate change on more directly affected world regions for Ireland and her security status. In a sense, we are already being stress-tested on these. For example, the post-Covid pandemic period was marked by significant questions over supply chain resilience worldwide, including stresses on food imports.[17] The Russo-Ukraine war and disruption to hydro-carbon supplies because of sanctions exposed consumers to higher fuel costs. The stabbing of several children and their teacher in Dublin provided a pretext for simmering xenophobic movements to emerge in the city's riots of November 2023, which brought home that both migration and far-right extremist ideology have become an issue in Ireland. Climate change will only exacerbate such trends because it is not simply about climate or the obvious impact of it's changing. It is also about it's impact on the systemic brittleness of our global society.

The fragility of food security probably doesn't immediately spring to mind when we think of Ireland. The country is a significant exporter of food and has, despite the limitations of it's temperate climate, become a robust export agri-economy.[18] It was recently ranked second internationally in terms of food security.[19] The configuration of Ireland's food supply system is skewed in favour of import/export production and supply dynamics. Yet, we are an island economy. Emerging research has shown the challenges that climate change poses for a highly efficient food supply system that is reliant on multiple centres of production linked by fragile supply chains.[20] Without reverting to an outdated mantra of 'self-sufficiency', there does need to be a greater reflection on the domestic capacity to grow sufficient food at scale to ensure secure supplies to the country's population. The outbreak of the Ukraine war highlighted our dependence on external sources for key commodities.[21] At present, we import several times what we produce in some aspects of food production, particularly animal feed and retail food commodities such as vegetables and grocery

16 Anthony J. Masys, "Non-traditional security: a risk-centric view," In *Handbook of Security Science*, by Anthony J Masys, (Cham: Springer, 2020), 459-474.
17 Willy C. Shih, "Global Supply Chains in a Post-Pandemic World," *Harvard Business Review*, (September 2020), https://hbr.org/2020/09/global-supply-chains-in-a-post-pandemic-world
18 Teagasc. n.d. *Agriculture in Ireland*. Accessed September 25, 2024. https://www.teagasc.ie/rural-economy/rural-economy/agri-food-business/agriculture-in-ireland/
19 Joe Mag Raollaigh, "Ireland among world leaders in food security index," *RTE News* (20 September 2022) Accessed September 25, 2024. https://www.rte.ie/news/ireland/2022/0920/1324318-ireland-food-security/
20 Walter Leal Filho et al., "An overview of the interactions between food production and climate change," *Science of the Total Environment* 838 (2022).
21 *Irish Times*, "The Irish Times view on Ireland's food security: a time for radical shifts." Irish Times, (11 March 2022), https://www.irishtimes.com/opinion/editorial/the-irish-times-view-on-ireland-s-food-security-a-time-for-radical-shifts-1.4824609

products.[22] The contrivance of the EU's Single Market has made reliance on transnational supply chains extensive, supply chains that may suffer disruption as climate change continues. Food security, while not urgent, may be exacerbated by complacency. Already, Ireland's food production is being impacted by irregular weather patterns, also a result of climate change.[23] The core issue here, as Beckian risk and NTS both throw into relief, is that the contrivance of globalised – specifically, *transnationally dependent* – food production and supply has become so entwined with national food production and consumption that the risks are not obvious. Climate change may precipitate partial de-globalisation, which in turn will affect both Ireland's imports and exports. Pressure on food security elsewhere will not leave Ireland untouched. Again, the risk is systemic and global.

In the sphere of energy security Ireland continues to be heavily reliant on imported energy, something that government is acutely aware of.[24] Recent estimates have seen a drop in this dependence, primarily through increased use of renewables. However, imported fossil fuels still account for the bulk of Ireland's energy supply.[25] The national vulnerability to energy security issues remains live. Political authority has developed a strategy to address these issues. Among these solutions are interconnectors, linking Ireland to other energy producers such as the UK and France.[26] There is even a recently proposed NATO-L connector between the United States and NATO countries in Europe, which might involve Ireland (Irish Independent, 2024).[27] While interconnectors present possible solutions to insecure energy supplies, they exemplify precisely what Beck's risk society entails: deployment of technology to alleviate a scarcity problem, which becomes a critical risk problem should it fail. The vulnerability of critical energy connector infrastructure is supported by recent events. The cyber threat is real, and it has already resulted in a systemic attack on Ireland's online infrastructure. The threat posed by hostile powers to undersea fibre optic cables is just as pertinent to undersea energy cables, as the Nordstream pipeline incident demonstrates. An energy connector system that the island relies on is no less vulnerable to actions by hostile powers. A domestically based energy production system, beyond the expansion of wind renewables, may need to be contemplated longer term.

Finally, there is the question of migratory flows. Without doubt, the single most important indirect security issue for Ireland in a near future impacted by climate change is global population mobility. Climate change refugees will become a more pronounced reality as we progress further into the twenty-first century.[28] It has already begun in some parts of

22 Thia Hennessy, "Food security is a concern in Ireland," *Irish Examiner* (9 April 2024), https://www.irishexaminer.com/news/spotlight/arid-41369674.html
23 Caroline O'Doherty, "'We are highly vulnerable'–experts say Irish economy will lose billions to climate change amid failure to prepare," *Irish Independent* (10 September 2024), https://www.independent.ie/irish-news/we-are-highly-vulnerable-experts-say-irish-economy-will-lose-billions-to-climate-change-amid-failure-to-prepare/a1807742926.html
24 Government of Ireland, *National Energy Security Framework: One Year Report* (Dublin: Government of Ireland, 2023).
25 Government of Ireland, *Energy Security in Ireland to 2030: Energy Security Package* (Dublin: Government of Ireland 2023), 9.
26 Dept of Environment, Climate & Communications, "Ireland and France mark beginning of construction work on 'Celtic Interconnector' and sign joint energy declaration," *Gov.ie* (13 November 2023), Accessed 25 September 2024, https://www.gov.ie/en/press-release/0ce3f-ireland-and-france-mark-beginning-of-construction-work-on-celtic-interconnector-and-sign-joint-energy-declaration/.
27 John Mulligan, "Ireland is key to proposed Atlantic interconnector that would secure energy supply for Nato members," *Irish Independent* (20 September 2024), https://www.independent.ie/business/irish/ireland-is-key-to-proposed-atlantic-interconnector-that-would-secure-energy-supply-for-nato-members/a716773347.html
28 Abdulaziz I. Almulhim et al., "Climate-induced migration in the Global South: an in depth analysis," *Nature NPJ Climate Action* 3 no. 47 (14 June 2024).

Africa and South Asia.[29] Climate change is now even being felt in the United States in coastal areas such as Louisiana and the Carolinas where shorelines have retreated. The European summer of 2024 and the recent Spanish flooding disaster both demonstrate that climate change can result in more acute crises, such as extreme weather and population displacement, even if considered temporary and localized. Ironically, the more resilient Ireland and Europe make themselves in the face of climate uncertainty, the more likely it will be a chosen destination for those fleeing the severe impact of climate change elsewhere, particularly the Global South. The question of migration policy is ultimately a political one, with significant social and cultural implications. It will remain a security issue, nonetheless, not least evinced by the embryonic mobilization of far-right actors. Ireland's capacity to respond to acute large-scale population displacement and inward migratory flows has not been tested in any meaningful sense, but the societal impact alone will imply security aspects and the experiences of our UK and European neighbours are worth reflecting on.

All in all, what Renn referred to as 'systemic risk' presents a multifaceted problem for governments, not least because longer-term planning fits uneasily into election cycles.[30] Cascading effects, along with the transgressive element of risk, mean that planning responses to specific risk events will not adequately mitigate the knock-on effects of their immediate impact.[31] Food insecurity, external energy reliance, and inward migratory pressures due to climate change impact elsewhere are only some of the interdependent elements of a risk landscape that will inevitably go beyond the impact of extreme weather on infrastructure and agricultural production. It will imply economic, socio-cultural, and political dimensions, which all pose questions for national security.

Conclusion – Future Proofing Ireland

These reflections are by no means exhaustive. They permit, in the space allowed, a brief application of a risk-centric/NTS-orientated conceptual nexus so that we can tease out examples of contrived or manufactured risk and creeping crises that long-term strategic planning to mitigate climate distress should consider. The impact of climate change on Ireland will include not only what climate change does to us, but what it will do to other parts of the world, which will in turn impact us. As Beck argued, modernity itself, along with it's associated technical and social contrivances, is the origin of this newer form of risk. The immediate consequences of climate change demand responses that include obvious remedial improvements in our defence capabilities, which play an essential role *inter alia* in disaster management. Primarily, these improved capabilities in military-grade air transport, rotary airlift capacity, as well as naval and offshore assets, are a basic requirement to offset the more direct consequences of disrupted weather patterns, infrastructure damage, and extreme weather events.

29 The White House, *Report on the Impact of Climate Change on Migration*. (Washington DC: The White House, 2021).
30 Renn, Ortwinn, "New challenges for risk analysis: systemic risks," *Journal of Risk Research* 24 no. 1 (2020): 127-133; Dirk Hellbing, "Globally networked risks and how to respond," *Nature* 497 (2013): 51-59.
31 Masys, "Non-traditional security."

However, it is not enough to respond to the risk. It is equally important for state authorities *to be seen* to be responding effectively to risk events by the citizenry. Risk scholars highlight that it is not only a question of dealing with risk as an objective, scientifically discernible reality. It is also necessary to deal with risk *perception*, particularly of the wider population. As Beck puts it: 'risks experienced [by citizens] presume a normative horizon of lost security and broken trust'.[32] The *demos* must have a basis for confidence in their government's capacity to respond effectively to the unforeseen. An ineffective response, like the Bush Administration's response to Hurricane Katrina, can undermine public confidence.

While the primary and overt considerations of climate change and security are important, it is the secondary, indirect or oblique impacts that require more long-term planning. These include risk-assessing aspects of our contemporary geopolitical position as an island nation, which is heavily reliant on technology, critical infrastructure, modern social and transnational political institutions, and – fundamentally – a globalised economy.

Globalisation is not irreversible, and partial de-globalisation may already be underway. Our external dependencies, for energy, for foodstuffs, and even for security, need to be included in ongoing planning and risk assessment for a climate-disrupted future. The current government risk assessment seems confined to a narrative of risk typology,[33] rather than a robust evaluation incorporating both probability and impact of various risks, along with mitigation/response measures. The various elements of risk need to be more systematically assessed along the lines of international best practice. Modernity and modernization, which have served Ireland well until now, are precisely what may place our security at risk in the future. Such risk will manifest not only through exogenous shocks but principally through 'creeping' threats to the functionality of these systemic dependencies. What we have, in short, is a level of structural interdependence that instantiates risks that are latent, difficult to detect or predict, but potentially significant. Not least, there is a need to re-evaluate our risk exposure to systemic level reliance on transboundary technological solutions to resource supply, as well as an institutional reliance on transnational connectivity. This requires that national decision-makers engage more proactively with our European partners.

Modernization, and all it's associated projects – from technological advances to transnational institution-building, economic prosperity, and membership of multilateral organizations – have provided unparalleled benefits to Ireland as an island nation on Europe's periphery. However, we remain stubbornly and geographically an island nation. While we enjoy extensive connectivity and interdependence as an open economy, projected strategic contingency planning needs to consider the extent to which we have become vulnerable to significant or catastrophic failures of the very system that has allowed Ireland to develop to the extent that it has. Climate change is a creeping crisis that presents just such potential. The narrow view of security that fails to account for the non-traditional

32 Beck, *Risk Society*, 28.
33 Department of the Taoiseach, "National Risk Assessment 2024: Overview of strategic risks," (2024), https://www.gov.ie/en/policy-information/448eb-national-risk-assessment-2024-overview-of-strategic-risks/

dimension risks developing blind spots in contingency planning. Expanding our view of risk to include vulnerabilities that have origins in advanced modernity's successes is a pre-requisite to medium- and long-term contingency planning. As with any risk-based approach, we should plan against the day and hope it never comes.

Strategic Manipulation: Influence Operations and Climate Change Disinformation

Zaur Gouliev

Abstract

This article explores disinformation as an instrument used by state and non-state actors to shape public narratives and influence climate policy, it primarily looks at how climate change disinformation is integrated into influence operations through social media. Governments around the world have begun recognising climate change as a security threat, while threat actors are increasingly using disinformation to push geopolitical goals, undermine international agreements, and create societal divisions. Tactics, techniques, and procedures (TTPs) include astroturfing, utilising echo chambers, and hiring unqualified experts for false testimonies, all which collectively erode scientific consensus and public trust in climate policy, stalling needed action. Through the manipulation of digital media and exploiting socio-political rifts, these campaigns effectively create resistance to critical climate measures, fragmenting global consensus on the issue and undermining policy. Military organisations like the Irish Defence Forces have a unique opportunity if partnered with policing and civilian organisations like An Garda Síochána, primarily via the National Bureau of Criminal Investigation (NBCI), National Security Unit (NSU) and the Environmental Protection Agency (EPA) through the Office of Environmental Enforcement who are tasked with monitoring environmental crimes, and which all can play a supporting role in countering climate disinformation through intelligence gathering and strategic communications. Intelligence gathering focuses on detecting Foreign Information Manipulation and Interference (FIMI) in climate narratives, especially from adversarial states who are large energy exporters. Strategic communications, meanwhile, strengthen public resilience by promoting accurate information and enhancing climate literacy. Combined, these can counter disinformation. This article presents case studies and varied strategies within climate disinformation influence operations and sets the tone on the importance of coordinated defence and communication strategies to support climate security.

Introduction

Climate change is now recognised as a pressing global security issue[1] with implications for geopolitical stability, economic resilience, and social cohesion. As scientific consensus strengthens around the urgency of climate action, both state and non-state actors have intensified digital disinformation efforts[2] to weaken this consensus, influence policy, and disrupt international cooperation. These campaigns use sophisticated tactics like astroturfing,[3] which creates an illusion of grassroots support against climate action, typically orchestrated by fossil fuel interests[4] to present industry agendas as public sentiment. Echo

1 Ana-Maria - ugulea and Ana-Maria Florea, "The Security of EU Citizens When Confronted with Climate Change and Disinformation," STRATEGIES XXI International Scientific Conference: The Complex and Dynamic Nature of the Security Environment, Centre for Defence and Security Strategic Studies, "Carol I" National Defence University, (9-10 December 2021), 75.
2 Stephan Lewandowsky, "Climate Change Disinformation and How to Combat It," *Annual Review of Public Health* 42 (2021): 1-21, https://doi.org/10.1146/annurev-publhealth-090419-102409.
3 Felix Keller, Daniel Schoch, Sebastian Stier, and JungHwan Yang, "Political Astroturfing on Twitter: How to Coordinate a Disinformation Campaign," *Political Communication* 37, no. 2 (2020): 256-280, https://doi.org/10.1080/10584609.2019.1661888.
4 Steven J. Barela and Jerome Duberry, "Understanding Disinformation Operations in the 21st Century," in *Defending Democracies: Combating Foreign Election Interference in a Digital Age*, ed. Duncan B. Hollis and Jens David Ohlin (Oxford: Oxford University Press, forthcoming 2021), https://ssrn.com/abstract=3757022 or http://dx.doi.org/10.2139/ssrn.3757022.

chambers further exacerbate this by using social media algorithms to isolate individuals within self-reinforcing content loops[5], making it difficult for accurate information to shape public discourse. Another tactic is the use of false experts[6]—individuals without genuine expertise, presented as authorities in climate science. This tactic fosters doubt[7] and creates a misleading *"false balance"* in media reporting, confusing the public and encouraging scepticism toward scientific consensus. The cumulative effect of such disinformation is significant, as it erodes public trust, delays crucial climate policies, and hinders the global response[8] to climate change. Military organisations are well-positioned[9] to address these growing disinformation threats. Through intelligence and analysis, they can identify and disrupt disinformation campaigns, particularly those orchestrated by foreign adversaries.[10] Additionally, strategic communications from military entities can play a crucial role in bolstering public resilience by promoting accurate information and fostering climate literacy. This article explores the complex nature of climate disinformation tactics and emphasises the need for a coordinated military response to strengthen global climate security.

Tactics, Techniques, and Procedures (TTPs)

Foreign actors exploit evolving tactics, techniques, and procedures[11] (TTPs) to manipulate the EU's information environment,[12] with astroturfing and echo chambers proving especially impactful in shaping public opinion on climate change. These methods distort public perceptions, sway opinions, and erode trust in scientific consensus, complicating climate policy. Astroturfing creates a false image of grassroots support or opposition to specific policies, often funded by fossil fuel interests aiming to mislead the public and policymakers. These industry-funded groups[13], disguised as independent,[14] citizen-led organisations, promote scepticism about climate science to delay or derail[15] regulations. By deploying emotionally charged language, they shape public sentiment, particularly in democracies where public opinion heavily influences policy. Additionally, astroturfing campaigns advocate for continued fossil fuel[16] use under narratives like *"energy independence"*

5 F Michela Del Vicario et al., "Echo Chambers in the Age of Misinformation," *Laboratory of Computational Social Science, Networks Dept IMT Alti Studi Lucca*, 55100 Lucca, Italy.
6 Jennifer Lackey, "False Confessions and Testimonial Injustice," *Journal of Criminal Law and Criminology* 110, no. 1 (2020): 43, https://scholarlycommons.law.northwestern.edu/jclc/vol110/iss1/4.
7 Federica Isabella Malfatti, "Can Testimony Generate Understanding?" *Social Epistemology* 33, no. 6 (2019): 477-490, https://doi.org/10.1080/02691728.2019.1628319.
8 Anthony A. Leiserowitz et al., "Climategate, Public Opinion, and the Loss of Trust," *American Behavioral Scientist* 57, no. 6 (2013): 818, first published online September 13, 2012, https://doi.org/10.1177/0002764212458272.
9 NATO, The Secretary General's Report: NATO Climate Change and Security Impact Assessment, 3rd ed. (July 2024).
10 Tomasz Kacała, "Military Leadership in the Context of Challenges and Threats Existing in Information Environment," *Journal of Corporate Responsibility and Leadership* 2, no. 1 (March 2026), doi: http://dx.doi.org/10.12775/JCRL.2015.001.
11 Foreign Information Manipulation and Interference Defence Standards: Test for Rapid Adoption of the Common Language and Framework 'DISARM', prepared in cooperation with Hybrid COE (2022), ISBN: 978-952-7472-46-0.
12 Strategic Communications, "Tackling Disinformation, Foreign Information Manipulation & Interference," European External Action Service, last modified 14 November 2024, https://www.eeas.europa.eu/eeas/tackling-disinformation-foreign-information-manipulation-interference_en
13 Kathy Mulvey and Seth Shulman, "The Climate Deception Dossiers: Internal Fossil Fuel Industry Memos Reveal Decades of Corporate Disinformation," Union of Concerned Scientists, June 29, 2015, https://www.ucsusa.org/resources/climate-deception-dossiers#ucs-report-downloads
14 Union of Concerned Scientists, "How Fossil Fuel Lobbyists Used 'Astroturf' Front Groups to Confuse the Public," Union of Concerned Scientists, June 29, 2015, https://www.ucsusa.org/resources/how-fossil-fuel-lobbyists-used-astroturf-front-groups-confuse-public
15 Greenpeace, "Exposing the Dirty Money Behind Fake Climate Science," 2010.
16 Union of Concerned Scientists, "Fossil Fuel Accountability," accessed November 11, 2024, https://www.ucsusa.org/climate/accountability#toc-deception.

or *"economic stability,"* spotlighting the supposed drawbacks of renewable energy—such as job losses and energy costs—while omitting it's long-term benefits.[17]

Echo chambers reinforce these tactics by isolating individuals in content loops aligned with their existing beliefs,[18] facilitated by algorithms that prioritise engagement. This creates closed digital spaces where disinformation thrives,[19] further entrenching scepticism about climate science. Users exposed to climate denial content, for instance, are more likely to encounter similar material, intensifying their doubts. Research shows echo chambers foster polarised communities that share homogeneous content, making it harder for factual information[20] to penetrate these networks. Together, astroturfing and echo chambers form a potent mechanism for spreading climate disinformation. Astroturfing seeds misleading content, which echo chambers then amplify to a receptive audience, creating a perceived public opposition to climate action. This synergy distorts public perception and skews policy debates, misleading policymakers with the illusion of broad opposition. The risks posed by these echo chambers contribute to the broader fragmentation of the information ecosystem,[21] which in turn exacerbates societal divisions and undermines efforts to address climate change.[22] Astroturfing and echo chambers work together to create a powerful mechanism for the spread of climate change disinformation. Astroturfing generates misleading content that is designed to appear as though it has widespread public support. Echo chambers then amplify this content by ensuring it reaches and resonates with a receptive audience, who are already predisposed to believe it. This synergistic relationship between astroturfing and echo chambers presents a significant challenge for efforts to combat climate change disinformation. It not only distorts public perception but also shapes policy debates by creating the false impression of widespread opposition to climate action. Policymakers may be swayed by what appears to be a groundswell of public sentiment,[23] when in fact it is the product of coordinated disinformation efforts. The consequences of this dynamic are evident in the slow progress of international climate negotiations and the persistent scepticism about climate science in certain political and cultural contexts. These tactics contribute to the broader landscape of disinformation that poses a direct threat to global security and stability.[24]

17 Mix, Tamara L., and Katie G. Waldo. "Know(ing) Your Power: Risk Society, Astroturf Campaigns, and the Battle over the Red Rock Coal-Fired Plant." *The Sociological Quarterly* 56, no. 1 (2015): 125–151. https://doi.org/10.1111/tsq.12065.
18 R. Kelly Garrett, "The 'Echo Chamber' Distraction: Disinformation Campaigns Are the Problem, Not Audience Fragmentation," *Journal of Applied Research in Memory and Cognition* 6, no. 4 (2017): 370-376, https://doi.org/10.1016/j.jarmac.2017.09.011.
19 Berta García-Orosa, "Disinformation, Social Media, Bots, and Astroturfing: The Fourth Wave of Digital Democracy," Profesional De La Información 30, no. 6 (2021), https://doi.org/10.3145/epi.2021.nov.03.
20 Samuel C. Rhodes, "Filter Bubbles, Echo Chambers, and Fake News: How Social Media Conditions Individuals to Be Less Critical of Political Misinformation," *Political Communication* 39, no. 6 (May 2021): 1-22, https://doi.org/10.1080/10584609.2021.1910887.
21 David Robert Grimes, "Echo Chambers Are Dangerous – We Must Try to Break Free of Our Online Bubbles," *The Guardian*, 5 December 2017.
22 Tom Ellison and Brigitte Hugh, Climate Security and Misinformation: A Baseline, Briefer No. 59 (Washington, D.C.: Center for Climate and Security, 2024).
23 David Schoch, Felix B. Keller, Sebastian Stier, et al., "Coordination Patterns Reveal Online Political Astroturfing Across the World," *Scientific Reports* 12 (2022): 4572, https://doi.org/10.1038/s41598-022-08404-9.
24 Tom Ellison and Brigitte Hugh, Climate Security and Misinformation: A Baseline, Briefer No. 59 (Washington, D.C.: Center for Climate and Security, April 23, 2024).

The Strategic Use of False "Experts": Another TTP?

The use of false experts is a common tactic in climate disinformation, where individuals lacking credible expertise[25] are portrayed as authorities on climate science. These figures often appear in media and online debates, creating a misleading sense of scientific dispute over climate change. Known as *"false balance,"* this tactic exploits the public's limited specialised knowledge, fostering confusion and scepticism about the scientific consensus[26] on climate change. Industries with vested interests, particularly fossil fuels, have historically[27] employed false experts to delay climate action. For example, ExxonMobil has used figures with questionable credentials[28] to downplay climate risks and cast doubt on the science of climate change, presenting the issue as uncertain[29]. This strategic framing of climate change as contentious has effectively fostered public inaction and political hesitancy, as it capitalises on the media's commitment to *"balance."* By placing a small minority of climate sceptics on par with most climate scientists, this approach falsely implies a divided scientific community. This tactic significantly impacts international climate agreements, as it promotes the narrative that climate change either lacks urgency or is a natural phenomenon, reducing the motivation for global action. Disinformation campaigns also play on nationalist[30] and economic fears, framing climate policies as threats to sovereignty or economic stability.[31] For instance, narratives suggesting job losses or higher energy costs due to climate action have galvanised opposition in economically fossil-fuel-dependent nations.[32] At international forums like the Paris Agreement negotiations,[33] disinformation has been used to question the legitimacy of climate science and feasibility of proposed solutions, sowing discord and delaying action. This focus on economic costs—while downplaying the benefits of transitioning to a low-carbon economy—has proven especially persuasive, slowing progress and weakening commitments, as countries hesitate in the face of manufactured uncertainty.

The Military – Intelligence Gathering, Strategic Comms and Building Resilience

Military organisations are recognising the security implications of disinformation, as adversarial actors, who have a large stake in energy—such as Russia—use these tactics

25 John Cook, "Deconstructing Climate Science Denial," in Edward Elgar Research Handbook in *Communicating Climate Change*, ed. David Holmes and Lucy M. Richardson (Cheltenham: Edward Elgar, 2020).
26 Hannah Schmid-Petri and Moritz Bürger, "The Effect of Misinformation and Inoculation: Replication of an Experiment on the Effect of False Experts in the Context of Climate Change Communication," *Public Understanding of Science* 31, no. 2 (2022): 152–167, https://doi.org/10.1177/09636625211024550.
27 Melissa Fleming, "Rampant Climate Disinformation Online Is Distorting Dangers, Delaying Climate Action," *We The Peoples*, May, 16 2022, https://medium.com/we-the-peoples/rampant-climate-disinformation-online-is-distorting-dangers-delaying-climate-action-375b5b-11cf9b
28 Geoffrey Supran and Naomi Oreskes, "Rhetoric and Frame Analysis of ExxonMobil's Climate Change Communications," *One Earth* 4, no. 5 (May 21, 2021), https://doi.org/10.1016/j.oneear.2021.04.014
29 *Kristen Alley Swain, "Media Framing of Climate Change Mitigation and Adaptation," in Handbook of Climate Change Mitigation and Adaptation, 2nd ed., ed. Wei-Yin Chen et al. (New York: Springer, 2021), 1–69.*
30 The Polarizing Impact of Political Disinformation and Hate Speech: A Cross-Country Configural Narrative," *Information Systems Frontiers*, April 17, 2023, https://doi.org/10.1007/s10796-023-10390-w.
31 Alexander J. Stewart, Nolan McCarty, and Joanna J. Bryson, "Polarization Under Rising Inequality and Economic Decline," *Science Advances* 6, no. 50 (December 2020).
32 Chris Martinez, Laura Kilbury, and Joel Martinez, "These Fossil Fuel Industry Tactics Are Fueling Democratic Backsliding," Tackling Climate Change and Environmental Injustice, December 5, 2023, https://www.americanprogress.org/article/these-fossil-fuel-industry-tactics-are-fueling-democratic-backsliding/.
33 Chloe Farand, *COP24: Climate Science Denial, Disinformation and Fake News at the UN Climate Talks.* Vancouver: Newstex, 2018, https://www.proquest.com/blogs-podcasts-websites/cop24-climate-science-denial-disinformation-fake/docview/2252980860/se-2/

within hybrid warfare strategies targeting Europe.[34] This approach utilises FIMI and aims to destabilise trust in climate science and impede policy action. The concept of FIMI has become increasingly relevant as these organisations recognise the role of disinformation in undermining national security. FIMI encompasses a range of tactics used by state and non-state actors to manipulate information environments, thereby influencing public opinion and policy decisions in target countries like Ireland.[35] The Department of Defence and Defence Forces Strategy Statement 2023-2026,[36] suggests integrating climate considerations into security planning and enhancing collaboration across different policy areas are essential strategies for military organisations to effectively respond to the evolving nature of climate disinformation, this is in line with other European military organisations advocating integrating climate change into their security frameworks.[37]

Ireland's Defence Forces, while not the primary actor in intelligence operations compared to civilian agencies like Garda Síochána Analysis Service (GSAS), Environmental Protection Agency (EPA) and police units within AGS like Garda National Bureau of Criminal Investigations (NBCI) whom are all concerned with the enforcement of environmental crime that have a strong organised crime dimension, can contribute to FIMI-related counterefforts through specialised data collection and analysis of disinformation campaigns using communication, geospatial, and signal intelligence capabilities. Strategic communications are important in countering disinformation through clear narratives[38] on the benefits of climate action and the risks associated with inaction. Emphasis should be placed on addressing fears prevalent in regions dependent on fossil fuels, emphasising the long-term stability offered by renewable energy. Long-term resilience-building[39] includes efforts to increase media literacy and foster a public understanding of disinformation, aiming to strengthen Ireland's information and cyber environment. This proactive stance should be part of a coordinated approach to national security, supporting both military and civilian actors to mitigate the impacts of climate-related disinformation in alignment with Ireland's broader security objectives.

Cases of Climate Disinformation and Military Responses

Disinformation in the Arctic Region — Military Responses

In the Arctic, climate disinformation campaigns—often state-backed, notably by Russia—downplay the environmental risks of Arctic drilling while emphasising short-term economic benefits.[40] These narratives aim to influence public opinion and policy, steering it towards

34 U.S. Department of Defense. Strategy for Operations in the Information Environment. Washington, DC: Department of Defense, June 2016.
35 Anna Pringle and David Robbins, "From Denial to Delay: Climate Change Discourses in Ireland," Administration 70, no. 3 (2022): 59–84, https://doi.org/10.2478/admin-2022-0019.
36 Department of Defence and Defence Forces, Strategy Statement 2023–2026 (2023).
37 European Union Institute for Security Studies (EUISS). Climate Change and European Security. Paris: EUISS, 2022.
38 Pavel Devyatkin, "How Is Climate Change Shaping Russia's Arctic Policy and Activities?" The Arctic Institute – Center for Circumpolar Security Studies, July 19, 2022, https://www.thearcticinstitute.org/climate-change-shaping-russia-arctic-policy-activities.
39 Anthony J. Blinken, "Building a More Resilient Information Environment." Speech, Shilla Hotel, Seoul, Republic of Korea, March 18, 2024.
40 Pavel Devyatkin, "How Is Climate Change Shaping Russia's Arctic Policy and Activities?" The Arctic Institute – Center for Circumpolar Security Studies, July 19, 2022, https://www.thearcticinstitute.org/climate-change-shaping-russia-arctic-policy-activities/.

resource exploitation despite severe environmental risks.[41] In response, NATO countries such as Norway and Canada have expanded military intelligence operations to monitor, expose, and counter these narratives. Additionally, NATO has prioritised addressing both traditional and emerging security threats in the Arctic,[42] enhancing joint exercises and intelligence-sharing among member states to tackle the unique challenges posed by the region's geopolitical importance.[43]

Disinformation campaigns frequently target renewable energy,[44] portraying it as unreliable, costly, and environmentally harmful to delay it's adoption and maintain fossil fuel dominance.[45] These narratives exploit economic fears, especially in fossil fuel-dependent regions,[46] with claims that wind and solar are inefficient and drive up costs.[47] Military organisations counter this by adopting renewable energy in their operations,[48] demonstrating it's feasibility and benefits. The Irish Defence Forces, for instance, have committed to reducing emissions and increasing energy efficiency, using solar energy at bases as part of their climate strategy.[49] Such implementations[50] provide concrete proof of renewable energy's reliability and cost-effectiveness. Through strategic communications, these organisations emphasise the role of renewables in enhancing energy security and reducing fossil fuel dependence, reshaping public perceptions and countering disinformation aimed at stalling the energy transition.

Climate Disinformation in Developing Countries — Military Responses

Developing countries, particularly those facing economic and political instability,[51] are highly vulnerable to climate disinformation, which can hinder climate policy efforts. Disinformation campaigns in regions like Sub-Saharan Africa often cast doubt on the urgency of climate change or the legitimacy of international agreements,[52] reducing government resolve and international cooperation. For example, narratives in these areas may downplay climate impacts on agriculture, framing climate change as a distant or natural phenomenon that doesn't warrant immediate action,[53] thereby diminishing

41 Ibid
42 NATO, "NATO's Approach to Countering Disinformation in the Arctic," NATO, November 8, 2023, https://www.nato.int/cps/en/natohq/topics_219728.htm
43 Ibid
44 Fiona Harvey, "'Massive Disinformation Campaign' Slowing Global Transition to Green Energy," *The Guardian*, August 9, 2024, https://www.theguardian.com/environment/2024/aug/09/massive-disinformation-campaign-slowing-global-transition-to-green-energy.
45 James Murray, "Global Briefing: NATO Accuses Russia of Pushing Climate and Green Energy Disinformation," *Business Green*, July 12, 2024, https://www.businessgreen.com/news-analysis/4332790/global-briefing-nato-accuses-russia-pushing-climate-green-energy-disinformation.
46 *EDMO*, "Wind Turbines and Poisoned Animals: A 'New Denial' Disinformation Narrative Against Renewable Energy," EDMO, January 25, 2024, https://edmo.eu/2024/01/25/wind-turbines-and-poisoned-animals-a-new-denial-disinformation-narrative-against-renewable-energy/.
47 Massive Disinformation Campaign is Slowing Global Transition to Green Energy," Carbon Brief, August 9, 2024, https://www.carbonbrief.org/daily-brief/massive-disinformation-campaign-is-slowing-global-transition-to-green-energy/.
48 Constantine Samaras, William J. Nuttall, and Morgan Bazilian, "Energy and the Military: Convergence of Security, Economic, and Environmental Decision-Making," *Energy Strategy Reviews* 26 (November 2019): 100409.
49 Defence Forces Questions," Dáil Éireann Debate, November 21, 2023.
50 The Defence Forces Solar PV Project," Sustainable Energy Authority of Ireland, 2019, https://www.seai.ie/case-studies/defence-forces-solar-pv/.
51 "Mapping a Surge of Disinformation in Africa," Africa Center for Strategic Studies, April 26, 2022, https://africacenter.org/spotlight/mapping-disinformation-in-africa/.
52 Sub-Saharan Africa: Building Resilience to Climate-Related Disasters," IMF, accessed August 18, 2024, https://www.imf.org/en/Publications/WP/Issues/2024/08/18/Building-Resilience-to-Climate-Related-Disasters.
53 Partnering with African Countries to Strengthen and Enhance Security," U.S. Department of State, December 14, 2022, https://www.state.gov/partnering-with-african-countries-to-strengthen-and-enhance-security/.

prioritisation of climate adaptation. In response, military alliances such as NATO engage in capacity-building with local security forces,[54] aiming to enhance resilience against climate disinformation. This includes training on strategic communication and support for civil-military cooperation, emphasising the importance of climate adaptation and accurate information flows. NATO's initiatives in partner countries, in collaboration with civil society and local governments,[55] strengthen institutional capacities to counter disinformation and ensure communities receive reliable climate information, thereby building resilience against climate-related vulnerabilities.

Conclusion

Climate disinformation poses a severe threat to global security and international climate policy, with vested interests using tactics like astroturfing, echo chambers, and false experts to erode trust in scientific consensus and delay essential action. These strategies skew public discourse, fostering scepticism and division that weaken collective climate efforts and influence policy decisions, diluting international resolve for effective climate agreements. Case studies in the Arctic, renewable energy sectors, and developing countries highlight how disinformation is leveraged to manipulate public opinion and policy. Military organisations can play an increasingly critical role in countering climate disinformation, using intelligence gathering, analysis, and strategic communications to expose false narratives and uphold science-based policies. By promoting accurate information and supporting climate literacy, they enhance public resilience. Coordinated efforts with international partners are essential to a global strategy that counters disinformation and strengthens capacities to address climate challenges. As climate impacts intensify, a comprehensive approach—uniting military, government, civil society, and private sector efforts—is crucial to building resilience and maintaining a unified response against both climate change and the disinformation that undermines it.

54 How Does NATO Respond to Disinformation?" NATO, May 25, 2021, https://www.nato.int/cps/en/natohq/news_183560.htm.
55 "NATO's Response to Climate-Security Risks," Chatham House, accessed August 18, 2024, https://www.chathamhouse.org/2023/06/natos-response-climate-security-risks.

The Impact of Climate Change on Naval Service Diving Section Operations

Cian Lynch

Introduction

The Naval Service Diving Section (NSDS) is the State's primary diving team offering a significant range of capabilities to Ireland through Aid To the Civil Power (ATCP) and Aid To the Civil Authority (ATCA) missions. Aside from military diving training, the primary capabilities offered to the state by the NSDS are search and recovery, underwater survey, Explosive Ordnance Disposal, and underwater engineering.[1] While the NSDS already operates in incredibly difficult conditions due to the depths at which they work, as well as often carrying out tasks in zero and near-zero visibility,[2] the conditions that the NSDS are employed in are likely to become even more challenging due to the onset of anthropogenic climate change in the maritime domain. This process is already beginning to have tangible effects in the ocean environment; more frequent storms of increasing severity, rising sea levels, and shifting ocean currents have all been already noted, with these effects likely to worsen significantly throughout coming decades.[3] As the NSDS has been highlighted in the *Report of the Commission on the Defence Forces* as a unit that should undergo modernisation,[4] this paper seeks to offer some considerations for future threats from climate change that might be best addressed during this period of modernisation. This paper will first explore the impact of climate change in the marine environment before outlining how other navies are engaging with the issue of climate change, and then sequentially address how the impacts of climate change will affect each of the NSDS's key roles and responsibilities and assess how these impacts might be mitigated. This analysis proposes that the robust nature of NSDS training and it's continued investment in and adoption of technologies and capabilities such as Remotely Operated Vehicles (ROVs) are likely to mitigate many of the impacts of climate change, as will the implementation of the proposals contained within the *Report of the Commission on the Defence Forces*.

The Impact of Anthropogenic Climate Change on the Marine Environment

As the process of anthropogenic climate change continues to worsen, driven by the destructive outpouring of greenhouse gases into the environment as well as marine-source and land-source pollution, it's effects become more potent and are experienced more frequently.[5] The effects that climate change is probable to have on Ireland's maritime domain is likely to be significant, particularly given the exposed location of this island within the North Atlantic. The compounding effects of climate change that are likely to be felt most severely in coastal communities in Ireland and the maritime domain around this island include flooding, coastal erosion, destruction of habitat, and the loss of low-lying coastal land; all due to sea level rise. The marine environment is also likely to undergo significant chemical changes such as changes in density, salinity, temperature,

1 Military.ie. "Naval Service Diving Section." Website, accessed September 4, 2024. https://www.military.ie/en/who-we-are/naval-service/specialist-units/diving-section/.
2 Conor Gallagher, "Ireland's Naval divers: 'People think of coral reefs. Military diving is a different beast'." The Irish Times, December 4, 2021.
3 Timoty Clack, et al. *Climate change, conflict, and (in)security: Hot War*. (Abingdon: Routledge, 2024), 3-4.
4 Commission on the Defence Forces. *Report of the Commission on the Defence Forces*. (2022), 67.
5 Vice Admiral Mark Mellett (Retd), interview by author, September 7, 2024.

and acidity.[6] Changes in the turbidity of the water, and increasing material in the water from eroded coasts may lead to a decrease in water transparency and diver visibility.[7] Lower salinity, caused by the influx of seawater from melting ice, and warming waters are likely to produce harmful algal blooms and increase other marine growth,[8] which is likely to also affect diver visibility but also have negative implications for ships' hydrodynamics and the operation of sensitive external equipment in the water. The processes of warming oceans and acidification are likely to have negative "*implications for ocean circulation and biogeochemical cycling,*" meaning that the natural currents around Ireland could be affected.[9] Of greatest concern in this regard would be the slowing, or collapse, of the Atlantic meridional overturning circulation which would have detrimental effects on Ireland's marine ecosystem, as well as on the island of Ireland more generally.[10]

Climate change is also increasing the likelihood of storm surges and flooding, which are both hugely damaging environmentally and economically, particularly in the marine environment and coastal communities.[11] The increasing frequency, severity, and unpredictability of storms on the North Atlantic storm track are likely to be of particular concern within Irish waters due to the devastation that these storms can have on coastal communities and industries.[12] Of particular concern with regard to these storms is the inherent danger that they present to those operating in the maritime domain. Clack, et al., note that this is a specific danger for navies due to the necessity of their operating in coastal areas and at sea. While at sea, "*more frequent and stronger storms make operating more arduous and conditions harder to forecast,*"[13] which not only endangers crews but also limits their effectiveness. These effects are significant for comparatively small Inshore and Offshore Patrol Vessels which can be less able to endure inclement conditions than larger vessels.[14] As has been demonstrated, anthropogenic climate change is likely to have signficant effects on the marine environment surrounding Ireland. These effects are clearly demonstrated to not only affect civilian industry and coastal communities but are also likely to impact the Naval Service due to the necessity of coastal naval bases and ships operating in inclement weather.

International Military Responses to Climate Change

The detrimental effects that climate change is expected to have in the maritime domain are influencing navies globally to prepare for it's effects. Many nations are beginning to consider the need for greater resilience against the effects of climate change while also focusing on reducing their outputs of greenhouse gases. The New Zealand Defence Forces, the UK's Royal Navy, and the US Navy are all taking note of the likely impact of climate

6 Eugene Farrell et al. *Environmental Protect Agency Report no 429: Building Coastal and Marine Resilience in Ireland.* (Wexford: Environmental Protection Agency, 2023), 5.
7 Weilin Hou and Alan Weidemann. "Diver visibility: Why one cannot see as far?" *Ocean Sensing and Monitoring* 7317, no. 1 (2009): 1-3.
8 Mellett (Retd), interview by author.
9 Farrell et al. *Environmental Protect Agency Report*, 5.
10 Mellett (Retd), interview by author. Should the Atlantic meridional overturning circulation (AMOC) collapse, Ireland is likely to see a rapid and drastic cooling, more sea ice, and flooding.
11 Farrell et al. *Building Coastal and Marine Resilience in Ireland*, 5.
12 Mellett (Retd), interview by author.
13 Clack, et al. *Climate change, conflict, and (in)security: Hot War*, 11.
14 Mellett (Retd), interview by author.

change on future operations,[15] while also acknowledging the part that their militaries play as contributors to climate change. New Zealand, the US, and the UK have all commenced efforts to acknowledge these faults and reduce their output of greenhouse gases and waste, notably through efforts to increase the efficiency of naval vessels.[16] As a short-term example of success, the Royal Navy has turned towards conventional fuels with a lower level of sulphur oxide, resulting in a 77% drop in sulphur oxide emissions; introduced greener ship designs, waste management, and more environmentally friendly antifouling paints; and crucially has fostered a culture change towards being more environmentally conscious.[17] As has been seen by these limited examples of the seriousness with which other nations' militaries—in particular, their navies—are treating climate change and investing in solutions to mitigate it's effects should influence the thinking within our nation concerning building resilience against the threats of climate change and reducing it's effects. It is worth noting, however, that this research failed to locate any instances of other militaries explicitly stating how they sought to change or prepare their diving teams for the advent of climate change.

Implications of Climate Change on Naval Service Diving Section Operations

Search and Recovery has been highlighted as one of the *"primary external roles"* of the NSDS, though it is the tasking that might be most affected by the impacts of climate change. The section is involved in an average of 15 searches for missing persons each year, with each task taking up to three weeks to complete.[18] The NSDS can also search for objects on the seabed, vehicles in the water, and the hulls of ships in an ATCP and ATCA role. This can include the recovery of evidence for An Garda Síochána or Customs. Such operations are already complicated by the weather, such as the search for the *MFV Alize* being temporarily delayed due to inclement weather.[19] As storms become more prevalent, more dangerous, and more unpredictable due to climate change, this could result in diving operations becoming more dangerous and outright precluding operations under some conditions. These operations may be further complicated by shifts in currents which may become more severe or unpredictable due to climate change,[20] though it is worth noting that NSDS personnel are already trained to operate in waters with strong currents, limiting the impact that this will have on them. NSDS divers are also trained to deal with zero visibility diving,[21] limiting the effects that reduced visibility due to coastal erosion, brackish water due to algal blooms and other marine growth, and tides will have. The movement of the

15 New Zealand Defence Force. *NZDF Strategic Plan 2019–2025.* (Wellington: Ministry of Defence (NZ), 2019), 10; Chris Howard, "Toward a Zero Carbon Navy," Professional Journal of the Royal New Zealand Navy 1. no.1 (2020): 82-86; Ministry of Defence (UK), *Climate Change and Sustainability Strategic Approach*, (London: Ministry of Defence (UK), 2021), 17; Department of Defense (US). *Quadrennial Defense Review 2014*. (Washington DC.: Department of Defense (US), 2014), VI

16 Howard, "Toward a Zero Carbon Navy," 82-86; Sarah Ashbridge and Alistair Beard, "Greening Defence: Transforming the Royal Navy for a Climate-Affected World," *Royal United Services Institute Commentary*, May 30, 2022; Department of the Navy, Office of the Assistant Secretary of the Navy for Energy, Installations, and Environment, *Department of the Navy Climate Action 2030*, (Washington, DC: Department of the Navy, 2022), 16-19.

17 Ashbridge and Beard, "Greening Defence."

18 Conor Gallagher, "Naval Service diving section hit hard by staffing crisis," *The Irish Times*. July 11, 2019.

19 Conor Kane. "Body reportedly found in search for fisherman." *RTÉ*. January 22, 2020.
Neil Michael. "Navy divers to assist in search for missing fisherman." *Irish Examiner*, January 7, 2020.

20 Lieutenant (NS) Jason Croke, interview by author, July 29, 2024.

21 Gallagher. "Ireland's Naval divers;" Croke, interview by author.

unit towards a greater reliance on Remotely Operated Vehicles (ROVs) and side-scan sonar also effectively reduces the threat to divers posed by climate change and the reduction in visibility as divers no longer have to enter the water to gain an understanding of what lies on the seabed.[22] As has been demonstrated, the probable implications of climate change could have negative effects on diving operations, though many of these are likely to be counteracted pre-emptively by the high standard of training that is already in place, as well as by the recent acquisition and implementation of Remotely Operated Vehicles.

The same implications of climate change are likely to be felt in the NSDS's underwater survey role. While this role has historically been associated with the survey of historic wrecks and the inspection of Naval Service vessels, it is likely to become even more important given the implications of climate change as well as Ireland's shifting strategic situation. The periodic inspection of Naval Service vessels' hulls by Naval Divers may need to become more regular due to increased marine growth,[23] brought on by the warmer waters and lower salinity. Ireland's joining of the Critical Seabed Infrastructure Protection (CSIP) initiative, which is a European Union Permanent Structured Cooperation (PESCO) initiative, highlights the greater awareness of the dangers that are potentially posed to Ireland's subsurface infrastructure. This is particularly relevant to the subsurface cables that transit through Irish waters.[24] While still under active consideration at the time of writing, Ireland may also be able to join NATO's Critical Undersea Infrastructure Coordination Cell which would allow for greater intelligence sharing among both NATO members and partner nations like Ireland.[25] These cables are not only particularly vulnerable to attack, as demonstrated by similar attacks on subsurface infrastructure elsewhere in recent years but are also of enormous economic importance in Ireland and the European Union.[26] The NSDS, being the *"only dive team in Ireland capable of carrying out deep sea operations,"*[27] are likely to have an important role in the monitoring of these assets to protect them, given the capabilities of NSDS ROVs and side scan sonar. As more unstable sea conditions are likely to make this role much more difficult, the NSDS's recent procurement of large V-Hulled PE Dive Boats with enclosed cabins for protecting the crew from the elements, which were purchased explicitly to address the issue of worsening sea conditions, is likely to prove to be a sound investment.[28] This requirement also suggests that the purchase of ROVs has been a sound investment both due to their capability to survey up to 1000m deep,[29] far beyond the range of any diver, but also because of the wisdom of removing divers entirely from the water where possible if their role can be performed more safely by an ROV.[30] As demonstrated, the recent acquisitions of ROVs, adoption of side scan sonar, and more

22 Niall O'Connor, "Deep dive: On site with Ireland's undersea drone experts for a major military exercise," *The Journal*, October 8, 2023.
23 Croke, interview by author.
24 Cormac O'Keefe. "Security experts welcome Dáil vote for Irish military involvement in EU seabed protection," *Irish Examiner*, July 5, 2024.
25 Robert McCabe and Brendan Flynn, "Under the Radar: Ireland, Maritime Security Capacity, and the Governance of Subsea Infrastructure," *European Security*, 33 (no. 2). (2024): 333-334; Cormac O'Keefe. "Ireland's neutrality does not stop it from being eyed as a cyber target," *Irish Examiner*, September 7, 2024.
26 As argued in last year's edition of the *Defence Forces Review*. Cian Lynch, "The Use of Aerial Assets in the Allied Campaign of Antisubmarine Warfare During the Great War as a Model for Enhancing Contemporary Irish Maritime Security," *Defence Forces Review 2023* (2024): 22-24.
27 Gallagher. "Naval Service diving section hit hard by staffing crisis." *The Irish Times*.
28 Croke, interview by author.
29 Military.ie. "Naval Service Diving Section."
30 Mellett (Retd), interview by author.

seaworthy boats are likely to mitigate some of the negative effects of climate change in an underwater survey role.

An area of particular concern due to climate change is the role of the NSDS in Explosive Ordnance Disposal (EOD). Items of explosive ordnance, which are typically historical in nature such as sea mines, dumped munitions, or unexploded depth charges, are still recovered on an annual basis.[31] Shifting sea currents, however unlikely, could potentially result in a greater number of UXOs becoming dislodged from the seabed and either washed onto Irish shores or dredged up in fishing nets.[32] This is of particular concern as there are around 200,000 sea mines from World War II alone unaccounted for in British and Irish waters.[33] Should more of these munitions become shifted by changing tides they may pose a threat to navigation in Irish waters or to the safety of coastal communities and industry. While these UXOs, and mines in particular, have been a danger for years, the adoption of ROVs is likely to limit the danger posed to NSDS divers as the munition can be investigated, or potentially even disposed of, entirely by the ROV without risking a ship or diver. As demonstrated, while changing currents due to climate change may have some effect on the NSDS's EOD role, however unlikely, this danger may be entirely mitigated by the increasing use of ROVs.

The final role of the NSDS that this article will address is the NSDS's underwater engineering task. This task includes the maintenance and cleaning of key external sensors and high-risk areas on the bottom of Naval Service vessels' hulls in between more extensive cleaning during periods in dry dock.[34] This is likely to gain even greater importance due to the previously highlighted acceleration of marine growth due to climate change, as lower salinity, increased carbon content, and higher water temperatures lead to algal blooms and other forms of harmful marine life.[35] The process of the acidification of the oceans, once again due to climate change, may also contribute to greater corrosion of ships' hulls and sensitive external equipment necessitating greater NSDS time and resources being devoted to these essential maintenance tasks.[36] While the NSDS is not responsible for the cleaning of the entire vessel—only critical and sensitive external underwater systems—it may have a greater role in the future should ROVs specifically designed for hull maintenance be used in this role, as suggested by Schultz et al., as a method of cost reduction due to improved hydrodynamics as less marine growth will slow the ship in the water.[37] The already observed increase in harmful marine growth, driven by climate change, is likely to have harmful effects on ship operation and effectiveness and result in a greater demand for NSDS time and resources.

31 Military.ie. "Naval Service Diving Section."
32 Croke, interview by author.
33 Cathal McMahon. "Elite seamen bid to pass gruelling Navy test." *Irish Mirror*. January 17, 2015.
34 Croke, interview by author.
35 Mellett (Retd), interview by author.
36 Ibid.
37 M. P. Schultz, J. A. Bendick, E. R. Holm, and W. M. Hertel. "Economic Impact of *Biofouling* on a Naval Surface Ship." Biofouling, 27, no. 1, (2011): 95.

Conclusion

Climate change is likely to have detrimental effects in the Irish maritime domain as storm severity and frequency, flooding, and changes in sea conditions begin to affect Irish coastal communities and industry. While the Naval Service Diving Section has been inoculated in a sense against many of the worst potential dangers of climate change by it's intense training and sound investments in Remotely Operated Vehicles, side scan sonar, and more seaworthy boats, this paper would suggest that it will be necessary to make significant changes to the composition of the unit and it's equipment to ensure that the NSDS is prepared for the effects of climate change; Firstly, the implementation of the proposals of the Commission on the Defence Forces will be necessary to ensure the future success of the unit.[38] A larger group of divers, with greater support and the ability to devote more time to their specific role, is certain to provide a more capable unit and one less at peril of the risks of climate change. The continued investment and training in ROVs is also clearly of great importance as they reduce the risk posed to divers by climate change. Other investments, such as a diving barge for more stable diving operations in inclement weather,[39] or even in a larger Naval Service vessel with greater seaworthiness and a dedicated ability to support NSDS operations,[40] would also be a sound investment and reduce the reliance of the NSDS on civilian vessels, thus ensuring it's continued resilience and capacity to deal with the threats of climate change.

38 Department of Defence, *The Detailed Implementation Plan for the Report of the Commission on the Defence Forces*, (Newbridge: Department of Defence, 2023), 56; Department of Defence, *High Level Action Plan for the Report of the Commission on the Defence Forces*. (Newbridge: Department of Defence, 2022). p. 21.
39 Croke, interview by author.
40 Mellett (Retd), interview by author.

Climate Change, Security, and Defence — A Global Leadership Role for Ireland

Ian Hughes and Richard Wood

The Contemporary Polycrisis

As the impacts of climate change become clearer, there is growing debate about the relationship between climate change and security and the implications of climate change for defence policies. McCarthy has previously outlined the implications of climate change for Ireland's defence and security landscape within the broader context of it's expected global security impacts.[1] The first global impact McCarthy highlights is the risk of increased resource-based conflicts over essentials, such as food and water, and global commodities, such as oil and minerals.[2] This risk is exacerbated by the fact that many global commodities are based in regions that are highly susceptible to the effects of climate change.

A second climate impact is loss of territory, accompanied by environmentally accelerated migration. Climate change is already causing major loss of land as parts of the world become uninhabitable due to sea level rise and temperature rise. On average 22.5 million people have been displaced annually since 2008 by weather and climate-related disasters, a pattern that is expected to increase significantly as the century progresses.[3] McCarthy also highlights the likelihood of sharp increases in international tensions as governments and citizens who are forced to deal with the worst consequences of climate change confront those who they perceive to be responsible but who also, by virtue of greater resources, are escaping the worst effects.[4]

Bourke broadens McCarthy's risk analysis from climate change to the much wider range of contemporary threats.[5] He points, for example, to the shift in geopolitics that is underway as China, in particular, seeks to restructure the current international system to one that reflects it's interests more strongly. Russia's war in Ukraine highlights the clear danger of Putin's Russia to the rules-based international order, while the Middle East is on the verge of all-out war.

This disturbing confluence of crises in the defence and security space is mirrored by the simultaneous occurrence of a series of crises across a wide range of economic, political, technological and social arenas. These include: environmental degradation, which threatens widespread food and water scarcity; a biodiversity crisis, which carries increased risks of pandemics; the emergence of new technologies, including Artificial Intelligence; ongoing cycles of global economic crisis; the erosion of democracy in previously consolidated democratic states; and socially destabilising levels of inequality both within and between states.

1 Capt Tadhg McCarthy, "The Implications of Climate Change on The Defence and Security Landscape in Ireland," *Defence Forces Review* (2021): 82-89.
2 European Commission, Climate Change and International Security. Paper from the High Representative and the European Commission to the European Council, S113/08. (Brussels: European Communities, 2008), 8. https://www.consilium.europa.eu/media/30862/en_clim_change_low.pdf
3 United Nations Human Rights, Office of the High Commissioner, "Losing your land to climate change," https://www.ohchr.org/EN/NewsEvents/Pages/LosingLandtoclimatechange.aspx (23 October 2017).
4 European Commission, "Climate Change and International Security, Paper from the High Representative and the European Commission to the European Council," 8, https://www.consilium.europa.eu/media/30862/en_clim_change_low.pdf.
5 Wesley Bourke, "Meeting multiple threats in an Uncertain Future," *Defence Forces Review* (2019): 182-190.

This proliferation of crises clearly illustrates that climate change is not an isolated problem susceptible to solution through singular responses, but rather part of what has been termed a much larger polycrisis.[6] The term polycrisis indicates that not only are multiple crises occurring simultaneously, but each crises has the potential to amplify the destructive effects of other crises.

The accelerating impacts of the contemporary polycrisis has led to a growing body of opinion that views these disparate crises as deeply interlinked and a signal of the necessity for deep systemic change across the whole of society.[7] In particular, a growing literature contends that the seemingly separate crises in climate, environment, geopolitics, inequality, and the security and defence arenas, all have common roots in the structure of modern societies and the norms and values upon which they are based.[8]

The Psychological Roots of the Polycrisis

In our work,[9] we have been exploring the psychological roots of the contemporary polycrisis. We argue that the deep roots of the polycrisis, and the cause of much violence and war, lies in the dangerous psychology of a minority of human beings, and the propensity of human systems, including politics, to concentrate power in the hands of this minority. This combination of individual psychology and social empowerment enables what Overy calls hubristic violence[10], that is violence fuelled by unbridled narcissism.

While dangerousness is not dependent on a specific disorder, research in psychology shows clearly that there is a sizeable number of people in every society whose psychological makeup renders them dangerous. Of particular salience is the psychological disorder of malignant narcissism. This has received attention over the last 60 years from a variety of clinicians, including Fromm[11], Kernberg[12], Shaw[13], Mika[14], and Wood[15],[16], amongst many others. It describes a personality that, as a result of devastating trauma it has experienced, is incapable of empathic human relationship.

Individuals with this personality typically exhibit a rigidly narcissistic belief in their own infallibility, a paranoid fear of those around them, and a psychopathic ruthlessness which

6 Thomas Homer-Dixon, Ortwin Renn, Johan Rockstrom, Jonathan F. Donges, & Scott Janzwood, "A Call for an International Research Program on the Risk of a Global Polycrisis," (Technical Paper for Cascade Institute, July 20, 2022), 3, http://dx.doi.org/10.2139/ssrn.4058592
7 Ian Hughes, Edmond Byrne, Markus Glatz-Schmallegger, Clodagh Harris, William Hynes, Keiran Keohane, & Bryan O Gallachóir. "Deep institutional innovation for sustainability and human development," *World Futures* (2021), 77(5): 371-394.
8 Riane Eisler & Douglas P. Fry, *Nurturing our humanity: How domination and partnership shape our brains, lives, and future* (Oxford: Oxford University Press, 2019).
9 Ian Hughes, *Disordered minds: How dangerous personalities are destroying democracy* (Winchester: John Hunt Publishing, 2018).; see also Richard Wood, *A Study of Malignant Narcissism: Personal and Professional Insights* (London: Routledge, 2022).; see also Richard Wood (Ed.), *Psychoanalytic Reflections on Vladimir Putin: The Cost of Malignant Leadership* (London: Routledge, 2024).
10 Richard Overy, *Why War?*(London: Penguin Books, 2024).
11 Erich Fromm, *The heart of man* (New York: Harper & Row, 1964).
12 Otto Kernberg, *Severe personality disorders* (New Haven, CO: Yale University Press, 1984).
13 Daniel Shaw, *Traumatic narcissism: Relational systems of subjugation* (London: Routledge, 2013).
14 Elizabeth Mika, "Who goes Trump? Tyranny as a triumph of narcissism," In Bandy Lee (Ed.) *The Dangerous Case of Donald Trump* (2nd ed., pp 46-53) (New York: Thomas Dunne Books, 2019).
15 Richard Wood, *A Study of Malignant Narcissism: Personal and Professional Insights* (London: Routledge, 2022).
16 Richard Wood (Ed.), *Psychoanalytic Reflections on Vladimir Putin: The Cost of Malignant Leadership*. (Oxfordshire: Taylor & Francis, 2024).

they apply to crush opponents and reshape the world according to their own disordered logic. Their psychological makeup makes it impossible for such persons to feel empathy for others, to view others as anything other than objects to be used or threats to be eliminated, and for whom the concept of equality is impossible to conceive.

For a malignant narcissist, normal everyday human interactions based on empathy and care, or need and interdependence, evoke revulsion which manifests as envy and rage. This rage underpins their belligerence and contributes to a manic aggressive energy that continuously drives them. Only when others align themselves with the malignant narcissist's desires does relatedness become a possibility, but such relationships are utterly transactional and ruthless in nature, though it might at first glance appear otherwise. Their emotional starvation, caused by their inability to maintain loving and supportive relationships, compels them to seek to excessively compensate for their lack with commodities such as money, power, and acclaim.

People with dangerous disorders represent a risk to society when they act alone. This is seen, for example, in the high proportion of homicides that are carried out by sociopaths. A much greater danger arises, however, when those with dangerous personality disorders act together. A key to understanding the danger that individuals with these disorders pose, therefore, is to understand how individual disorders become mass pathology.

Tragically, there are many instances of this 'descent into pathocracy'[17] to illustrate how a pathological minority can come to control an entire society. These tragic examples include Hitler's Germany, Stalin's Russia, Mao's China, and Cambodia under Pol Pot,[18] among many others.

The role that people with dangerous disorders play in mass political violence cannot be explained simply by the personality of individual leaders alone, however. Instead, the rise of dangerous leaders requires an appreciation of the appeal of such personalities to broad swathes of society, alongside an understanding of the conditions which make their rise to power possible.

Also, pathological individuals do not, of course, have a monopoly on violence and greed. Identifying the central catalysts of mass political violence as being psychologically disordered does not deny the role of large numbers of psychologically normal human beings from participating in acts of violence. The devastation that malignantly narcissistic leaders can produce can be understood in part however, by the licence that such leaders give to the populations they govern. Through their language and policies, they allow others to enact their own brutality towards 'enemies', within and without, that the narcissistic leader targets as threats to be eliminated.

17 Andrew M. Lobaczewski, *Political ponerology: A science on the nature of evil adjusted for political purposes* (Somerset: Red Pill Press, Ltd., 2013)
18 Ian Hughes, *Disordered minds: How dangerous personalities are destroying democracy* (Winchester: John Hunt Publishing, 2018).

Finally, social structures play an essential role in empowering dangerous leaders and their violent followers. Economic insecurity, social disintegration, and mass disaffection with existing structures of power are among the necessary conditions which enable pathological leaders to come to power, whether through violence or the ballot box.

War and violence, of course, are not the only areas where dangerous narcissistic leadership poses a threat to society. The literature on dangerous leaders, both historic and contemporary highlights that the following risks are also heightened by dangerous authoritarian leadership[19]: risk to democracy; risk to civil liberties; risk to minority rights and women's rights; risk to social cohesion; and risk to international cooperation. In the context of the wider polycrisis, Khorram-Manesh[20] warns about the danger of narcissistic leaders undermining progress towards the Sustainable Development Goals, including the role of narcissistic leaders in climate denial and undermining policies aimed at addressing climate change.

Implications for International Relations Theory

As outlined by Doyle,[21] three main worldviews have shaped the modern perception of world politics: Realism, Liberalism, and Socialism. Each worldview has both an empirical, analytic theory explaining political outcomes and a normative underpinning in terms of the political values it is based upon. Every major theory also addresses three main levels of analysis, the individual, the structure of domestic society, and the structure of the international system.

Realism is based on the premise that international politics is characterised by a 'state of war'—the constant possibility of war among states. This constant possibility requires that all states follow 'realpolitik' by being self-interested, preparing for war, and calculating the relative balance of power. According to realist theories, mutual mistrust characterises interstate politics so that, even with the best will in the world, no power can surrender any part of it's security or liberty to another. International order must ultimately be based on power or force.

Our psychological understanding helps explain the constant state of war, as various strands of realist theory do, as being due to the combination of the nature of humanity, the character of states, and the structure of the international order. In accord with fundamentalist versions of Realism, our psychological perspective attributes the 'state of war' as being rooted primarily in the psychological drive for power of a malignantly narcissistic minority of the population. The pathological psychology of this minority impels them to pursue, as Machiavelli wrote, "the glorious exercise of an individual's courageous ambition."[22]

19 Bandy X Lee, *The dangerous case of Donald Trump: 37 psychiatrists and mental health experts assess a president-updated and expanded with new essays* (New York: Thomas Dunne Books, 2019).
20 Amir Khorram-Manesh, Krzysztof Goniewicz & Frederick M. Burkle, The Impacts of Narcissistic Leadership on Achieving the United Nations' Sustainable Development Goals—A Scoping Review. *Challenges* (2024), 15(37), https://doi.org/10.3390/ challe15030037
21 Michael W. Doyle, *Ways of war and peace* (New York: WW Norton, 1997).
22 Niccolò Machiavelli, *The prince and other writings* (New York: Simon and Schuster, 2014).

The presence of a significant number of powerful malignant leaders helps explain the antagonistic ultra-competitive structure of the international system. Our psychological perspective also accords with Constitutionalist versions of Realism, however, which claim that domestic structures and institutions do make a difference in the formulation of foreign policy and the degree of antagonism that characterises the international system, a point to which we will return shortly.

In stark contrast to Realism, Liberal theories of the international order insist that there exists a firm possibility of a state of peace between states, not simply an absence of war. Liberal states, by focusing on protecting the rights of their citizens and on commerce and international trade, move states away from antagonism and war. For Locke and Bentham, for example, peace can emerge if individual citizens and statespersons are dedicated to the rule of law, and the defence of individual life, liberty and property. For Smith and Schumpeter, the state of war can be tamed by the development of capitalist democracy and the pacifying effects of markets and individual commercial activity. For Kant, the state of war can be overcome by a process of constitutional evolution in which emerging republican governments establish among themselves a 'pacific union' whose expansion offers the prospect of a perpetual and universal peace.

The core of Liberalism is the importance of the freedom of the individual, the right to be treated and the duty to treat others as ethical subjects, not as objects or means only.[23] Our psychological perspective, however, alerts us to the fact that not everyone is psychologically capable of recognising and adhering to these core tenets which Liberals insist are the foundations for peace and security. Liberal theory, however, also points to a potential remedy for dangerous malignantly narcissistic leaders, namely democracy.

In line with this Liberal argument, our psychological perspective argues that the system of checks and balances within a properly functioning democratic system places limits on the destructiveness of pathological leaders. These checks include the potential opposition of citizens to war, constraints on leaders by representative legislatures and the rule of law, and the rotation of elites through elections. By imposing such limits, democracy has the potential to become an engine of peace.

Finally, as Doyle argues, as discredited as they may have become in mainstream policy circles, Marxist ideas still offer significant insights into the politics of war and peace. Socialist theories highlight the importance of socioeconomic factors in international relations and add an insightful focus on the impact of inequality of the world political system on violence and war.

23 Michael W. Doyle, *Ways of war and peace* (New York: WW Norton, 1997).

Alignment with Ireland's Foreign and Defence Policies

The so-called Triple Lock mechanism sets out the conditions for the deployment of Irish Defence Forces personnel for peacekeeping operations overseas. This requires that the operation must be mandated by the UN, approved by the Government, and approved by the Irish Parliament—Dáil Éireann.

We propose that, similarly, a three-pronged approach would significantly reduce the threat that dangerously disordered leaders pose to international peace and security, and which lie at the root of the contemporary polycrisis, including the threat of climate change.

First, defence policy should aim to drastically reduce the incidence of war and violence across the world. The impacts of war and violence from our psychological perspective are twofold. First, conditions of war and violence empower those with malignant narcissism since they align with their personality traits of unconstrained aggression, indifference to human suffering, and inability to show weakness or compromise. As Jason Stearns has written in his account of the war in the Democratic Republic of the Congo, the effect of violence is like that of a centrifuge in which the most ruthless remain at the centre, while those with any conscience are flung to the fringes of political life.[24] Furthermore, violence and war create mass trauma, which is a cause of the development of malignantly narcissistic personalities in the first place. Human resilience ensures that the majority of children exposed to trauma do not develop malignant narcissism, but a minority do. Violence therefore creates malignantly narcissistic individuals who, if given access to leadership positions, will pay forward the trauma they themselves experience in childhood.

Second, defence policy should explicitly acknowledge the critical importance of the system of checks and balances in a functioning democratic system as defences against the dangers of malignantly narcissistic leaders. These defences are not confined simply to the role which elections play in the selection and removal of political leaders, but also crucially include the rule of law, protections for universal human rights, gender equality, separation of powers, and the role of international law in holding leaders to account. Democratic rules, systems and cultures act as a defence against dangerous leadership.

Third, defence policy should acknowledge the systemic role of violence and gross inequalities in creating mass support for dangerous leadership. Defence policy should therefore seek to dismantle systemic injustices both at a national level and within the international system.

Finally, in pursuing this threefold path, defence policy should acknowledge that, in terms of methodology, non-violence is the only means that can ultimately attain these goals. The violent pursuit of these goals will simply empower the most dangerous among us who have no interest in, or capacity to, pursue a just and peaceful international order.

24 Jason Stearns, *Dancing in the Glory of Monsters*, (New York: Public Affairs, 2012).

Although a detailed outline of what a different type of defence policy might look like is beyond the scope of this paper, a few lines of research point to possible directions of travel. One line of possible (further) development is to more strongly link structural violence with direct violence and encompass the goal of reducing the former explicitly within defence policy. In this scenario the objective would be to progressively shift spending from defence to investments that reduce global poverty, inequality, and autocracy, as investments in the latter, over time, make the former less necessary. One specific example of this is research on the development of social ecologies and the peaceful child.[25] This research provides a model pathway for the development of children capable of adopting a peace and social justice orientation towards others, ranging from investment in maternal health and safety to the creation of more just societies within which children are socialised.

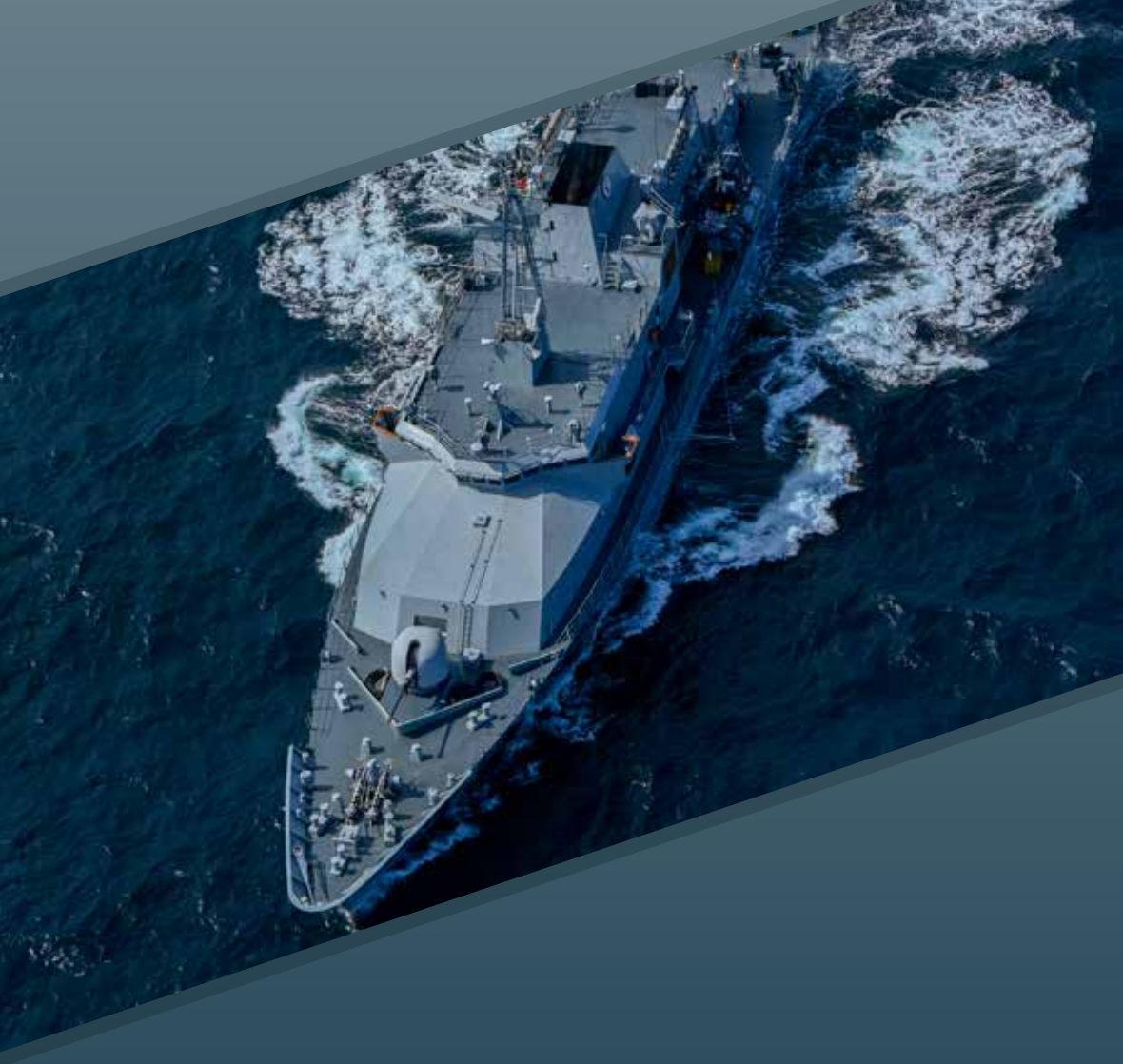
In short, a new type of defence policy should recognise that defence can be best served by attending to issues of caring, social justice, and wealth inequality while formulating the means to prevent dangerous narcissistic leadership.

The comparison of these goals with Ireland's existing foreign policy and defence posture shows a remarkable congruence. As Connors[26] has highlighted, 'The Global Island, Ireland's Foreign Policy for a Changing World'[27] sets out Ireland's 'Signature Foreign Policies' as combating poverty and hunger, advancing human rights, promoting disarmament, commitment to UN Peacekeeping and sharing our experience of peace and reconciliation on the island of Ireland.

In addition, Ireland played a significant role in the development and adoption of the 2030 Agenda on Sustainable Development and Sustainable Development Goals (SDGs) which recognise the links across the peace, humanitarian and development work.[28] Ireland's development policy also emphasises and advocates for conflict prevention specifically addressing underlying causes and/or accelerators of conflict, such as inequality, climate change and poor governance.[29]

Given this alignment, Ireland has an opportunity to lead a distinctive international response to climate change as a security issue by stressing the common roots of climate change and the wider polycrisis in the psychology of trauma and the destructive influence of a dangerous minority if they are allowed access to positions of leadership.

25 Daniel J. Christie, Catherine Panter-Brick, Mark Tomlinson, Jere R. Behrman, James R. Cochrane, Andrew Dawes, ... & Raija-Leena Punamaki, Healthy human development as a path to peace. *In Pathways to peace: The transformative power of children and families* (pp. 273-302) (Cambridge: MIT Press, 2014).
26 Niall Connors, 'Global Citizenship' as Strategic Culture: Is a More Cosmopolitan Feminist Perspective Needed in Military Education?, *Defence Forces Review* (2021).
27 Department of Foreign Affairs, *Ireland, The Global Island: Ireland's Foreign Policy for a Changing World*, (Dublin: Government of Ireland, 2015).
28 Ireland co-facilitated the intergovernmental negotiations of the SDGs with Kenya, in 2015. United Nations, General Assembly Resolution adopted 25 September 2015 A/RES/70/1, https://www.un.org/ga/search/view_doc.asp?symbol=A/RES/70/1&Lang=E.
29 Marcella Smyth, & Aoife Lyons, Building and Sustaining Peace: Ireland's Approach, *Defence Forces Review* (2020): 238-248.



The Perfect Storm of Rising Tides and Rising Threats: Ireland's Maritime Domain Awareness Challenges in it's Exclusive Strategy-Free Zone

Lt (NS) Wietse Buwalda

Introduction

Ireland, an island nation on Europe's western frontier, faces unique maritime security challenges exacerbated by climate change and evolving geopolitical tensions. This article examines the current state of Ireland's maritime security framework, focusing on four key areas: the threats from a climate perspective, the existing strategy vacuum, the lack of a joint maritime domain awareness (MDA) program, and limited government action despite multiple expert recommendations.

Ireland's Maritime Domain: Challenges and Importance

Ireland's maritime domain extends beyond it's territorial waters (up to 12 nautical miles from the maritime baseline) into the Exclusive Economic Zone (EEZ – up to 200 nautical miles from the maritime baseline), and out into it's claimed extended continental shelf (to a maximum of 350 nautical miles from the baseline or 100nm beyond the 2,500-meter isobath or depth). Within the EEZ, Ireland has sovereign rights over the exploration and use of marine resources. Beyond the EEZ, in international waters, on it's extended continental shelf claimed area, it has rights to the natural resources on the seabed and subsoil. Ireland has a responsibility to monitor and respond to threats, including those to critical undersea infrastructure like communications cables that traverse it's claimed seabed territory. As a signatory of the North East Atlantic Fisheries Convention (NEAFC), it also has an obligation to conduct at-sea inspections of fishing vessels in the NEAFC Regulatory Area. This multi-layered maritime domain has complex governance and security challenges. The existing Naval Service capabilities (professional and committed) are limited compared to similar-sized states like Denmark, Finland, New Zealand, and Singapore. The 2022 Commission on the Defence Forces report highlighted the need for substantial investment and capability enhancements to address these gaps.

The following vignette is a hypothetical scenario of a major maritime security crisis engulfing Ireland in the second half of the 2020s. It draws on previous recorded events, near misses, existing developments, and evidence of potential threats. It also draws from the National Risk Assessment 2024[1]. The 30 October 2024 Niinistö Report is exquisitely timely in this regard:

> *"Despite their different nature, these threats are also cumulative in nature and mutually reinforcing thus creating a number of horizontal challenges that need to be addressed in an integrated way."*[2]

> *"We can no longer expect to deal with one crisis at a time but need to manage and respond to various crises simultaneously."*[3]

1 Department of the Taoiseach, "National Risk Assessment 2024 – Overview of Strategic Risks," (Government of Ireland, September 16, 2024), https://www.gov.ie/en/policy-information/448eb-national-risk-assessment-2024-overview-of-strategic-risks/#strategic-risks-for-ireland-for-2024.
2 Sauli Niinistö, "Safer Together – Strengthening Europe's Civilian and Military Preparedness and Readiness," (Report for the European Commission, October 30, 2024), 47, accessed November 13, 2024, https://commission.europa.eu/document/download/5bb2881f-9e29-42f2-8b77-8739b19d047c_en?filename=2024_Niinisto-report_Book_VF.pdf.
3 Ibid., 60.

This means *"taking worst-case scenarios seriously as the benchmark for our preparedness efforts."*[4] In line with this Niinistö Report recommendation, the vignette provides a talking point to *"test high-level decision-making, operational coordination and to build strong links between actors and across sectors"*[5]. The outcome of which *"should streamline decision-making, coordination, and information sharing processes, and further clarify roles and responsibilities at the EU, national, and local levels"*[6] and highlight the urgent need for a published Maritime Security Strategy.

Vignette: "In the [Strategy] Vacuum, No One Can Hear You Scream"

The ghost ship MV Alta lurched through towering waves off Ireland's southern coast. For two years, she had wandered the Atlantic, crewless, and forgotten[7]. Now, she was approaching Cork Harbour, detected by satellite three times but slipping past the Kinsale gas rigs unnoticed, simply because no one was looking at the screen.[8]

Figure 1: EMSA SEG report showing the highly probable detection of MV ALTA five days prior to coming ashore. This evidence was omitted from the MCIB report into the incident. [9] [10]

4 Ibid., 48.
5 Ibid., 17.
6 Ibid., 17.
7 Matt Burgess, "The Mysterious Final Voyage of the Alta, Ireland's Doomed Ghost Ship," *Wired*, March 29, 2020, https://www.wired.com/story/ghost-ship-ireland-mv-alta/.
8 Dáil Éireann Debate, "Written Answers–Departmental Reports," Parliamentary Question 676 (November 3, 2020) answered by Minister for Defence Simon Coveney TD, accessed November 13, 2024, https://www.oireachtas.ie/en/debates/question/2020-11-03/section/601/#pq-answers-676.
9 Unknown [Redacted], "CAPABILITY: MARITIME SECURITY – A NAVAL SERVICE ROLE. Commission on the Defence Forces Public Consultation Response," (Commission on the Defence Forces, March 2022), https://assets.gov.ie/194535/9ceb5774-57d7-4ea6-815e-c72e6f8d3fb7.pdf.
10 Irish Naval Service, "Analysis of Highly Probable Detection of MV ALTA by EMSA SEG on 10 February 2020." Briefing for the Naval Service Representative on the Interdepartmental Working Group Established on Foot of the Recommendation of the MCIB Report into the Grounding of the Derelict Vessel MV Alta on the South Coast in February 2020, July 2, 2021.

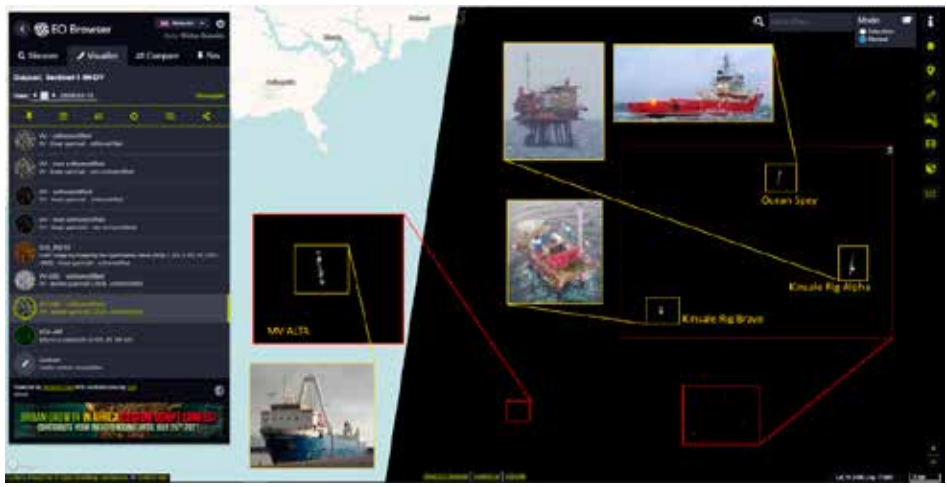


Figure 2: SAR detection of MV ALTA near the Kinsale Gas Rigs on the night prior to coming ashore.[11] [12]

Commander Michael Flynn cursed the weather and his triple-jobbing[13]. Windy.com showed 10-meter swells and 57-knot winds at Roches Point[14]. *"Third storm in a week*[15]*, the Atlantic's gone mad*[16]," he muttered. Reduced crew[17] and no contractor checks[18] due to flight cancellations[19] meant his focus was on ship maintenance. He looked out his office window at a familiar sight–the detained MV Mathew, the cargo ship caught in Ireland's largest-ever drug smuggling bust just months earlier[20] [21]. In the Operations room, Petty Officer Hayes learned they had lost their best maritime intelligence service contract[22] and had no insight on the 'Dark Fleet'[23] or the recent movements of unknown fishing

11 Sentinel Hub, "Sentinel-1 Imagery from February 15, 2020, of the MV Alta Incident Area," *EO Browser*. Accessed July 7, 2021. https://www.sentinel-hub.com/explore/eobrowser/.
12 Irish Naval Service, "Analysis of Sentinel-1 Imagery and the MV Alta Incident." *Briefing for the Naval Service Representative on the Interdepartmental Working Group Established on Foot of the Recommendation of the MCIB Report into the Grounding of the Derelict Vessel MV Alta on the South Coast in February 2020*, July 2, 2021.
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14 *Met Éireann*, "Climate Statement for Winter 2021/2022 and February 2022," *Met Éireann*, March 2022, https://www.met.ie/ga/climate-statement-for-february-2022.
15 Met Éireann, "Climate Statement for February and Winter 2020," Met Éireann, March 2020. https://www.met.ie/climate-statement-for-february-2020.
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19 "Several Flights Cancelled or Diverted from Cork Airport Due to Adverse Weather," *The Irish Times*, August 10, 2023. https://www.irishtimes.com/ireland/2023/08/10/several-flights-cancelled-or-diverted-from-cork-airport-due-to-adverse-weather/.
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21 Christopher Gomes, "MV Matthew: The Poster Child of an Overlooked Problem," *Global Financial Integrity* (blog), November 14, 2023. https://gfintegrity.org/mv-matthew-the-poster-child-of-an-overlooked-problem/.
22 Conor Gallagher, Jack Power, and Pat Leahy, "Ireland Will Cease Purchases of Israeli Military Equipment, Says Tánaiste," *The Irish Times*, August 30, 2024. https://www.irishtimes.com/politics/2024/08/30/ireland-will-cease-purchases-of-israeli-military-equipment-says-tanaiste/.
23 Narjiss Ghajour, "The Dark Fleet Explained," *Maritime Professionals* (blog), January 10, 2024. https://maritime-professionals.com/the-dark-fleet-explained/.

trawlers West of the EEZ[24]. At Valentia Coast Guard MRCC, AIS outages were blamed on weather, while the EMSA SEG Satellite Detection Layer[25] was turned off. Across the Irish Sea, UK Joint Maritime Security Centre[26] analyst Jennifer Reeves read an AI-generated Imminent Collision Risk Report[27] with alarm. Simultaneously, in the Maritime Centre for the Security of Critical Undersea Infrastructure within NATO's Maritime Command (MARCOM) in Northwood, UK, warnings were sounding about a developing situation in Brighouse Bay, Scotland.

The drama unfolded rapidly. A sanctions-busting Russian-controlled tanker[28], VLCC DEMETER struck the drifting Alta[29]. One hundred and fifty thousand tons of crude oil gushed into the churning waters as the tanker split in half. A thick, black slick spread across the entire South East coast. Simultaneously, in the Red Sea, the USS Carney faced Houthi anti-ship missiles[30]. The Bab el-Mandeb Strait was now a war zone[31] amidst the world's second largest ship oil spill from the MV Sounion[32], the first now being in Cork. In Panama, Canal Authority chief Eduardo Vasquez confronted the impossible: drought had forced the Panama Canal's closure for the first time in history[33]. Ireland faced a perfect storm. As emergency services battled the oil spill in Cork, the ferry MV Isle of Inishmore capsized off Rosslare[34], overloaded with trucks diverted from the cyber-attacked Dublin Port[35]. Hundreds were in the water, with gale-force winds and legal disputes[36] hampering rescue efforts. In the Emergency Coordination Centre, Taoiseach Michael O'Brien surveyed the chaos.

24 Windward [@WindwardAI], "The Vessels Are All Marked as High or Moderate Risk for IUU Fishing by Windward's AI-Powered Risk Models. This Is the 1st Time Ecuador Has Seen an Onslaught of Chinese and/or IUU Fishing Vessels – 147 Vessels! Are We Seeing a New IUU Fishing Hot Zone Developing in Real Time?," https://t.co/n4lYjcpEWq." *Twitter*, September 2, 2024, https://x.com/WindwardAI/status/1830594442115305679.
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34 "Sweden Closes Case of MV Estonia Sinking," *The Maritime Executive*, February 15, 2024, https://maritime-executive.com/article/sweden-closes-case-of-mv-estonia-sinking.
35 Chalermpong Senarak, "Port Cyberattacks from 2011 to 2023: A Literature Review and Discussion of Selected Cases," *Maritime Economics & Logistics* 26, no. 1 (March 1, 2024): 105–30, https://doi.org/10.1057/s41278-023-00276-8.
36 John Mulligan, "Search-and-Rescue Operator CHC Takes Legal Action against New Contract Holder Bristow," *Irish Independent*, August 10, 2024, https://www.independent.ie/business/irish/search-and-rescue-operator-chc-takes-legal-action-against-new-contract-holder-bristow/a592903720.html.

Anti-immigration riots[37], partly triggered by an increase migrants and refugees from Ukraine, the Middle East and Africa driven by factors such as IUU fishing in the Gulf of Guinea[38], drought in the Sahel[39], and war in Ukraine, Gaza, and Lebanon[40], had just been controlled by stretched emergency services. The new Trump Administration appointed U.S. Ambassador called with offers of assistance and pointed questions about Ireland's ability to secure it's vital sea lanes.[41] [42] The lights flickered as emergency generators took over. Updates came in that throughput on the Scotland Gas Interconnector[43] was stopped. Aghada and Whitegate power stations[44] were offline from the oil spill, and undersea fibre optic cables damaged last week[45], had yet to be repaired due to the weather. With no gas from Britain, wind power generation shut down due to high winds[46] and cuts in communications, Ireland was suddenly dark and very alone in the Atlantic.

Cork fouled. Rosslare in crisis. Dublin Port closed, the Luas still smouldering and the country in the dark. *"Where is our strategy to deal with this?!"* O'Brien screamed.

Ireland's Maritime Domain: Challenges and Importance

Ireland's Exclusive Economic Zone (EEZ) covers an area of 437,500 km², more than six times it's land area.[47] This maritime domain is critical for Ireland's economic prosperity. 73% of Irelands population live within 25km of the shore.[48] 99% of trade by volume and 95% by value is conducted via sea routes.[49] Approximately two-thirds of all transatlantic subsea cables pass over claimed Irish seabed territory.[50] Ireland imported 81.6% of it's total primary energy requirement via the sea in 2023.[51] Ireland's maritime domain is also in the air, with the transatlantic air travel corridor's importance an often-overlooked aspect

37 Olivia Fletcher and Bloomberg, "Irish Anti-Immigration Protesters Arrested After Clashes With Police," *TIME*, July 16, 2024, https://time.com/6999049/dublin-ireland-anti-immigration-protests-arrests/.
38 Kebba Jeffang, "Overfishing off West Africa Hits Livelihoods, Fuelling Emigration," *Dialogue Earth* (blog), November 9, 2023, https://dialogue.earth/en/ocean/overfishing-off-west-africa-hits-livelihoods-fuelling-emigration/.
39 Colin Delfosse, "UN Warns of Worsening Conflict and Displacement in Sahel without Immediate Climate Action," *UNHCR Ireland*, November 16, 2022, https://www.unhcr.org/ie/news/press-releases/un-warns-worsening-conflict-and-displacement-sahel-without-immediate-climate.
40 Conor Lally, "Withdrawing Irish Troops from Lebanon Due to Israel-Hamas War May Cause Added 'Carnage,' Says Martin," *The Irish Times*, May 19, 2024, https://www.irishtimes.com/politics/2024/05/19/withdrawing-irish-troops-from-lebanon-due-to-israel-hamas-war-may-cause-added-carnage-says-martin/.
41 *U.S. Department of State*, "Integrated Country Strategy: Ireland," U.S. Department of State, March 16, 2022, https://www.state.gov/wp-content/uploads/2022/06/ICS_EUR_Ireland_Public.pdf.
42 Robert McCabe and Brendan Flynn, "Under the Radar: Ireland, Maritime Security Capacity, and the Governance of Subsea Infrastructure," *European Security* 33, no. 2 (April 2, 2024): 324–44, https://doi.org/10.1080/09662839.2023.2248001.
43 Energy Institute, "Where Does Ireland's Gas Come from and What Determines it's Price?" *Ireland 2050*, 2024, https://irelandenergy2050.ie/questions/where-does-irelands-gas-come-from-and-what-determines-its-price/.
44 Infrageomatics and OpenStreetMap, "Open Infrastructure Map," 2024, https://openinframap.org/stats/area/Ireland/plants.
45 *BreakingNews.ie*, "Fishing Trawler Allegedly Caused €800,000 Damage to Virgin Media's Undersea Cable," BreakingNews.ie, June 4, 2024, https://www.breakingnews.ie/business/fishing-trawler-allegedly-caused-e800000-damage-to-virgin-medias-undersea-cable-1633694.html.
46 Stephen Robb, "What Happens to Wind Farms during Storms?" *Farmers Journal*, December 7, 2021. https://www.farmersjournal.ie/news/news/what-happens-to-wind-farms-during-storms-666724.
47 *Marine Institute*, "The Map of Ireland Is Bigger Than You Think," Marine Institute, 2022, https://www.marine.ie/site-area/news-events/news/map-ireland-bigger-you-think.
48 Richard Curtin, "An Estimation of a Reference Population for the Irish Seafood Sector," (BIM, February 7, 2018), https://bim.ie/wp-content/uploads/2021/02/BIM-an-estimation-of-a-reference-population-for-the-irish-seafood-sector.pdf.
49 Irish Maritime Development Office, "The Irish Maritime Transport Economist Volume 20 2023," (Dublin, Ireland: IMDO, May 2023), https://www.imdo.ie/Home/sites/default/files/IMDOFiles/IMDO%20IMTE%20Vol%2020%202023.pdf.
50 Cormac O'Keeffe, "NATO Open to Helping Ireland Protect Undersea Cables That Cross Irish Waters," *Irish Examiner*, March 6, 2023, https://www.irishexaminer.com/news/arid-41086645.html.
51 SEAI, *Energy in Ireland 2023* (Ireland: SEAI, December 2023), https://www.seai.ie/publications/Energy-in-Ireland-2023.pdf.

of Ireland's maritime strategic position.[52] Ireland's maritime domain remains vulnerable due to several factors: lack of a national and maritime security strategy, limited MDA capabilities, fragmented governance across multiple agencies, and successive government inaction. These vulnerabilities are particularly concerning given Ireland's geographic and cultural position between the US and the European Union and it's responsibilities in safeguarding a sizeable portion of the EU's western approaches.

Rising Tides, Rising Threats

The global strategic environment has drastically changed due to climate change and linked conflict, with a disproportionate effect on the maritime domain. Climate change is intensifying existing maritime security challenges and creating new ones.[53] Increased frequency and intensity of storms pose risks to maritime infrastructure, shipping, and offshore energy installations.[54] Sea level rise threatens coastal communities and critical infrastructure, altering maritime boundaries and jurisdictions.[55] Changing marine ecosystems impacts fisheries and biodiversity, leading to conflicts over diminishing resources.[56] These climate-driven changes intersect with geopolitical tensions and criminal activities. Russia's illegal war on Ukraine, in particular it's maritime blockade and theft of food exports has severely aggravated a global food crisis.[57] In 2023, Europe received the most irregular migrants from Syria but less well known is that the next largest groups were from the Gulf of Guinea region[58], caused by IUU fishing induced regional instability.[59]

Disruption to global trade routes include threats by Iran to close the Straits of Gibraltar by force[60], drought disruption to the Panama canal[61] and Yemen's Houthis targeting civilian shipping in the Red Sea and Gulf of Aden[62]. Further compounding factors are the exponential increase in transatlantic narcotic smuggling[63], China's continued illegal

52 Irish Tourism Industry Confederation, "The Importance of Aviation to Irish Tourism: Interdependent, Symbiotic and Critical," *Irish Tourism Industry Confederation–ITIC* (blog), May 2024, https://www.itic.ie/aviation-report-2024/.
53 Christian Bueger and Timothy Edmunds, "New Challenges and a Look to the Future," in *Understanding Maritime Security*, ed. Christian Bueger and Timothy Edmunds (Oxford: Oxford University Press, 2024), 190-218, https://doi.org/10.1093/oso/9780197767146.003.0008.
54 Jinxin Dong et al., "Climate Change Impacts on Coastal and Offshore Petroleum Infrastructure and the Associated Oil Spill Risk: A Review," *Journal of Marine Science and Engineering* 10, no. 7 (July 2022): 849, https://doi.org/10.3390/jmse10070849.
55 Signe Veierud Busch, "Law of the Sea Responses to Sea-Level Rise and Threatened Maritime Entitlements: Applying an Exception Rule to Manage an Exceptional Situation," in *The Law of the Sea and Climate Change: Solutions and Constraints*, ed. Elise Johansen, Ingvild Ulrikke Jakobsen, and Signe Veierud Busch (Cambridge: Cambridge University Press, 2020), 309–35, https://doi.org/10.1017/9781108907118.014.
56 Jessica Spijkers et al., "Exploring the Future of Fishery Conflict through Narrative Scenarios," *One Earth* 4, no. 3 (March 19, 2021): 386–96, https://doi.org/10.1016/j.oneear.2021.02.004.
57 Hussam Hussein and Matyas Knol, "The Ukraine War, Food Trade and the Network of Global Crises," *The International Spectator* 58, no. 3 (July 3, 2023): 74–95, https://doi.org/10.1080/03932729.2023.2211894.
58 Kali Robinson, Diana Roy, and Sabine Baumgartner, "Europe's Migration Dilemma," *Council on Foreign Relations*, May 31, 2024, https://www.cfr.org/article/europes-migration-dilemma.
59 Fiifi Edu-Afful, "Illegal, Unreported and Unregulated Fishing Trends and Impact in the Gulf of Guinea: Stakeholder Responses," *Report from Kofi Annan International Peacekeeping Training Center, Danish Maritime Security Project, Symposium on Illegal, Unreported and Unregulated Fishing Trends and Impact in the Gulf of Guinea*, 15-17 May 2023, Hotel le Vaisseau, Abidjan, May 2023, https://kaiptc-danishmaritimesecurityproject.org/wp-content/uploads/2023/09/2023-IUU-Symposuim-English-Report.pdf.
60 *Reuters*, "Iran Threatens Mediterranean Closure over Gaza, without Saying How," Reuters, 23 December 2023, sec. Middle East, https://www.reuters.com/world/middle-east/iran-threatens-mediterranean-closure-over-gaza-without-saying-how-2023-12-23/.
61 Peter S. Goodman and Federico Rios, "To Save the Panama Canal from Drought, a Disruptive Fix," *The New York Times*, 14 August 2024, sec. Business, https://www.nytimes.com/2024/08/14/business/panama-canal-drought.html.
62 Renee Maltezou and Reuters, "Salvors Begin Towing Stricken Tanker Sounion in Race to Avert Catastrophic Oil Spill," *MarineLink*, 14 September 2024, https://www.marinelink.com/news/salvors-begin-towing-stricken-tanker-517055.
63 Niall O'Connor, "Ex-Garda Fighting Europe's €14 Billion Drugs Trade Says Irish Gangs Are 'Top of the Pyramid,'" *TheJournal.ie*, 23 July 2021, https://www.thejournal.ie/cocaine-smuggling-atlantic-maritime-operation-analysis-centre-5501718-Jul2021/.

claims in the South China Sea[64] and the growing 'dark fleet' of decrepit vessels used to avoid sanctions.[65] Hybrid threats by state and non-state actors using a combination of conventional and unconventional tactics in the maritime domain[66], including cyber-attacks on port infrastructure[67] and undersea cables means that Irelands maritime domain has become *"a zone of insecurity and a conduit for the rapid transfer of threats ashore"*.[68]

Gaps in Ireland's Maritime Security Framework

Ireland's current maritime security framework is characterised by significant gaps that hinder it's ability to effectively address the complex challenges in it's maritime domain.

1. Lack of a National Maritime Security Strategy

Despite the government's intention since 2019 to develop a National Security Strategy, there has been no published progress.[69] This vacuum leaves Ireland without a comprehensive framework for addressing maritime security challenges, including those exacerbated by climate change. The European Union Maritime Security Strategy (EUMSS) emphasises the need for member states to develop national strategies aligned with EU-level objectives.[70] Ireland has yet to produce such a document, potentially limiting it's ability to effectively coordinate with EU partners on maritime security matters.

2. Absence of Joint Maritime Domain Awareness

MDA is *"the effective understanding of anything associated with the global maritime domain that impacts security, safety, economy, or the environment"*.[71] Ireland lacks a centralised, joint approach to MDA.

64 Hwon Lee, "The Legality of Militarization of the South China Sea and it's Legal Implications," *KMI International Journal of Maritime Affairs and Fisheries* 15, no. 1 (2023): 1–24, https://doi.org/10.54007/ijmaf.2023.15.1.1.
65 Elisabeth Braw, "Russia's Growing Dark Fleet: Risks for the Global Maritime Order," *Atlantic Council* (blog), 11 January 2024, https://www.atlanticcouncil.org/in-depth-research-reports/issue-brief/russias-growing-dark-fleet-risks-for-the-global-maritime-order/.
66 David Letts, "The Maritime Domain," in *Hybrid Threats and Grey Zone Conflict: The Challenge to Liberal Democracies*, ed. Mitt Regan and Aurel Sari (Oxford: Oxford University Press, 2024), 251-270, https://doi.org/10.1093/oso/9780197744772.003.0012.
67 Jonathan Greig, "DHS Secretary: Cyberattacks Are the Most Significant Threat to Port Infrastructure," November 18, 2022, *The Record*, https://therecord.media/dhs-secretary-cyberattacks-are-the-most-significant-threat-to-port-infrastructure.
68 Ian Speller, "Submission by Dr. Ian Speller: Commission on the Defence Forces Public Consultation Response," (Commission on the Defence Forces, March 2022), https://assets.gov.ie/136077/aa60413b-17e9-4f09-bdd8-0839ecfd0b20.pdf.
69 Cormac O'Keeffe, "'Critical' Irish Security Strategy Still Awaited Four Years On," *Irish Examiner*, 7 February 2024, https://www.irishexaminer.com/news/arid-41326741.html.
70 Council of the EU, "Maritime Security: Council Approves Revised EU Strategy and Action Plan," *Consilium*, October 24, 2023. https://www.consilium.europa.eu/en/press/press-releases/2023/10/24/maritime-security-council-approves-revised-eu-strategy-and-action-plan/.
71 Allison McDowell-Smith, "Maritime Domain Awareness (MDA)," in *The Handbook of Homeland Security*, 1st ed., ed. Scott N. Romaniuk, Martin Scott Catino, and C. Augustus Martin (Boca Raton: CRC Press, 2023), 848. https://doi.org/10.4324/9781315144511.

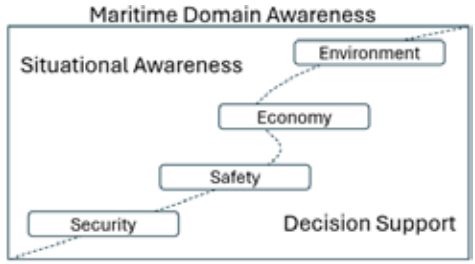


Figure 3: Maritime Domain Awareness conceptual framework [72] (Modified by author).

The Commission on the Defence Forces report, published in February 2022, highlighted the need for enhanced MDA capabilities. However, implementation of these recommendations has been slow.[73]

80	42	Ireland should deepen its engagement with the implementation of the EU's Maritime Security Strategy.	Accept in Principle	Q4 2023
81 (i)	42	A whole-of-government National Maritime Security Strategy should be developed. As part of this, or in advance, the powers required by the Naval Service for effective enforcement, in support of national security, in the maritime domain should be addressed.	Further Evaluation	Further Evaluation TBC

Figure 4: Extract from the detailed Implementation Plan for the Report of the Commission on the Defence Forces regarding Maritime Security.[74]

Despite publicity of MARSUR and CISE[75], the reality is deficiencies in Ireland's MDA include the lack of a centralised maritime picture, limited integration of data from various agencies and sensors, and non-existent surveillance capabilities in the air, space, and underwater domains. The lack of a joint central coordinating and responsible body allows the existence of domain awareness gaps exemplified by the MV ALTA incident and resulting inaccurate MCIB Report.[76] No single agency has truly comprehensive overall responsibility in Ireland for MDA.

3. Limited Government Action Despite Recommendations

At least three important reports have shown the need for improvements in Ireland's maritime security framework:

72 Hamed Yaghoubi Shahir, "Maritime Domain Awareness: Engineering Analytic Frameworks," (PhD diss., Simon Fraser University, 2016), 1, https://summit.sfu.ca/_flysystem/fedora/sfu_migrate/16658/etd9588_.pdf.
73 Department of Defence, "The Detailed Implementation Plan for the Report of the Commission on the Defence Forces," November 2023. Department of Defence and Defence Forces, https://www.military.ie/en/members-area/members-area-files/codf-detailed-implementation-plan_2023_final.pdf.
74 Ibid., 52.
75 Dáil Éireann Debate, "Defence Forces," Parliamentary Question 32 (March 21, 2024) answered by Tánaiste and Minister for Defence Micheál Martin TD, accessed November 13, 2024, https://www.oireachtas.ie/en/debates/question/2024-03-21/32.
76 Marine Casualty Investigation Board. *Investigation into an Incident Involving the Grounding of the Vessel 'MV Alta' at Ballyandreen Bay, Ballycotton, Co. Cork, 16 February 2020*, Report No. MCIB/299 (No. 1 of 2021), 12. MCIB Report. Dublin: Marine Casualty Investigation Board, 2020. https://mcib.ie/assets/files/pdf/2021-10-07-11-47-mcib_alta_report.pdf.

a. The Interdepartmental Maritime Surveillance Working Group (2008) recommended enhanced coordination between agencies involved in maritime surveillance.[77]

b. The EU Maritime Security Strategy (2014, updated in 2023) emphasized the need for member states to develop national strategies and enhance their maritime security capabilities.[78]

c. The Commission on the Defence Forces (2022) called for significant investments in naval capabilities and the development of a comprehensive MDA program.[79]

Despite these recommendations, progress has been limited. The Naval Service faces significant challenges due to underinvestment and personnel shortages, undermining Ireland's ability to effectively monitor and protect it's maritime domain. The slow pace of implementation is evident in the government's response to the Commission on the Defence Forces recommendations. Key maritime security initiatives are listed as *"Further Evaluation TBC"* in the implementation plan[80], indicating a lack of urgency in addressing critical gaps.

> *"Maritime security remains an under-prioritised and poorly understood area for policy makers, reflected in a long history of underinvestment in the Irish Naval Service and in the maritime security capacity of the state."*[81]

The near total vacuum in Ireland's maritime security framework leaves the country vulnerable to a range of threats and challenges, the lack of publishing such a strategy is a threat in of itself. Without a comprehensive strategy, effective MDA, coordinated governance, and sufficient resources, Ireland will struggle to protect it's maritime interests and fulfil it's responsibilities as an EU member state on the Atlantic frontier.

Conclusion

Ireland's maritime domain is a critical national asset, vital for economic prosperity and security. The challenges identified in this analysis – rising threats, lack of a national strategy, limited MDA capabilities, fractured governance, and lack of implementation of recommended improvements – require immediate attention.

> *"We will need to reconcile our historical traditions and defence prioritisations, with the reality that we are a frontier island, surrounded by water; a reality which will not be welcomed by many, in and out of uniform."*[82]

If ignored, Ireland will struggle to protect it's national security interests and fulfil it's responsibilities as an EU member state.

77 Department of Transport, "Marine Surveillance Committee & Working Group (MarSur)," July 30, 2019. https://www.gov.ie/en/organisation-information/fb10b1-marine-surveillance-committee-working-group-marsur/.
78 General Secretariat of the Council. "Outcome of Proceedings: Council Conclusions on the Revised EU Maritime Security Strategy (EUMSS) and it's Action Plan." Permanent Representatives Committee/Council, Brussels, October 24, 2023. https://www.consilium.europa.eu/media/67499/st14280-en23.pdf.
79 Commission on the Defence Forces. *Report of the Commission on the Defence Forces*, February 2022. https://www.military.ie/en/public-information/publications/report-of-the-commission-on-defence-forces/report-of-the-commission-on-defence-forces.pdf.
80 Department of Defence, *The Detailed Implementation Plan for the Report of the Commission on the Defence Forces*, November 2023.
81 McCabe and Flynn, "Under the Radar."
82 Unknown [Redacted]. "Points for Consideration: Ireland's Strategic Depths–Commission on the Defence Forces Public Consultation Response," March 2022. Commission on the Defence Forces. https://assets.gov.ie/194119/7160e5df-5f81-4676-8362-3168c426bb99.pdf.

Climate Action: A Leadership Opportunity for the Defence Forces

Comdt Eoghan Carton

Abstract

Climate leadership is about taking action to reduce emissions but also encouraging others to take action. The Climate Action Plan requires the Defence Forces, a public-sector body, to lead by example in driving far-reaching climate action. Beyond mandated targets, the organisation has other climate-related roles and obligations including influence in climate governance and climate security operations.

Acknowledging the organisation is active in climate and sustainability, the purpose of this article is to identify how the DF can take the lead in climate action. It examines climate leadership in Defence and the implementation of climate action. It primarily draws on literature in climate leadership, climate security and CSR/ESG and is supported with primary data, including three expert interviews providing political, industry and Defence perspectives.

Climate leadership in Defence was found to be the delivery of substantive and effective climate action across all of it's relevant climate-related areas. At organisational level, this is facilitated by a polycentric approach which involves all personnel in the organisation, promotes leadership at every level and encourages experimentation and innovation. Exemplary climate leadership, required of public bodies, was found not to act in isolation, but in conjunction with structural, entrepreneurial and cognitive leadership. Potential barriers to successful climate action were identified for Defence, with 'leadership commitment' and 'knowledge' being the most influential.

The article presents a conceptual model for climate leadership in the DF and a Defence-specific framework for implementing climate action with five components (leadership commitment, context, policy, implementation and results). It concludes by making recommendations for effective implementation of climate action within the DF.

> *"Europe's armed forces need to reduce their greenhouse gas emissions and fossil fuel dependency on the ground while phasing in green energy, without affecting their operational effectiveness and the resilience of defence-related critical infrastructure"*[1]
>
> (European Commission, 2023)

Introduction

As a public sector body, the Defence Forces (DF) must lead by example and reduce it's greenhouse gas emissions by 51 per cent by 2030.[2] The National Climate Action Plan requires the public sector to demonstrate 'exemplary' climate action and *"play a leadership*

1 European Commission, *EU Proposes Comprehensive New Outlook on Threats of Climate Change and Environmental Degradation on Peace, Security and Defence, European Commission*, (28 June 2023), https://ec.europa.eu/commission/presscorner/detail/en/ip_23_3492.
2 Government of Ireland. Department of the Environment, Climate and Communications, *Climate Action Plan 2024* (20 December 2023), https://www.gov.ie/en/publication/79659-climate-action-plan-2024/.

role in driving far-reaching climate action across it's buildings, transport, waste, and energy usage, as well as wider society."[3] Beyond mandated targets, the DF must account for the security implications of climate change, adaption of it's own infrastructure and crisis response. The diverse nature of military activities, ranging from warfare and humanitarian operations overseas to aiding the civil power and local authorities at home, will be impacted and shaped by climate change.[4] The DF has a responsibility to understand, mitigate against, and adapt to climate change.

A review of defence publications over the past decade, from the White Paper on Defence 2015 to the Defence Policy Review 2024, shows an increasing acknowledgment of climate change, it's implications for defence and security, and the organisations responsibilities. The DF Climate Action Roadmap[5] outlines how the 2030 target can be achieved and identifies a *"tradition of showing leadership amongst other public bodies in challenging times"* as an opportunity. It also recognises that all public bodies face the same seemingly unique challenges such as old building stock, resourcing, funding, and a requirement for operational output. It therefore stands to reason that other public bodies may look to the DF for leadership.

There is a leadership opportunity that aligns with the national focus and interest, which may be key to unlocking a step change in support for climate action. The aim of this article is to develop an understanding of what is meant by climate leadership, defined as taking action to reduce emissions but also encouraging others to take action,[6] in the context of Defence. Following this, it seeks to identify, adopt, and adapt a framework for implementation in everyday activities with a view to achieving decarbonisation targets but also providing organisational climate leadership in delivering climate action across all of it's areas of responsibility.

The Study of Climate Leadership

The study of leadership is evolving to account for a more complex world, requiring leaders to tackle wicked problems such as climate change.[7] In an interview, Minister Eamon Ryan stressed that *"everyone is involved"* in climate action and when such whole-scale *"system change"* is required, traditional *"hierarchical systems"* will not work.[8] This suggests that existing public sector structures, including the DF, may need to be adapted to comprehensively deal with climate change.

3 Government of Ireland. Department of the Environment, Climate and Communications, *Climate Action Plan 2023* (21 December 2022), https://www.gov.ie/en/publication/7bd8c-climate-action-plan-2023/.
4 Andy Scollick, "The Irish Defence Forces in a Changing Climate: Implications and Suggestions for Preparedness, Adaptation and Mitigation Measures," *Defence Forces Review 2022*, (2023).
5 SEE. *Defence Forces Climate Action Roadmap*. Defence Forces Senior Energy Executive, (29 March 2023).
6 Kate Crowley and Akihiro Nakamura, "Defining Regional Climate Leadership: Learning from Comparative Analysis in the Asia Pacific," *Journal of Comparative Policy Analysis: Research and Practice* 20, no. 4 (8 August 2018): 387–403.
7 Ross et al., "Leadership Beyond The Great Pause: Climate Change And Other Wicked Problems," (2022), https://doi.org/10.6531/JFS.202206_26(4).0002.
8 Eamon Ryan, "Climate Action: A Leadership Opportunity for the Defence Forces"–Interview with Minister Eamon Ryan, TD. Interview by Eoghan Carton. Government Buildings, Leinster House, Kildare Street, Dublin 2. 26 January 2024.

Broadly speaking, environmental strategies involve both symbolic and substantive components.[9],[10],[11] Symbolic actions, while important, practiced in isolation could be viewed as green washing, whereas substantive actions are tangible, impactful and measurable.[12] Figure 1 relates symbolic and substantive leadership to environmental ambition and suggests it is the delivery of substantive actions which form the basis for environmental, and by extension, climate leadership.[13] The concept of delivering substantive actions must therefore be explored further. The value of symbolic actions should not be lost however;[14] the (UK) 'Defence Fuels Agency' has recently changed to the 'Defence Operational Energy Agency', a symbolic action, reflecting the understanding of climate change and sustainability.[15]

	Internal environmental ambitions	
External environmental ambitions	*Low*	*High*
Low	(a) Laggard	(b) Pioneer
High	(c) Symbolic leader	(d) Substantive leader:

Figure 1 Internal and External Environmental Ambitions of Actors (Based on Wurzel et al, 2019[16])

Climate leadership is well researched in the EU and while there is a recent focus on the concept of exemplary leadership, studies point towards the need for multiple types of climate leadership to be practiced by individuals and organisations.[17],[18] Liefferink and Wurzel synthesise numerous studies of the EU's environmental and climate leadership, outlining four distinct types of leadership acting in unison; exemplary, structural, cognitive, and entrepreneurial.[19]

Exemplary leadership suggests setting an example, while structural, cognitive and entrepreneurial leadership suggest *what* the example to be set is. These are "*interrelated and interact*" to form complete climate leadership.[20] Structural leadership is associated with

9 Alexandra Hatsios, "Chief Sustainability Officers: Symbolic or Substantial?," 2023, https://cdr.lib.unc.edu/concern/honors_theses/js956r922.
10 Duncan Liefferink and Rüdiger K. W. Wurzel, "Environmental Leaders and Pioneers: Agents of Change?," *Journal of European Public Policy* 24, no. 7 (20 July 2017): 951–68.
11 David G. Hyatt and Nicholas Berente, "Substantive or Symbolic Environmental Strategies? Effects of External and Internal Normative Stakeholder Pressures," *Business Strategy and the Environment* 26, no. 8 (December 2017): 1212–34.
12 Waldman et al., "Defining the Socially Responsible Leader: Revisiting Issues in Responsible Leadership," *Journal of Leadership & Organizational Studies* 27, no. 1 (1 February 2020): 5–20.
13 Wurzel et al., "Pioneers, Leaders and Followers in Multilevel and Polycentric Climate Governance," *Environmental Politics* 28, no. 1 (2 January 2019): 1–21.
14 Georgina Pacor, "Here's Why Symbolic Leadership Is the Tool You Have Been Looking For," (2 April 2024), https://www.aigroup.com.au/resourcecentre/resource-centre-blogs/hr-blogs/heres-why-symbolic-leadership-is-the-tool-you-have-been-looking-for/.
15 Richard Nugee, "Climate Action: A Leadership Opportunity for the Defence Forces"–Interview with Lieutenant General Richard Nugee CB CVO CBE (Retd.). Interview by Eoghan Carton [MS Teams], 22 March 2024.
16 Wurzel et al., "Pioneers, Leaders and Followers in Multilevel and Polycentric Climate Governance.".
17 Duncan Liefferink et al., "Climate Governance across the Globe: Leaders, Pioneers, and Followers in Environmental Governance," in *Routledge Handbook of Environmental Policy*, ed. Duncan Liefferink, Mikael Skou Andersen, Jana Gheuens, Paul Tobin, Diarmuid Torney, Rüdiger K. W. Wurzel, 1st Edition (Routledge, 2023), 237–48.
18 Tobin et al., "EU Climate Leadership: Domestic and Global Dimensions," in *Handbook on European Union Climate Change Policy and Politics* (Edward Elgar Publishing, 2023), 187–200.
19 Liefferink and Wurzel, "Environmental Leaders and Pioneers: Agents of Change?"
20 Sebastian Oberthür and Claire Dupont, "The European Union's International Climate Leadership: Towards a Grand Climate Strategy?", *Journal of European Public Policy* 28, no. 7 (3 July 2021): 1095–1114.

actors using their structural, economic, and/or military power to shape through their sphere of influence.[21] Actors practicing cognitive leadership rely on scientific evidence, experimentation, and the ability to implement ideas and concepts.[22] Entrepreneurial leadership has it's origins in instrumental, intellectual, and ideas-based leadership,[23],[24] whereby actors propose solutions to achieve common goals. More recently entrepreneurial leadership is defined by actors using diplomacy and negotiation skills to set agendas, build coalitions and broker agreements.[25],[26]

In parallel to these leadership types, a polycentric governance approach is required for an organisation to deliver substantive climate action[27],[28]. A polycentric approach involves all personnel in an organisation and suggests the capacity for independent leadership at multiple levels, an interconnected approach that encourages experimentation and increases the benefits of innovation.

With this understanding of climate leadership in the general sense, what does climate leadership look like for an organisation such as the DF? What are the substantive roles required of the DF to demonstrate climate leadership? This article began with the need to achieve decarbonisation targets but this is not the only substantive reason the DF should strive to drive far-reaching climate action.

A Substantive Role for Defence in Climate Action

The Environmental Protection Agency (EPA) provide an adaption-mitigation model (Figure 2) which is useful in understanding an organisation's response to climate change. This will form the basis for examining the role of Defence in climate change and will be built upon to conceptualise climate leadership in the DF.

21 Tobin et al., "EU Climate Leadership: Domestic and Global Dimensions."
22 Wurzel et al., "Pioneers, Leaders and Followers in Multilevel and Polycentric Climate Governance."
23 Christer Karlsson et al., "The Legitimacy of Leadership in International Climate Change Negotiations," *Ambio* 41 Suppl 1, no. Suppl 1 (2012): 46–55.
24 Parker et al., "Climate Change Leaders and Followers: Leadership Recognition and Selection in the UNFCCC Negotiations," *International Relations* 29, no. 4 (1 December 2015): 434–54.
25 Tobin et al., "EU Climate Leadership: Domestic and Global Dimensions."
26 Wurzel et al., "Pioneers, Leaders and Followers in Multilevel and Polycentric Climate Governance."
27 Kajsa-Stina Benulic et al., "The Meaning of Leadership in Polycentric Climate Action," *Environmental Politics* 31, no. 6 (19 September 2022): 1016–36.
28 Ryan, "Climate Action: A Leadership Opportunity for the Defence Forces"–Interview with Minister Eamon Ryan, TD. Interview by Eoghan Carton [Government Buildings, Leinster House, Kildare Street, Dublin 2.].

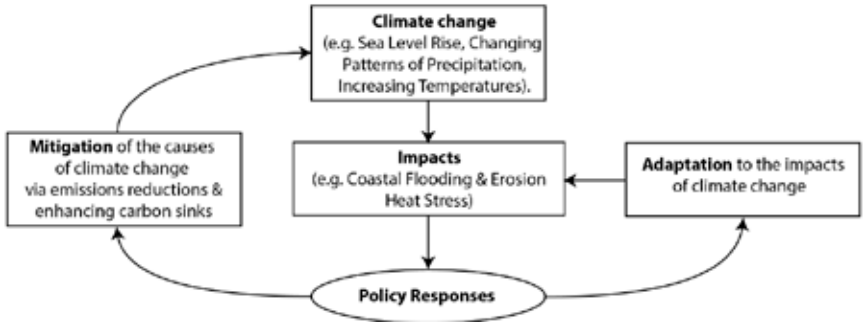


Figure 2 EPA Adaption-Mitigation Model[29]

There is a requirement to analyse the role of Defence in *"distinctly different contexts"*[30], considering it's own, internal responsibility to adapt and mitigate, but also to ensure it's ability to sufficiently respond. The climate-security nexus is acknowledged by international institutions and militaries worldwide with climate change seen as a risk multiplier, exacerbating existing security issues and contributing to conflict[31],[32]. The Bundeswehr recently commissioned a report to consider the impact of global climate change on Defence. It outlines the security implications, implying increased military operations due to climate-induced violent conflict, the fight for raw materials, new maritime routes and climate migration, concluding with a comprehensive list of adaption measures which include policy updates, procurements and cooperation with other agencies.

Payne and Swed[33] describe three areas of danger for the (US) military from climate change; (i) *physical danger* to military infrastructure, (ii) *logistical danger* by continued reliance on fossil fuels and (iii) *conflict danger* due to operations in conflicts created or exacerbated by climate change. Their study focusses on security and adaption and characterises much of the international research on Defence's response to climate change. While climate change has become part of military discourse[34] and is even described as institutionalised in the Swedish Armed Forces (SAF)[35], the focus of research tends to be on adaption and the effects on military operations, as opposed to reducing emissions through mitigation. A brief look towards European neighbours however shows how other militaries are planning for roles beyond adaption and climate security. Their consideration of mitigation, governance,

29 EPA. EPA Climate Ireland–What is climate adaptation? Accessed May 2023, https://www.climateireland.ie/adaptation/what-is-climate-adaptation/.
30 Rickard Söder, "Climate Change, Security and Military Organizations: Changing Notions in the Swedish Armed Forces," *Earth System Governance* 15 (1 January 2023): 100169.
31 UNDPPA. *Addressing the Impact of Climate Change on Peace and Security*. Political and Peacebuilding Affairs, 2024, https://dppa.un.org/en/addressing-impact-of-climate-change-peace-and-security.
32 Nugee, "Climate Action: A Leadership Opportunity for the Defence Forces"–Interview with Lieutenant General Richard Nugee CB CVO CBE (Retd.). Interview by Eoghan Carton [MS Teams].
33 Corey R. Payne and Ori Swed, "Disentangling the US Military's Climate Change Paradox: An Institutional Approach," *Sociology Compass*, 17 July 2023, https://doi.org/10.1111/soc4.13127.
34 Adrien Estève, "Preparing the French Military to a Warming World: Climatization Through Riskification," in *The Climatization of Global Politics*, ed. Stefan Aykut and Lucile Maertens (Cham: Springer International Publishing, 2023), 101–19.
35 Söder, "Climate Change, Security and Military Organizations: Changing Notions in the Swedish Armed Forces".

developing knowledge and leadership demonstrates the importance of other roles and highlights a link between adaption and mitigation[36],[37].

Emerging studies show Defence as an influential actor in climate change discourse and governance[38],[39]. With capabilities such as information gathering, resource allocation and operational planning, militaries can make a valuable contribution to both mitigation and adaption efforts[40]. Motta et al. describe how military personnel, as a trusted cohort in society, can be influential in communicating climate change issues when framed as national security concerns[41], an effect that can be as powerful at local community level as well as at governmental level. The influence of Defence in wider society therefore should not be discounted, with Söder arguing that the SAF approach to climate change will have implications for general discussions around the subject in wider society[42].

Evidently, leadership is a critical aspect of military operations, and most militaries invest considerable effort in developing it's leaders through internal and external training and education programmes. The well-publicised UK Ministry of Defence (MOD) Climate Change and Sustainability Strategic Approach outlines the importance of Defence Sector leadership in supporting *"wider UK (climate) objectives"*[43]. With a reputation for handling crises competently, the opinions and discourse from military leadership will be held in high regard and will influence perceptions on climate change and climate policy.

With the above in mind, Defence's climate actions can be broadly packaged as mitigation, adaption, influence and climate security. The DF's ability to navigate the conflicting demands of the Climate Action Plan and the Climate-Security Nexus to formulate policy and successfully deliver these actions may constitute climate leadership in Defence. The model in Figure 3 is an expansion of the earlier EPA model, broadened to include 'influence' and 'climate security' actions, allowing climate leadership to be conceptualised at organisational level. The model reflects the roles for Defence, that implementing substantive climate-related actions characterises climate leadership but that the overall process can be supported by symbolic actions.

36 Ministère des Armées. *Climate & Defence Strategy*. April 2022, https://www.defense.gouv.fr/sites/default/files/ministere-armees/Presentation%20Climate%20ans%20defence%20strategy.pdf.
37 Federal Ministry Defence. *Climate Crisis and the Role of Armed Forces*. Official publication of the Republic of Austria, Federal Ministry of Defence, 2022. https://verteidigungspolitik.at/.
38 Anselm Vogler, "Barking up the Tree Wrongly? How National Security Strategies Frame Climate and Other Environmental Change as Security Issues," *Political Geography* 105 (1 August 2023): 102893.
39 Söder, "Climate Change, Security and Military Organizations: Changing Notions in the Swedish Armed Forces".
40 Dhanasree Jayaram and Marie Claire Brisbois, "Aiding or Undermining? The Military as an Emergent Actor in Global Climate Governance," *Earth System Governance* 9 (1 September 2021): 100107.
41 Motta et al., "A Call to Arms for Climate Change? How Military Service Member Concern About Climate Change Can Inform Effective Climate Communication," *Environmental Communication* 15, no. 1 (2 January 2021): 85–98.
42 Söder, "Climate Change, Security and Military Organizations: Changing Notions in the Swedish Armed Forces".
43 UK MOD. *Ministry of Defence Climate Change and Sustainability Strategic Approach*. 30 March 2021, https://www.gov.uk/government/publications/ministry-of-defence-climate-change-and-sustainability-strategic-approach.

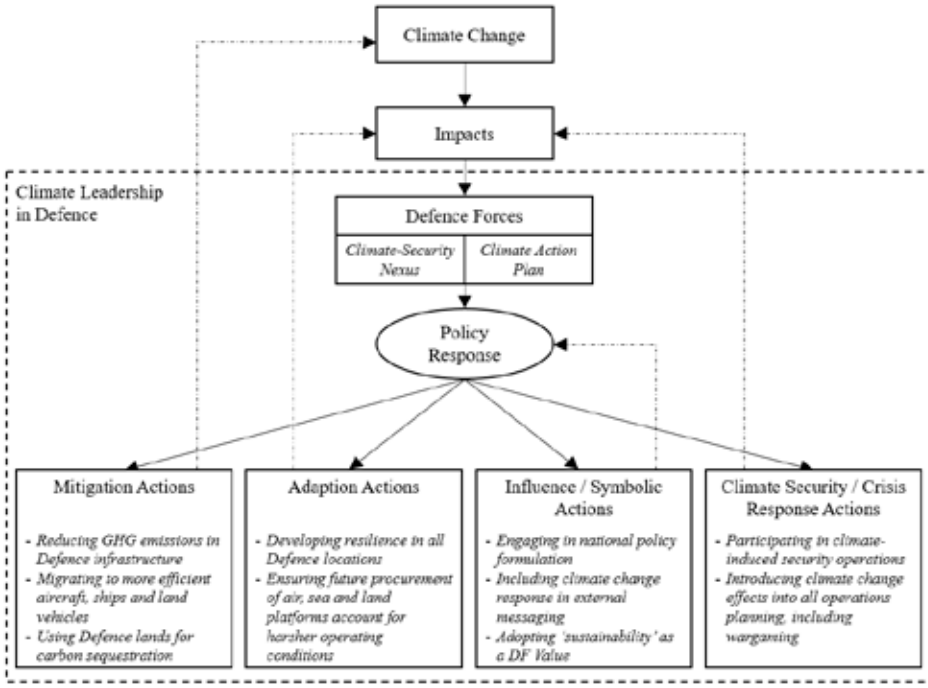


Figure 3 Conceptual Model for Climate Leadership in Defence[44]

A Framework for Implementing Climate Action in Defence

As Corporate Social Responsibility (CSR) and Environmental, Social and Governance (ESG) are well-established concepts[45], recent studies of their implementation were reviewed and revealed several useful implementation frameworks[46], with 'context', 'policy', 'implementation' and 'results' being the common important steps. 'Commitment of top management' and 'staff knowledge' appeared to be the most prominent barriers to successful implementation across several studies[47] and while these cannot simply be translated as barriers to climate action, they indicate important considerations. As such, the existing frameworks were built upon to include 'leadership commitment', creating a five-part framework (Figure 5) for implementing organisational climate action which, if delivered correctly, may characterise climate leadership.

44 Eoghan Carton, "Climate Action: A Leadership Opportunity for the Defence Forces" (MA, Maynooth University, 2024).
45 Robert Downey, "Should the Defence Forces Develop a Sustainability Strategy, and If so, Should It Be a Top-Down or Bottom-Up Approach?" (MA, Maynooth University, 2022).MAT
46 Bayan Sameer Bantan and Keith Thomas, "Measuring What Matters: A Sector- specific Corporate Social Responsibility Framework for Quality Practice," *Thunderbird International Business Review* 63, no. 3 (May 2021): 339–54.
47 Carton, "Climate Action: A Leadership Opportunity for the Defence Forces".

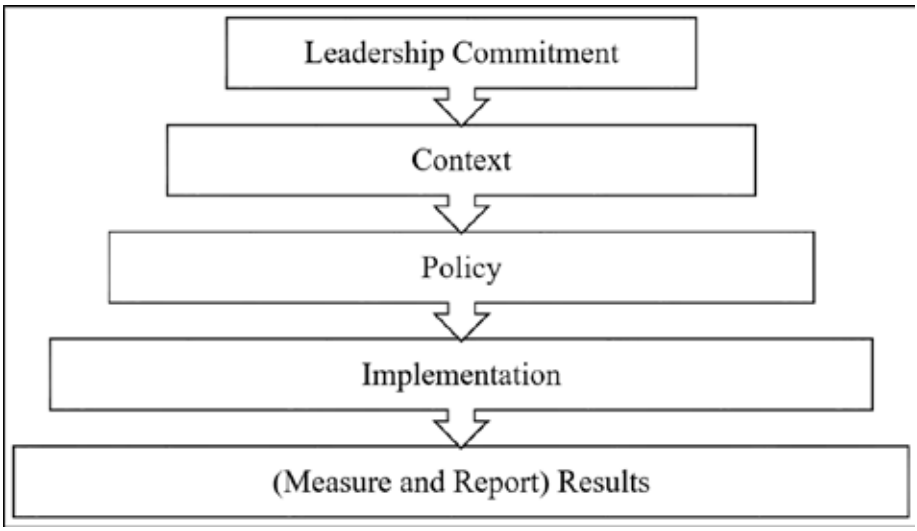


Figure 5 Climate Action Implementation Framework[48]

The commitment of top management is potentially the most significant barrier to substantive climate action and thus the ability to display exemplary climate leadership[49],[50],[51]. Furthermore, there is a clear link between the level at which responsibility is allocated and the quality of implementation[52]. In an interview, Lieutenant General Richard Nugee (Retd.) who lead the UK MODs Climate Change and Sustainability Strategic Approach, emphasised that the civilian and military components of Defence are *"working to the same purpose"*, indicating the need for a coherent approach[53]. At the strategic level, the Department of Defence (DoD) and DF may consider a unified approach to climate and sustainability at top management level in the form of a combined civilian-military unit, the formation of which could be guided by the recent establishment of the Capability Development Unit.

The extent to which a contextual analysis is carried out will vary dependent on the level. At the tactical level, units and installations will focus on their own contribution to climate change, aligning it with mandated targets[54]. At the operational level, services, corps and formations will focus on their specific organisational responsibilities such as operational aviation and naval emissions in the context of the Air and Maritime components, or

48 Ibid.
49 Hunoldt et al., "Being Responsible: How Managers Aim to Implement Corporate Social Responsibility," *Business & Society* 59, no. 7 (1 September 2020): 1441–82.
50 Mauricio Latapi et al., "The Barriers to Corporate Social Responsibility in the Nordic Energy Sector," *Sustainability: Science Practice and Policy* 13, no. 9 (27 April 2021): 4891.
51 EDA. *Barriers to Success and Solutions to Implementing Energy Efficiency Measures in Defence Buildings and Sites*. European Defence Agency, CF SEDSS III, December 2023.
52 Johan Graafland and Hugo Smid, "Decoupling Among CSR Policies, Programs, and Impacts: An Empirical Study," *Business & Society* 58, no. 2 (1 February 2019): 231–67.
53 Nugee, "Climate Action: A Leadership Opportunity for the Defence Forces"–Interview with Lieutenant General Richard Nugee CB CVO CBE (Retd.). Interview by Eoghan Carton [MS Teams].
54 Tahniyath Fatima and Said Elbanna, "Corporate Social Responsibility (CSR) Implementation: A Review and a Research Agenda Towards an Integrative Framework," *Journal of Business Ethics: JBE* 183, no. 1 (2023): 105–21.

infrastructure for the Corps of Engineers. This will allow for specific targets and objectives to be developed. At the strategic level, a detailed multi-dimensional analysis of the context is required which will include the organisation's place within the national and international context. At this level, targets and objectives from the operational level will be combined and adjusted as necessary to reflect the overall mandated targets.

The organisation must have a strong policy statement, detailing all important issues[55],[56], including objectives and targets which are clear and simple to understand, with intermediate targets where possible. In addition, it must be communicated appropriately to ensure it is interpreted correctly and understood[57]. As the policy must connect with staff[58], there is a strong argument for separate policies at the strategic, operational and tactical levels. A well-constructed and detailed strategic-level policy which covers all important organisational issues may fail to connect to the staff at the tactical level. As such it may be at risk of decoupling from the subsequent implementation programme. At the strategic level, a combined DoD/DF policy may be considered, similar to the UK MOD Climate Change and Sustainability Approach[59].

Each target, objective and goal stated in policies and strategies must have an associated implementation programme, the strength of which will reduce the probability of means-ends decoupling[60]. Ashbridge and Beard warn of the risk of greenwashing by publishing a comprehensive and ambitious strategy but not following up with how it will be achieved and withholding details on finance and resourcing[61]; this how is the implementation programme.

Greenwashing is avoided by ensuring clear policies upstream of implementation and maintaining an effective link between implementation and results[62], therefore results must be measured appropriately against policy objectives and targets. Results and reporting are inextricably linked and any recommendations for the delivery of substantive climate action in the DF must consider both hand in hand.

This article has conceptualised organisational leadership in the DF and presented a framework for implementation. The challenge now is to determine whether application of this framework allows the DF to account for the types of climate leadership and ensure a polycentric approach.

55 Graafland and Smid, "Decoupling Among CSR Policies, Programs, and Impacts: An Empirical Study".
56 Liam McLaughlin, "Climate Action: A Leadership Opportunity for the Defence Forces"–Interview with Mr Liam McLaughlin. Interview by Eoghan Carton [MS Teams], 28 February 2024.
57 Ménard et al., "Addressing the Policy-Implementation Gaps in Water Services: The Key Role of Meso-Institutions," *Water International* 43, no. 1 (2 January 2018): 13–33.
58 McLaughlin, "Climate Action: A Leadership Opportunity for the Defence Forces"–Interview with Mr Liam McLaughlin. Interview by Eoghan Carton [MS Teams].
59 *UK MOD. Ministry of Defence Climate Change and Sustainability Strategic Approach.*
60 Graafland and Smid, "Decoupling Among CSR Policies, Programs, and Impacts: An Empirical Study".
61 Ashbridge and Beard, "Greening Defence: The UK Armed Forces Strategic Approach to Climate Change," The Royal United Services Institute for Defence and Security Studies, 4 March 2022, https://rusi.org/explore-our-research/publications/commentary/greening-defence-uk-armed-forces-strategic-approach-climate-change.
62 Bantan and Thomas, "Measuring What Matters: A Sector- specific Corporate Social Responsibility Framework for Quality Practice".

Will This Framework Achieve Exemplary Climate Leadership?

Examination of the most significant potential barrier to successful climate action, leadership commitment, identifies the value of developing a strategic level civilian/military unit and ensuring elevated responsibility at all levels, in doing so practicing structural leadership. Cognitive leadership can be shown by carrying out a detailed contextual analysis at all levels and adopting flexibility in internally reallocating targets. Strong policy practices at all levels internally, while also engaging in policy setting externally, will reduce the risk of decoupling from implementation, demonstrating both structural and entrepreneurial leadership. Strong implementation programmes, correct allocation of responsibility and integration into core Defence processes will allow for the delivery of effective climate action. If measured and reported appropriately the risk of greenwashing will be reduced, creating the conditions for the organisation to demonstrate exemplary climate leadership through it's climate-related actions.

The framework can be replicated at all levels in the organisation, facilitating services, corps, units and individuals to implement actions, demonstrating a polycentric approach. Defence-specific training and education for employees will improve knowledge and awareness at all levels, helping to overcome one of the potential barriers to success in climate action.

Recommendations

1. The DF should prioritise the adoption of the Climate Action Implementation Framework (Figure 5) in order to create the conditions for climate action across the wide-spectrum of climate-related areas and specifically to achieve mandated targets. The framework facilitates a polycentric approach and accounts for the five key components identified in this article (leadership commitment, context, policy, implementation and results).

2. With leadership commitment highlighted as a major potential barrier[63] and allocation of responsibility at board level linked to high quality implementation[64], the DoD and DF might consider a unified approach to climate and sustainability in the form of a civilian/military unit.

3. The DoD and DF should consider developing a Defence-specific climate and sustainability training and education suite. This will overcome the potential barrier of 'knowledge and awareness' and serve to equip all personnel, from top management to individual aircrew, sailors, soldiers and civilian staff, with appropriate knowledge.

4. Innovation and experimentation are linked to a polycentric approach and were common themes in literature and expert interviews. The DF must encourage an experimental approach to climate action, pushing beyond the existing energy management structure,

63 Liou et al., "Exploring the Key Barriers to ESG Adoption in Enterprises," *Systems and Soft Computing* 5 (1 December 2023): 200066.
64 Graafland and Smid, "Decoupling Among CSR Policies, Programs, and Impacts: An Empirical Study".

to all levels in the organisation. The recently established Defence Research, Technology and Innovation Unit could be exploited to support the delivery of climate action.

Conclusion

Although important, the study of leadership types, styles and approaches merely only tell us how a 'climate leader' will be judged retrospectively. While understanding these are important, they lead us to an inevitable conclusion that climate leadership is the delivery of substantive climate action. Delivering substantive climate action requires commitment of leadership, allocated staff to understand the context, policy formulation, implementation, and measurement and reporting of results.

Climate change is no longer an emerging threat, it is a clear and present danger, affecting everything we do. Individually and organisationally, we have an obligation to act. The DF, a key pillar of the state, has an opportunity to lead in climate action, not just by achieving ambitious decarbonisation targets, but by incorporating substantive climate action into all of it's activities. By seizing this leadership opportunity, the DF can continue to protect Ireland and it's citizens, encouraging others to follow suit and therefore becoming the exemplar required of it in the Climate Action Plan.

> *"Climate has put us in a very serious position and in this crisis we have to see the opportunity."*[65]
>
> (Mary Robinson, 2020)

65 Mary Robinson, Mary Robinson: Business and governments must avoid net-zero 'hypocrisy', interview by Matt Mace, 4 February 2020, https://www.edie.net/mary-robinson-business-and-governments-must-avoid-net-zero-hypocrisy/.

The Challenges Presented in Moving the Irish Naval Service Fleet to Sustainable Energy Sources and Technologies

Lt Cdr David Memery & Sub Lt Eoin McEnery

"Climate change is the most urgent challenge characterising the 21st century. It is increasingly shaping the security landscape . . . both in terms of the threats we face and the manner in which we prepare ourselves to address them"[1]

- Josep Borrell (Head of the European Defence Agency)

Abstract

This paper will outline the current challenges faced by the Irish Naval Service Fleet in meeting internationally and nationally defined de-carbonisation targets, and how the future design of Irish naval vessels can affect these goals. The Naval Service must begin the process of transferring to a more carbon-neutral force, and whilst this will never be an overnight fix, it is necessary for change to start now. Future vessel designs should be the starting point for change. Utilising modern-day technologies, the Naval Service can begin to compare and contrast the effectiveness of various de-carbonisation measures, like CO2 Reducing Technologies (CRTs), CO2 Reducing Measures (CRM) and alternative fuel sources, using such tools as Ship Impact Modelling software to design future naval vessels and examine the feasibility of alternative energy source supply chains whilst engaging with external academic and commercial actors who are also now examining de-carbonisation techniques within the maritime domain.

Introduction

The global maritime environment is one of the fastest-growing polluters of CO2, with shipping emitting 1,000 MT of CO2 per year, approximately 3% of all global CO2 emissions. Trends show that if the marine sector does not react, it will see a rise of up to 50% by mid-century.[2] Up to 80% of all energy consumed by the Irish Naval Service is used for ship's propulsion.[3] This statistic gives a greater insight into the rising concerns of the Irish naval fleet and why a re-evaluation is required, to ensure a reduction in CO2 emissions and overall pollution of naval vessels. Investigations are being carried out into alternative fuel sources, like hydrotreated vegetable oil, methanol and hydrogen, and their effectiveness in decreasing overall CO2 emissions. Questions should also be asked as to how the design of naval vessels could also affect the overall CO2 output of the fleet.

International Context

The European Defence Agency and the European Commission's Joint Research Centre have highlighted the threat climate change poses to future defence operations, urging

1 Ricardo Tavares da Cost, Elisabeth Krausmann, and Constantinos Hadjisavvas, "Impacts of climate change on defence-related critical energy infrastructure," (2023):3.
2 "Shipping is responsible for over a tenth of transport emissions," Transport & Environment, accessed September 4, 2024, https://www.transportenvironment.org/topics/ships#:~:text=Shipping%20emits%201%2C000%20Mt%20CO2,stringent%20measures%20are%20not%20taken
3 Data from the Irish Naval Service's ISO 50001 Energy Management System.

a transition toward more sustainable practices. It is no secret that shipbuilding and operations contribute significantly to greenhouse gas emissions, and with this in mind, as a preventative strategy, the Defence Sector must contribute to lessening the effects of climate change.[4] Research by the International Maritime Organization (IMO) states that the global shipping fleet accounts for 2.5% of all global CO2 emissions,[5] rising to 1,046 million tonnes of CO2 in 2007,[6] whilst approximately 80% of energy consumption for the Naval Service is used for ship's propulsion in the form of Marine Gasoil (MGO) emitting 26,000 tonnes of CO2 in 2016, although this had reduced to 10,325 tonnes of CO2 by 2023.[7]

As energy supply chains become more pressurised due to regional conflicts, geo-political considerations, and societal pressures being applied to combat climate change, the continued use of fossil fuels becomes increasingly unpalatable within the maritime domain, yet the solutions are constrained by the existing maritime fleet technology, and the capital cost of re-engineering existing ship's systems. This impacts the Naval Service as perceived 'good actors' operating within environmentally sensitive areas, and in the reliable provision of Maritime Defence and Security Operations if existing MGO supply lines are reduced or severed. NATO has identified such reliable provision of a variety of energy sources as a critical requirement to maintain the required levels of effectiveness for longer, without relying on conventional fuels and reducing environmental impact.[8]

In 2021 the UK Ministry of Defence (MOD) identified tackling Climate Change and Biodiversity loss as it's number one international priority, as part of a larger UK governmental strategy.[9] As part of their 'Green Transition' policy, the UK MOD will *"act as a partner in the UK's green industrial transition using a fast-follower approach and spurring innovation"*.[10]

To improve fuel efficiency within the merchant fleet the IMO has introduced various regulations such as Energy Efficiency Design Index (EEDI), Ships Energy Efficiency Management Plan (SEEMP) and Energy Efficiency Operational Inex (EEOI), which all entered force in 2013 for all vessels over 400 gross tonnes. Whilst these were optimised for commercial use, their utility in the military domain cannot be ignored, for example EEDI is now a routine practice in shipbuilding, whilst SEEMP and EEOI have utility in the ongoing operational performance of a military vessel in the context of energy management. The Paris Agreement of the Framework Convention on Climate Change (COP21) established strong requirements for the wider maritime industry to play an active role concerning energy efficiency.[11] The IMO Marine Environment Protection

4 Karem Akoul, "How maritime can help the defence sector be sustainable," Marinelog.com , accessed May 31, 2024, https://www.marinelog.com/views/op-eds/op-ed-how-maritime-can-help-the-defense-sector-be-sustainable/
5 International Maritime Organisation (IMO), *Third IMO GHG Study 2014*, (London, 2015).
6 Reza Ziarati, and B. Yucel Akdemir. "MariEMS–Maritime Energy and Management System," (2016).
7 Irish Naval Service's ISO 50001 Energy Management System.
8 "Environment, climate change and security," North Atlantic Treaty Organisation (NATO), accessed 31 May 2024, https://www.nato.int/cps/en/natohq/topics_91048.htm
9 UK Ministry of Defence, *Climate Change and Sustainability Strategic Approach*, (London, 2021): 6.
10 UK Ministry of Defence, *Climate Change and Sustainability Strategic Approach*, 12.
11 M. Kitada , et al. "Exploring the frontiers of maritime energy management research," In Global perspectives in MET: Towards Sustainable, Green and Integrated Maritime Transport, (2017): 481-490.

Committee's 2018 strategy outlines an intent to reduce Greenhouse Gas (GHG) emissions from international shipping by 50% by 2050 when compared to a 2008 GHG baseline.[12]

Energy Management is a collective responsibility which requires teamwork and should involve all crew/service members, incorporating improvements in both transformation and use of energy, whilst also reducing harmful pollutants.[13] To make a real impact on reducing engine emissions there needs to be a combined effort applying a range of options, such as;

1. Maximising thermal efficiency,
2. Considering adaption of hybrid propulsion,
3. Using alternative fuels and/or fuel cells,
4. Integration of novel catalysts, exhaust recirculation systems and exhaust treatment,
5. Multi-stage cooling,
6. Variable turbochargers,
7. Use of lighter materials,
8. More efficient machinery bearings,
9. Injecting water after combustion to reduce NOx formation,
10. Use of novel injectors with high injection pressures.[14]

Conventional methods and equipment are now being re-evaluated, upgraded or completely replaced to meet these goals, the difference between short-term solutions with limited scope for development, and a long-term sustainable option is how flexible vessels will be to using new energy sources and technologies as they become viable, and the financial commitment to maintain such a development strategy, as well as the impact upon operational output as naval vessels undergoing refit to incorporate new solutions. To meet the 50% reduction target, both from the IMO and as defined by Irish governmental policy, the Naval Service will have to combine two or three technologies or undergo a radical technological shift to provide innovative, high-efficiency solutions from an economical and environmental standpoint. Alternative fuels, ship electrification and renewable energy sources are all recognised as different ways to achieve these goals.[15]

Renewable energy can be used to either produce 'green' fuels, although this requires significant shore and marine infrastructure, or be employed directly for a ship's propulsion

12 Veronica Jaramillo Jimenez, Hyungju Kim, and Ziaul Haque Munim. "A review of ship energy efficiency research and directions towards emission reduction in the maritime industry," *Journal of Cleaner Production* 366 (2022): 132888.
13 Reza Ziarati, et al., "Maritime energy management system (MariEMS) online delivery platform," In *IAMU18 AGA2017*, (2017): 255-264.
14 Reza Ziarati, and Basak Yucel Akdemir, "LEANSHIP – Design and development of high fidelity integrated ship management system for matching engine operations to sea and air conditions," *3rd Automotive and Vehicle Technologies Conference Proceedings*, (Istanbul, 2015).
15 International Transport Forum, "Decarbonising Maritime Transport: Pathways to Zero Carbon Shipping by 2035," *International Transport Forum Policy Papers no. 47*, (Paris: OECD Publishing 2018), doi: 10.1787/b1a7632c.

and power generation. However, the excess of traditional fossil-fuel-powered transportation and the reduced investment market have slowed the evolution of renewable energy systems for shipping.[16] Renewables can be implemented in shipping in one of two ways, either as a retrofit for the current fleet or as part of a new vessel design. Due to the nature of the Irish Naval Service fleet and proposed future procurements in line with LOA2/3 the Defence Forces would have to adopt a hybrid model incorporating both strategies.

Alternative Fuels

The Internal Combustion Engine (ICE) is by far the most prevalent marine propulsion technology available, making up approximately 98% of all commercial shipping and military surface fleets. They offer the highest levels of efficiency today and are highly appealing to the marine sector due to the reduction in energy costs using heavy fuel oil. The operation of ICE is relatively straightforward and well understood, with a lifespan commensurate with the long lifespans of the ships to which they are fitted. The maritime sector should be able to meet it's carbon reduction targets by enhancing ICEs, adapting them to future alternative fuels, and adopting smart control technology.[17]

Types of Alternative Fuels	CO2 Emissions Reductions
LNG	0-20%
Hydrogen	0-100%
Ammonia	0-100%
Biofuels	25-100%
Fuel Cells	2-20%
Wind	1-32%
Solar	0-100%
Electricity	0-100%

Table 1: Eventual CO2 Emission reduction by using alternative fuels.[18]

Liquid Natural Gas (LNG)

LNG has a 40% lower energy density than MGO,[19] however, when one considers the storage system this drops to 33%. It is also not a renewable or sustainable energy source and is simply a transition from one limited supply to another, all be it with increased de-carbonisation, it may however act as a transitional fuel to renewables.

16 J. Carlton,, J. Aldwinkle, and J. Anderson, "Future ship powering options: Exploring alternative methods of ship propulsion," *Lond. R. Acad. Eng,* (London, 2013): 1-95
17 Marc Sima, "Why the internal combustion engine is essential in shipping's decarbonisation mission," Hellenic Shipping News, accessed 15 August 2024, https://www.hellenicshippingnews.com/why-the-internal-combustion-engine-is-essential-in-shippings-decarbonisation-mission/
18 M. Issa., et al., "Marinization of a two-stage mixed structured packing scrubber for SOx abatement and CO2 capture." *International Journal of Advanced Research,7, no. 4* (2019):73-82.
19 Lloyd's Register and UMAS, "*Techno-Economic Assessment of Zero-Carbon Fuels.*" (2020)

Hydrogen

Hydrogen propulsion in shipping is technically possible but requires large-scale implementation of hydrogen infrastructure for production, shipping, storage and port services. Although Ireland may yet develop sufficient production capacity based on the potential energy densities available from offshore wind farms, the excess capacity may allow for emission-free production. However, on a volumetric basis, liquid hydrogen may require four-times the space of MGO, or twice that of LNG, due to it's low energy density. An unfortunate side-effect of hydrogen for ship's propulsion is that it has a very low ignition temperature, therefore burning hydrogen-air mixtures near stoichiometric composition can generate high combustion temperatures and produce excess NOx emissions, as well as presenting additional safety risks in a military vessel.

Ammonia

Unlike hydrogen, ammonia is a prime fuel energy source that can be used in a variety of engines and fuel cells, and due to it's prevalence in many industrial processes already has a well-established storage and delivery infrastructure, being one of the top three compounds shipped globally each year.[20] Unfortunately, it's drawbacks impacting military use are it's toxicity, the potential effect on an ecosystem from a spill, and the potential injury from skin burns, eye damage and poisoning.[21]

Biofuels

A common approach proposed to these authors is the adoption of biofuels, however, one must recall that biofuels derived from food plants compete at once with agriculture for soils, potentially causing more difficulties in the medium to long term as climate change and population growth increase pressures on the food supply chain. The European Biofuels Technology Platform has categorised biofuels into three generations, of which the 1st generation is derived from sugar, fat or starch and conflicts with food, whereas 2nd generation biofuel evolved from agricultural and forestry residues and 3rd generation is produced from aquatic autotrophic organisms, such as algae, thus extending the carbon resources available for production. It is anticipated that 3rd generation biofuels may become commercially viable in the next 10 years,[22] thus offsetting the impact on food supply chains. The challenge with biofuels in the maritime sector is a lack of experience and understanding in the handling and implementation of biofuels as a part of their energy supply, as well as the quantity of fuels required within the maritime sector, consequently, sustainable biofuel production is constrained by food costs, land availability and societal considerations.[23] Overall, research has found that biofuels are marginally more cost-effective than renewable energy, conversely, biofuels face hurdles in sustainability and

20 Patrizia Serra, and Gianfranco Fancello. "Towards the IMO's GHG goals: A critical overview of the perspectives and challenges of the main options for decarbonizing international shipping." *Sustainability* 12, no. 8 (2020): 3220.
21 Julia Hansson, et al., "The potential role of ammonia as marine fuel—based on energy systems modelling and multi-criteria decision analysis." *Sustainability* 12, no. 8 (2020): 3265
22 Michael Hannon, et al., "*Biofuels* from algae: challenges and potential." Biofuels 1, no. 5 (2010): 763.
23 C.W.C. Hsieh. and C. Felby, "Biofuels for the marine shipping sector." *IEA Bioenergy, 39*, (2017): 9-83.
O. Konur, "*Biodiesel fuels*: A scientometric review of the research," Biodiesel Fuels, (2021): 225-248.

supply, making biofuel pathways uncompetitive and susceptible to restrictions or increased pricing in the medium term.[24]

Fuel Cell

Fuel cells are a cost-effective means of producing low-carbon electricity and a critical technology in enabling the use of alternative fuels.[25] Fundamentally fuel-cells turn the fuel within them into electricity and have become a validated land-based power source that could replace ICEs in the next few years.[26] As ships move from traditional propulsion systems to forms of electric drive, fuel-cell efficiency ratios of the order of 60% present a tempting path to decarbonisation, and if heat recovery is also used this figure can rise to as high as 80%.[27]

Wind

As pressure has increased upon decarbonisation within the maritime sector some have cast their eyes back to the historical use of sail as a sustainable means of ship's propulsion. Ultimately, wind is a well-known, widely accessible, sustainable energy source, but does suffer drawbacks in variations in force, and the difficulty in harnessing it's entire capacity. Some commercial vessels have adopted the traditional soft-sail on a tall spar, but generally only in a more supporting role, delivering savings of 10-30%.[28] The challenges presented by sail make them unsuitable for military use, where agile and rapid performance is required of vessels.

Solar

Some research has been conducted on the use of photovoltaic (PV) cells to generate electricity directly from sunlight and were considered for a time as a source of shore-power for Naval Service Reserve vessels, however, is faced with the constraint of insufficient space onboard a vessel, and the need for battery-based energy storage, as well as the increased risk of corrosion due to saltwater. it's viability for true-life decarbonisation is also limited to approximately 12%,[29] although a figure of a mere 6% is considered more realistic.[30] The greatest potential for PV as a decarbonisation option within the maritime domain is that of shore-power support to vessels alongside.

24 Charles J McKinlay, Stephen R. Turnock, and Dominic A. Hudson. "Route to zero emission shipping: Hydrogen, ammonia or methanol?," *International Journal of Hydrogen Energy* 46, no. 55 (2021): 28282-28297.
25 Iain Staffell, et al., "The role of hydrogen and fuel cells in the global energy system," *Energy & Environmental Science* 12, no. 2 (2019): 463-491.
26 Ryan O'Hayre, et al., *Fuel cell fundamentals*. (New Jersey: John Wiley & Sons, 2016).
27 Ryan O'Hayre, et al., *Fuel cell fundamentals*, (2016).
28 Linus Mofor, Peter Nuttall, and Alison Newell. "Renewable Energy Options for Shipping-Technology Brief." (2014): 1-58.,
"20% fuel saving for commercial vessels through hybrid wind plus motor cruise mode," CORDIS, accessed July 31,2024, https://cordis.europa.eu/project/id/650195/reporting/it
29 Harilaos N Psaraftis, "Green maritime transportation: Market based measures," In *Green transportation logistics: The quest for win-win solutions*, (Cham: Springer International Publishing, 2016): 267-297
30 Gregory Mark Atkinson, "Analysis of marine solar power trials on Blue Star Delos," *Journal of Marine Engineering & Technology* 15, no. 3 (2016): 115-123.
Evert A. Bouman, et al., "State-of-the-art technologies, measures, and potential for reducing GHG emissions from shipping–A review," *Transportation Research Part D: Transport and Environment* 52 (2017): 408-421.

Electricity

One of the main limitations of electricity for a ship's propulsion is it's storage in batteries, as the energy density per mass unit versus traditional diesel oil, being approximately 150 times lower, whilst the production of batteries consumes significant energy in it's own right.[31] This means that the only effective use of electricity for a ship's propulsion is by direct generation, giving only a marginal improvement over traditional marine engines, although it does provide flexibility in vessel design.

Table 2 outlines some of the advantages and disadvantages of these alternative fuels.

Alternative Fuel	Advantages	Disadvantages
LNG	▪ Prices are competitive ▪ Infrastructure technology that is available	▪ Insulated tanks are necessary for storage ▪ Unable to meet the 50% CO2 reduction target
Hydrogen	▪ Enable the zero-carbon option with fuel-cells ▪ Can be made from electrolysis near ports	▪ Fuel prices are extremely high ▪ There is not a piston engine or infrastructure available ▪ Very low storage temperature
Ammonia	▪ Can be employed for engines and fuel-cells ▪ Can be stored at a high temperature and low pressure	▪ Toxicity and environmental impact when leaked ▪ When utilised in internal combustion engines, hydrogen must be added
Biofuel	▪ It is possible to be carbon-free ▪ Compatibility with existing engines	▪ Price ▪ Narrow product volume
Electricity Storage in Batteries	▪ Efficiency ▪ Enables zero-emissions	▪ Small energy density of mass and volumetric density ▪ Cost

Table 2: Principal advantages and disadvantages of alternative fuels.[32]

31 Mohamad Issa, Adrian Ilinca, and Fahed Martini. "Ship energy efficiency and maritime sector initiatives to reduce carbon emissions," *Energies* 15, no. 21 (2022): 7910.
32 Issa, "Ship energy efficiency and maritime sector initiatives," 7918.

CO2 Reducing Technologies (CRT)

A CRT that is commonly seen in land-based projects is a Carbon Capture, Utilisation and Storage (CCUS) system. A CCUS works as follows:

- CO2 is captured from a source point (exhaust, smokestack) using scrubbers adapted to capture CO2.
- This captured CO2 is then converted to a liquified form for ease of storage. CO2 is more stable in a climate-controlled, liquid state.
- This is then stored onboard until the vessel can unload and store CO2 in a land-based plant.
- CO2 can then be re-used.[33]

While installing and operating a CCUS system onboard a current vessel is a challenge on it's own, it does show the possible prospects of installing and utilising one of these systems on future designs, especially vessels like the Multi-Role Vessel (MRV), which will allow for more opportunities due to the overall size of the vessel. While an entire CCUS system would be difficult to maintain and utilise on a naval vessel, portions of the system could be used to decrease overall CO2 output, such as a scrubber system.

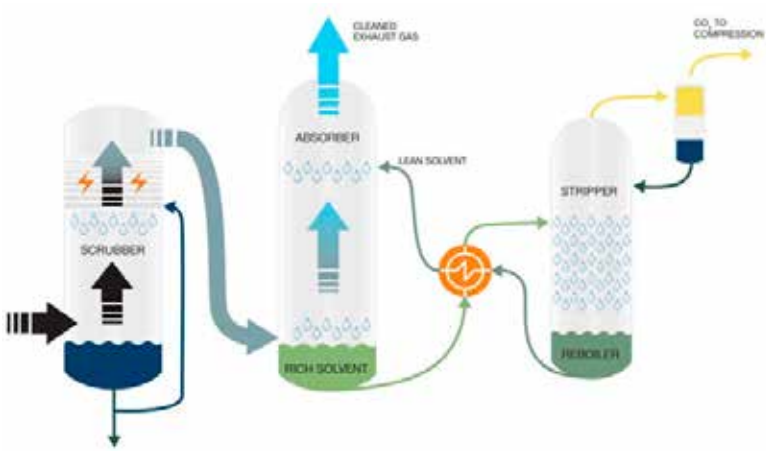


Figure 1: Wartsila Exhaust Treatment System.[34]

CO2 Scrubber System

A CO2 scrubber can be utilized in two different forms. Not only ship-borne systems but also ocean-based solutions (Ocean-Scrubbing) but for this paper, ship-based systems will

33 Benoît Grovel, "CCUS: The overlooked technology behind marine energy transition," Bureau Veritas Shipping, Accessed September 4, 2024, https://marine-offshore.bureauveritas.com/ccus-overlooked-technology-behind-marine-energy-transition
34 "Wartsila Exhaust Treatment system image," Wartsila. Accessed September 4, 2024. https://www.wartsila.com/marine/products/exhaust-treatment/carbon-capture-and-storage

be the main focus. CO2 scrubbers work by "*washing*" the exhaust gasses with a solvent-rich mixture. CO2 binds to the solvent, resulting in 90-99% of CO2 being removed from exhaust gasses before release.[35] Fig. 2 below highlights the process of firstly scrubbing CO2 from the exhaust, the CO2 is then passed through the solvent, and into a CO2 stripper to produce clean exhaust outputs. This CO2 solvent can be stored onboard a vessel, similar to how the CCUS system works in the section above. Wartsila had their scrubber system retrofitted onto the MS Robin Hood in 2014 which is a ferry that travels between Sweden and Germany and must obey the strict Sulfur emissions regulations of the area.[36] This shows the current operational state of these systems, in that they can be configured, and retrofitted onto an existing older vessel, like the MS Robin Hood, if space allows it. Currently, there are no highlighted costings for these units, therefore a comparison cannot be made between Scrubber units and what is discussed further in this article.

Figure 2: Ship-based Carbon capture (Scrubber).[37]

CO2 Reducing Measures (CRM)

While CRTs may be beyond the scope of what the navy is currently capable of achieving, there are still alternative methods for decreasing overall CO2 production. A few methods include:

- Route planning optimisation (Vessels arrive in port at a specified time, not moving at high speeds to save fuel),

35 Lars Pilmann Brorholt, "What is carbon capture, and how does it work," Accessed September 4, 2024, https://forcetechnology.com/en/articles/carbon-capture-technologies-emissions#:~:text=In%20the%20scrubber%2C%20the%20exhaust,is%20pumped%20to%20a%20stripper
36 Wartsila Corporation, "Retrofitting Scrubber Systems," *YouTube*, October 2, 2014. video, 1:00, https://www.youtube.com/watch?v=GUWr1ukgm80&t=185s
37 Rick van Kasteren, "The road to ship-based carbon," *Ship Building Industry Vol. 16 Issue 2*, 2022: 42-43 https://issuu.com/marco-geels/docs/sbi_16-2_totaal_lr/s/15759089

- Transition to renewable fuel sources (Discussed elsewhere in this document),
- Efficient port operations (Avoid waiting time before birthing),
- Slow steaming (Decreasing travel speeds to conserve fuel and reducing CO2 emissions),
- Energy on board saving (Switch off internal light when not required, stopping pumps when they are not required),
- Battery technology adoption (Storing energy in DC batteries).[38]

The CRM that attracts the most interest is that of utilising air, to create what is called hull air bubble lubrication.

Hull Air Bubble Lubrication (HABL)

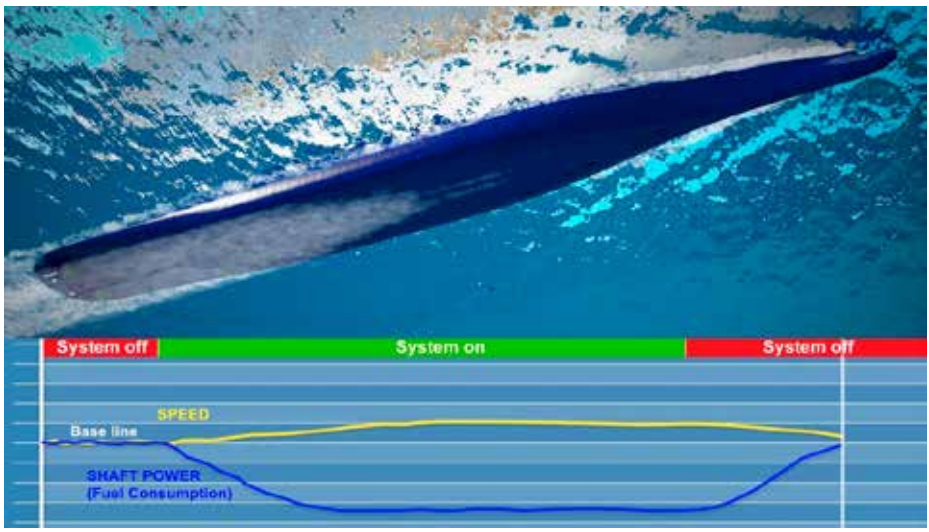


Figure 3: Diagram comparing fuel consumption with Speed in a HABL system.[39]

Hull air bubble lubrication is a process in which a vessel pumps air under a vessel, creating a pocket of air between the hull of the ship and the water around it, decreasing resistance from the ocean and allowing a vessel to cut through the sea while also using less engine load to do so, decreasing fuel usage by up to 10%. Systems like this can be a benefit in many ways. Due to the lower power required to move the vessel, the overall top speed could be increased due to decreased resistance. In addition to this, the layer of air between the hull and the surface of the water could decrease the overall noise produced by the vessel

38 "Different Ways to Reduce CO2 Emissions from Sea Freight," SINAY Maritime Data Solution, Accessed September 2, 2024, https://sinay.ai/en/different-ways-to-reduce-co2-emissions-from-sea-freight/
39 "Hull Air bubble lubrication system effectiveness versus fuel consumption," Silverstream Technologies, Accessed September 11, 2024, https://www.dd3d-studio.com/portfolio-item/silverstream-technologies-3d-animations/

in an operational sense.[40] Ideally, this system would be installed on the flat underside of a vessel to produce the micro-film of air, meaning its' effectiveness is dependent upon the shape and size of the vessel, which must be balanced against other operational design requirements. Similarly to what is mentioned above, BLRT repair yards released a YouTube video highlighting a DACS air lubrication system onboard a DANITA vessel.[41]

Ship Universe have broken down the costings of installing such a system onboard an existing vessel as roughly around $500,000–$2,000,000, depending on the size of the vessel, with a further $200,000–$500,000 in labour and $100,000–$300,000 for any required structural changes. While this appears to be only negative, when the fuel-saving figures are brought into account (5-15% decrease in fuel consumption) it is estimated that a ship could save between $150,000 and $450,000 per annum, again depending on the size of the vessel.[42]

Ships Impact Model (SIM)

There are software systems available which allow shipbuilders and architects to calculate the overall technical performance of a vessel. It is safe to say that the more efficiently a vessel is designed, the lower overall CO2 production will be. Tools like the Ships Impact Model (SIM) allow a design team/ architect to create a hull design which will account for external effects (fouling, hull resistance, etc.) and from there produce a detailed analysis of the hull's overall effectiveness. From there, an engineer or design team can begin to compare the values received from the vessel data and contrast this information against CRTs. The Marine Research Group, University of London states SIM is intended for use at the early stage of a new build or retrofit design process, with the underlying basis for the model being the calculation of changes from known baseline ships.[43] Versatile SIM offers engineers full integration abilities and includes the following analysis tools:

- Concept Design,
- Stability Assessment, (Damaged and Intact),
- Manoeuvring Performance,
- Seakeeping,
- Structural Analysis.[44]

One of the key tools in this software is QinetiQ's Resistance and Propulsion, which will estimate the resistance and powering of the vessel required to reach the maximum efficiency of the vessel. The software will decrease the capability of the vessel by increasing

40 Amanda Thurman, "Five common misconceptions about air lubrication – and why they're wrong," accessed September 11, 2024, https://www.wartsila.com/insights/article/five-common-misconceptions-about-air-lubrication-and-why-they-re-wrong
41 BLRT Repair Yards. "Installation of a unique air lubrication system (dacs) on board Danita vessel at BLRT repair yards," *YouTube*, October 2, 2023, video, 0.27 https://www.youtube.com/watch?v=uAt1r5-S-O8&t=39s
42 "Cost/Install Breakdown: Air Lubrication Systems," Ship Universe, accessed November 21, 2024 https://www.shipuniverse.com/cost-install-breakdown-air-lubrication-systems/#:~:text=System%20Purchase%3A%20%24500%2C000%20to%20%242,%24300%2C000%20for%20necessary%20structural%20changes.
43 J. Calleya, R. Pawling, and A. Greig. "Ship impact model for technical assessment and selection of Carbon dioxide Reducing Technologies (CRTs)," *Ocean Engineering* 97 (2015): 82-89.
44 "Paramarine® Advanced Marine Design Software," QinetiQ, accessed September 03, 2024, https://www.qinetiq.com/-/media/56c780cd30444d67a3490ff7c7403dd3.ashx?ver=bf4178f645b140939178889ae8beba51

the active resistance on the hull, such as by mimicking fouling (build-up of rust/ marine microorganisms, algae, and plants). Utilising software the data can be populated in the SIM and then used to compare various CRTs. The flow diagram is to be carried out for the baseline ship and then repeated for each technology or combination of technologies, as required.[45] Design tools like Paramarine by QinetiQ would give the Irish Navy the ability to fully understand the strengths and weaknesses of new ship designs and would allow the INS to increase the overall efficiency of new vessels. Efficiency means lower requirement on the quantity of power output required from main engines to propel the vessel, in turn, decreasing the amount of fuel being burned and decreasing the amount of CO2 being produced and released.

The process shown below is what a SIM process tool uses to carry out the baseline of a vessel, and then will be repeated for each individual CRT that is to be tested. If a larger shipping vessel were to be investigated into the use of multiple CRT systems, then this process would start to show it's versatility.

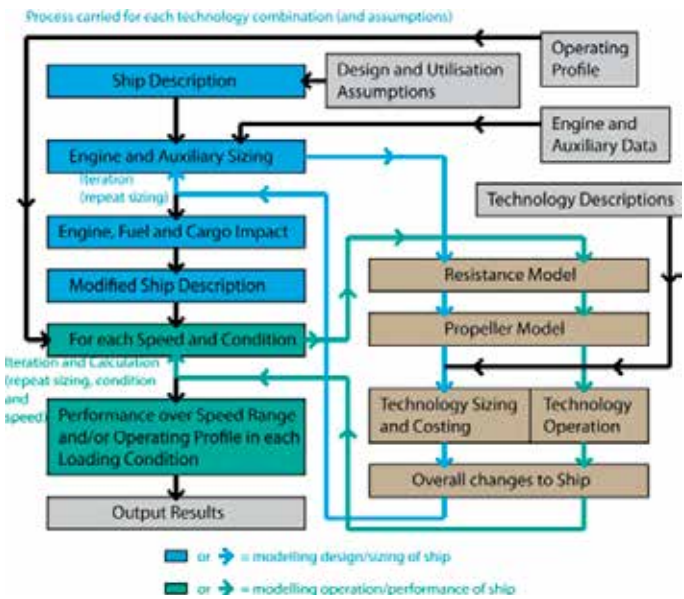


Figure 4: Ship Impact Model process flow diagram.[46]

45 Calleya, "Ship impact model for technical," 82-89.
46 Calleya, "Ship impact model for technical," 82-89.

Conclusions

Whilst the Irish Naval Service can adopt many of the above-mentioned options, like slower steaming whilst on patrol, or inhibiting pumps and lighting while not required, other options are not mature enough to fully adopt. Battery-based technology is a rapidly advancing technology (as can be seen in the automotive industry) which will reach a stage that will allow vessels to become almost completely carbon neutral, but the current size of maritime battery packs are too large to allow successful adaption into military vessels on a substantial scale. Until the overall size of battery banks have decreased no naval vessel will ever be able to become completely carbon neutral.

While most systems are not designed to be used on Irish Naval Service vessels, there are many alternative opportunities for the Naval Service to implement innovative solutions, and due to the Naval Service's smaller size, it can be much more adaptive and agile in developing a sustainable future. Retrofitting these systems onto existing Naval Service vessels would not be recommended, as the Irish naval fleet would not be designed to implement these systems, but, as the Naval Service works through it's future fleet design, process tools such as SIM, the adoption of alternative fuels, CRTs, such as HABL, and CUSS may become critical enablers to the Naval Service in meeting it's de-carbonisation goals.

Saving Savable Lives: The Development of a New Information Management Framework to Enable Irish Emergency Communications during Crisis Management Operations

Comdt Denis Flynn

Abstract

All forms of emergency share one specific characteristic. They all constitute either a direct or indirect threat to life, health, property, the natural environment, or societal normality. These emergency incidents can evolve quickly, often with resulting complex cascading effects. The National Risk Assessment for Ireland was published by the Department of Defence in 2023, identifying 22 Strategic level risks with the potential to trigger a National level emergency. A climate change trajectory was included with each of these risks and the natural risks identified will in particular pose a challenge for emergency management stakeholders across Government, including the Defence Forces. This article examines the best mechanism for saving savable lives in emergency environments that are volatile, uncertain, complex and ambiguous. It is posed that the simple action of increasing the distance of vulnerable actors and assets from the prevalent threat (cordon and evacuation) will enormously increase chances of survivability in these environments. However, efficient inter-agency crisis communications are vital to get this powerful but simple action right. Despite this inherent simplicity, coordination across all aspects of societal and Government actors is immensely difficult to achieve. This article describes a new Emergency Management Situation Report Template derived by the author as a result of research conducted during the 6th Joint Command and Staff Course. The proposed Template could enable and optimise emergency communications at all phases and levels of crisis management operations. It is simple in design and strategically relevant due to the current development of the National Public Warning System. The usage of a simple emergency communications measure such as this provides uncomplicated measures by which a common threat picture can be rapidly disseminated across all levels of society and stakeholder response, thereby contributing to complete comprehension of the hazard posed and a common societal unity of effort. Thus, National efforts aimed at the effective protection of life, property and the environment can be further optimised, thereby augmenting national resilience, while restoring society to normality as soon as possible following the disruptive effects of emergency incidents.

Introduction

All forms of emergency share one specific characteristic. They all constitute either a direct or indirect threat to life, health, property, the natural environment, or societal normality.[1] This research will examine the best mechanism for saving salvable lives in the evolving emergency management environment.[2] Firstly, it is posed that the simple action of increasing the distance of vulnerable actors and assets from the prevalent threat (cordon

1 Department of the Environment, *National Framework for Major Emergency Management*, (Dublin: Department of the Environment, 2006), 15.

2 The terms disaster, hazard, and emergency are often used interchangeably within academic literature. The National Framework for Major Emergency Management defines the term emergency, as an "unexpected and potentially dangerous situation, requiring immediate action", which can describe a broad range of situations. These may vary from the most minor, which are dealt with by persons without emergency services involvement, through "normal" emergencies, which involve response by one or more of the principal emergency services, to major emergencies. Department of the Environment, *National Framework for Major Emergency Management*, (Dublin: Department of the Environment, 2006), 15.

and evacuation) will enormously increase the survivability of any vulnerable actors.[3] These incidents can be extremely complex, evolving quickly, and with resulting complicated cascading effects.[4] The effective management of these incidents require effective decision making and leadership, at all levels of response often in an extremely time sensitive manner. It is posed, that a failure to act rapidly within the emergency response environment, can often expose those whom require assistance to further unnecessary risk.[5] History is replete with examples of where the communication of even the simplest messages in the complex emergency management environment can become highly distorted, leading to the most dangerous of outcomes. This article focuses on the protection of life through the implementation of protective measures such as cordon and evacuation measures, and the effective communication of these requirements during all phases of emergency management response. It tracks the research conducted by the Author in fulfilling the academic requirements of the 6th Joint Command and Staff Course.

The purpose of effective emergency communications is to generate a stable system for the delivery of critical information in a time intensive and highly complex emergency environment.[6] Organisations charged with emergency response are often hampered initially by the failure of decision makers and leaders to act. This is often further compounded through a complete lack of situational awareness in the developing emergency environment.[7] Combating this problem requires the utilisation of effective emergency communications processes and frameworks.

The 2017 Strategic Emergency Management: National Structures and Framework (SEM) document lays down the required structures for coordinating an Irish 'whole of Government' approach to emergency management. An overarching premise of this strategic National framework is to cultivate the welfare, support and protection of the Irish population throughout all stages of emergency response. It achieves this by ensuring the existence of fit-for-purpose National procedures and structures, which are ideally placed to best deal with the broad range of emergency scenarios that are outlined within it. It delineates in addition, those necessary frameworks required in order achieve a 'systems approach' to the management of National level emergencies. This five-stage systems approach to emergency management is highlighted in Figure 1.[8] A key facet of this systems

3 Damon Coppola, *Introduction to International Disaster Management*, (1st ed. USA: Oxford: Butterworth-Heinemann. 2006), 230.
4 Jida Liu, Changqi Dong, Shi An, Qiang Mai, "Dynamic Evolution Analysis of the Emergency Collaboration Network for Compound Disasters: A Case Study Involving a Public Health Emergency and an Accident Disaster during COVID-19," *Healthcare* 10, no 3 (March 2022): 2, doi:10.3390/healthcare10030500.
5 Department of the Environment, *National Framework for Major Emergency Management*, (Dublin: Department of the Environment, 2006), 64.
6 Haupt, Brittany. "The Use of Crisis Communication Strategies in Emergency Management" *Journal of Homeland Security and Emergency Management* 18, no. 2 (2021): 125-150. https://doi.org/10.1515/jhsem-2020-0039
7 Department of the Environment, *National Framework for Major Emergency Management*, (Dublin: Department of the Environment, 2006), 64.
8 Department of Defence, *Strategic Emergency Management National Structures and Frameworks*., (Dublin: Department of Defence, 2017), 10.

approach is that it integrates multiple levels and stakeholders at all levels from hazard analysis right through to response and recovery operations.[9]

Figure 1: The Five Stage Systems Approach to Emergency Management
(Department of Defence, 2017, p. 10).

Additionally, the Framework for Major Emergency Management also states that *"The Defence Forces capabilities can be employed across a wide spectrum of activity in a major emergency"*.[10] The findings of this research may also delineate the potential implications for the Defence Forces in National Emergency Management, but specifically those elements actively involved in both aid to the civil power/authority (ATCP/A) operations.[11]

The first stage in the systems approach to emergency management is hazard analysis. At a strategic level, this analysis is conducted as part of the National Risk Assessment for Ireland. It provides a basis on which key risks are identified, prioritised and managed by Government, and focuses on key risks with the potential to trigger a National level emergency. Since the publication of the 2020 assessment, the global geopolitical landscape has deteriorated. Russia's invasion of Ukraine has had profound impacts on the security and defence environment with cascading effects on international food and energy markets, and the global supply chain.[12] As climate change accelerates, it is anticipated that a number

9 The Strategic Emergency Management National Structures and Framework document, summarises the wide range of 50 specific emergency scenarios potentially requiring a national level response in Annex form. The Irish Government, in the coordination of emergency management at the strategic level, operate a Lead Government Department model. This necessitates that the planning for and response to an emergency or crisis is the responsibility of the Minister and his/her department, which has functional responsibility for that particular event as laid down within the SEM Annex A. In essence, it delineates the principal response and support agencies accountable for Tactical (Local) and/or Operational (Regional) response. Department of Defence, *Strategic Emergency Management National Structures and Frameworks*., (Dublin: Department of Defence, 2017), 39-41.
10 Department of the Environment, *National Framework for Major Emergency Management*, (Dublin: Department of the Environment, 2006), 75.
11 In Ireland, all Government Departments, associated Agencies, and Civil Authorities can in their response to an emergency, request the assistance of the Defence Forces in an Aid to The Civil Authority (ATCA) capacity. This allows the requesting agency to draw upon specific niche military capabilities, and expertise. The SEM Framework assigns Lead Government Department responsibility for each of the 50 emergency scenarios outlined within. A brief analysis of this document yields that 36 of these scenarios list the DF, as potentially having either a principle or supporting role in assisting the requesting authority in it's response. Department of Defence, *Strategic Emergency Management National Structures and Frameworks*., (Dublin: Department of Defence, 2017), 39-41.
12 Department of the Taoiseach, *National Risk Assessment: Overview of Strategic Risks*., (Dublin: Department of the Taoiseach, 2023), 9.

of the risks identified may also increase as a result. Regions which are less impacted by climate change can expect to be affected by those regions that are, due to increased migration of vulnerable populations for example. Directly related to climate change, the increasing risk posed by extreme weather events and natural disasters pose a strategic challenge for Ireland. These risks may take many forms such as increased coastal erosion and inundations, storms, flooding, extreme temperatures and prolonged periods of drought.[13] Due to the potential for climate change to have a compounding effect on each of these key risks, each risk identified is analysed and given a climate change trajectory.[14] Figure 2 highlights the 22 identified National level risks, the confidence level for each risk assessment, and the climate change trajectory.[15] All risks that reach the threshold for inclusion in this capacity have cross-sectoral and cross-societal impacts. Therefore, all Government Departments and Agencies have a role in mitigating those risks in their areas of responsibility.[16]

Figure 2: The National Risk Assessment Risk Matrix 2023

Warning systems such as Public Warning Systems[17] are used to protect life by warning the general population about an impending emergency (such as those identified in the National Risk Assessment for Ireland). Mileti & Sorensen contend that they typically constitute a final line of defence after pre-engineered solutions have failed to mitigate the disaster itself. Mileti and Sorensen also highlight that the lead organisation responsible for

13 Department of Defence, *A National Risk Assessment for Ireland 2023*, (Dublin: Department of Defence, 2023), 5.
14 This is in line with EU Reporting Guidelines on Disaster Risk Management, Art. 6(1) d of Decision No 1313/2013/EU. Department of Defence, *A National Risk Assessment for Ireland 2023*, (Dublin: Department of Defence, 2023), 14.
15 Department of Defence, *A National Risk Assessment for Ireland 2023*, (Dublin: Department of Defence, 2023), 36.
16 Department of Defence, *A National Risk Assessment for Ireland 2023*, (Dublin: Department of Defence, 2023), 8.
17 The European Electronic Communications Code (EU Directive) requires Member States to have a National, mobile phone-based emergency text alert system. The EU refers to this as a Public Warning System. The system is designed to be able to warn citizens of an imminent risk to life arising from very severe weather or a natural disaster, where immediate action is required (Department of the Environment, Climate and Communications, 2023).

the Public Warning Systems must accept and adopt responsibility for developing smooth running relationships between all associated emergency response stakeholders.[18] The main aim of the SEM document, and it's associated annexes, is to ensure that all State Departments, Agencies and Sectors can react both quickly and efficiently to any large-scale emergency. This is a particular requirement for all the Lead Government Departments. This Framework identifies those critical roles for those Lead Government Departments. It delineates those entities accountable for the management of the whole of Government approach to specified emergencies during all phases of the emergency management cycle. This also describes the significance of maintaining ongoing communications with the public and key identified stakeholders, such as the Defence Forces, at all stages and phases of emergency response.[19]

The requirement for a National Public Warning System has been a specific objective of the Government Task Force on Emergency Planning since it's foundation in October 2001. EU Directive 2018/1972, prescribed that all member states must have a system to transmit public warnings through publicly available electronic communications services. To this end, and following discussions held by the Government Task Force on Emergency Planning and a Subgroup on Emergency Communications throughout 2019 and 2020, the Office of Emergency Planning and the Department of Environment, Climate and Communications are currently proposing a high-level road map to achieve the delivery of a Public Warning System for the Irish Public.[20]

There are two strategic aims of this Public Warning Systems development project. The first is the delivery of a system that can warn the Irish public to either prepare for, or respond to imminent or developing major emergencies which are likely to have a high or very high impact as identified in line with the National Risk Assessment for Ireland. The second objective is to ensure the specific Public Warning System put in place meets the requirements laid down in Article 110 of Directive (EU) 2018/1972 of the European Electronic Communications Code.[21]

The DF cannot afford to be isolated from this process of development constituting a key enabler in the security architecture of the State. As part of a direct linkage to the Research conducted, this study highlighted potential implications resulting from the developmentof this Public Warning System, on the potential roles and responsibilities of the Defence Forces in the National emergency management sphere.[22]

18 Mileti, Dennis S. and John H. Sorensen. "Communication of Emergency Public Warnings: A Social Science Perspective and State-of-the-Art Assessment." (1990): 4-10, doi: 10.2172/6137387.
19 Department of Defence, *Strategic Emergency Management National Structures and Frameworks*., (Dublin: Department of Defence, 2017), 11.
20 Office of Emergency Planning. (2023). *https://www.gov.ie/*. Retrieved from: https://www.gov.ie/en/campaigns/624e4-emergency-planning/
21 European Commission. 'Council Directive 2018/1972 of the European Parliament and of the Council of 11 December 2018 establishing the European Electronic Communications Code', *Official Journal of the European Union*, L 321/36, (2018), 1–179. Retrieved from: https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32018L1972.
22 This is also in line with the strategic direction provided by the White Paper on Defence (2015) which outlines the Government's defence policy, providing a framework for enabling a 'flexible and adaptive response to any adverse changes in a dynamic security environment'. The White Paper also outlines security tasks that both the Department of Defence and the Defence Forces may undertake in their support to those Departments and Agencies identified as constituent components of the State's security architecture. Department of Defence, *The White Paper on Defence, 2015*, (Dublin: Department of Defence, 2015), 3.

Methods

Several research methods were considered for the purposes of this qualitative study. Initial themes within the field of National emergency management and Emergency Communications practices were identified during the composition of this Study's Literature Review. These themes were then used as a basis for compiling a Questionnaire. Due to the fact that this particular research topic spanned a vast compendium of societal and emergency response stakeholders at both a National and International level, the author chose to utilise a specific network of emergency response professionals available. The chosen network was the current Defence Forces Explosive Ordnance Disposal Duty Panel in addition to a select number of ex panel members who had recently retired from the panel due to either promotion to Lieutenant Colonel or retirement. In the cases of retired members, great care was taken to ensure that respondents were selected whom were still working within a professional emergency management function.[23] The overall objective of the questionnaire was to establish an initial base of valid and justifiable data which could be further honed through the conduct of a Focus Group. Data obtained from the questionnaires was interpreted using the organic Microsoft Forms software tools provided as part of the National University of Ireland, Maynooth student software suite.

Data emerging from the Questionnaires and the Focus Group, were thematically analysed. Thematic analysis is a system utilised to identify, analyse and then report on patterns that recur within given data sets.[24] The use of the Questionnaires as a method in a mixed method qualitative study afforded the author a detailed and organised description and interpretation of the data set. This made it the ideal format for the extraction of important information. Thematic analysis such as this provides a research framework which aids the researcher in identifying patterns within a dataset, thereby drawing out variables that assist in the answering of the posed research question.

In addition, the author attended a strategic National conference directly pertaining to the research topic. The 2nd All Island Disaster Risk Reduction Conference was held on the 30th of November 2023 and 1st December 2023, chaired by the Office of Emergency Planning and the Shared Island Unit of the Department of An Taoiseach. The principal theme of the conference was emergency communications with an emphasis on the development of the National Public Warning System. This particular theme was selected as it is currently strategically relevant from an all-island point of view. It was attended by a wide range of civil and military emergency management stakeholders and practitioners. Additionally, the conference programme was filled by highly experienced academic and practitioner professionals drawn from both Ireland and the United Kingdom. The conference agenda centred particularly on emergency communications issues with a particular emphasis on

23 The Defence Forces can provide a significant support role in a major emergency response, and can be employed across a wide spectrum of activities. The Defence Forces play a key role in responding to all emergency incidents involving improvised explosive devices, when they are called upon by An Garda Siochána, by the provision of Explosive Ordinance Disposal (EOD) teams, in an Aid to the Civil Power role. Department of the Environment, *National Framework for Major Emergency Management*, (Dublin: Department of the Environment, 2006), 75. This was the main reason they were selected as the chosen network.
24 Braun, Virginia, and Victoria Clarke. 2006. "Using Thematic Analysis in Psychology." *Qualitative Research in Psychology* 3 (2): 77–101. doi:10.1191/1478088706qp063oa.

those working at a strategic level in academic, public administration, semi-state, private, and voluntary sectors.[25]

Results

The primary objective of the research conducted was to investigate how National information management processes could be optimised to enable the protection of life throughout all phases and levels of crisis management operations. It corroborated that the single most powerful mechanism for saving salvable lives in VUCA[26] environments is by adopting effective implementation of cordon and evacuation measures. These simple measures effectively distance vulnerable actors from the source of any threat or hazard. The research conducted for this study has concluded. However, the Office of Emergency Planning continues to progress the development of the Public Warning System, guided by the terms of reference of the Government Task Force Subgroup on Emergency Communications. [27] The recommendations of this study as outlined in Section Four may align with the current objectives of the Emergency Communications Subgroup.

The Strategic Emergency Management Guideline 2-Emergency Communications document states that whilst every emergency is unique, presenting with varied communications challenges, communications planning should be a core component of all Governmental Departments, Agencies and Sectoral emergency planning and preparation efforts.[28] The same document provides strategic planning guidance in relation to ensuring efficient operational communications and information flow so that factual information can be transmitted both horizontally (own organisation) and vertically (either to higher authority or down the chain of command). It further specifies that factual information is required in order to inform and enable decision making at all levels. [29] An overview of this information flow process is included as Figure 3.

25 The 2nd Annual All Island Disaster Risk Reduction Conference series. Department of Defence, 2023, Retrieved from: https://www.gov.ie/en/news/3c9a6-all-island-resilience-conference/.
26 The United States Army War College introduced the acronym VUCA in 1987, standing for Volatility, Uncertainty, Complexity and Ambiguity. The purpose of the acronym at that point was to describe the unstable geopolitical conditions following the end of cold war. Throughout the following decades, this acronym has become widely used in many fields from business, to the medical sector, to the management of complex crises and emergencies. The common underpinning characteristic is the attempts by the crisis manager to make decisions, and manage and mitigate the most dangerous effects of the crisis in the most turbulent and chaotic of environments. Murugan, Sathiabalan, Saranya Rajavel, Arun Aggarwal, and Amarjeet Singh. 2020. "Volatility, Uncertainty, Complexity and Ambiguity (VUCA) in Context of the COVID-19 Pandemic: Challenges and Way Forward". *International Journal of Health Systems and Implementation Research* 4 (2), 10-16. https://ijhsir.ahsas-pgichd.org/index.php/ijhsir/article/view/93.
27 Office of Emergency Planning. (2024). https://www.gov.ie/. Retrieved from: https://www.gov.ie/en/campaigns/624e4-emergency-planning/
28 Department of Defence, Strategic Emergency Management, Guideline 2 – Emergency Communications, Version 1.2, Feb 2023, For Decision, (Dublin: Office of Emergency Planning, Department of Defence, 2023), 3.
29 Department of Defence, Strategic Emergency Management, Guideline 2 – Emergency Communications, Version 1.2, Feb 2023, For Decision, (Dublin: Office of Emergency Planning, Department of Defence, 2023), 6.

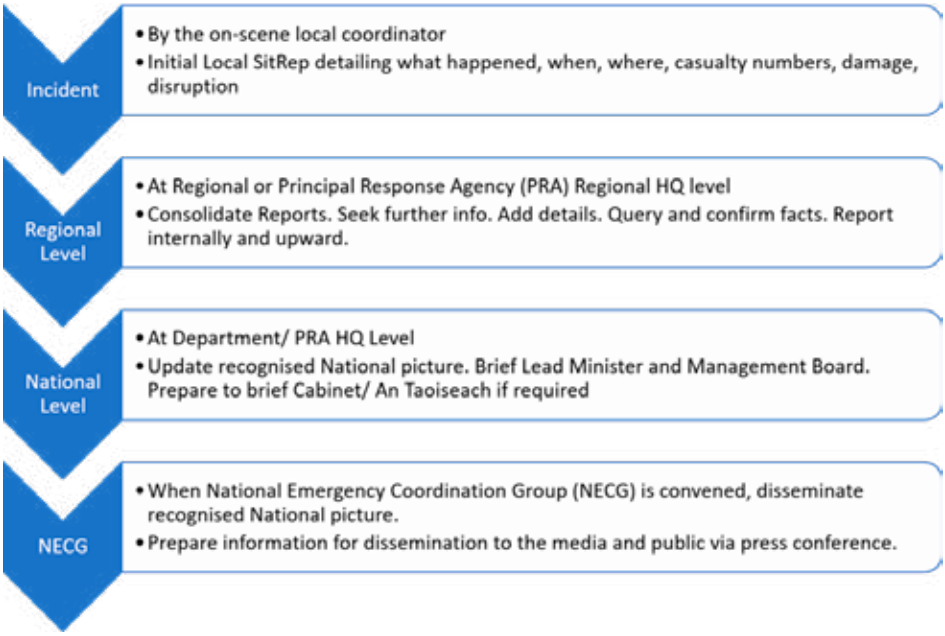


Figure 3: The SEM Guideline 2-Emergency Communications Information Flow Process (Adapted from: Department of Defence, 2023, p. 6).

The main findings of the research conducted are in line with the characteristics of effective operational communication outlined in the Emergency Communication Guideline 2.[30] The specific factors identified as essential in this document (Timely, Concise, Complete, and Accurate) have been validated by the data obtained during this research and echoed in the key findings outlined in Table 1.

30 Department of Defence, Strategic Emergency Management, Guideline 2 – Emergency Communications, Version 1.2, Feb 2023, For Decision, (Dublin: Office of Emergency Planning, Department of Defence, 2023), 5.

Number	Key Finding
1	Simple message construction and dissemination is crucial for emergency communications.
2	These simple messages must be effectively delivered to all stakeholders including the general public if required.
3	Cordon and evacuation guidance must contain certain critical factors to be effective.
4	This information must be simple guidance, easily understood by all, and delivered in a timely fashion to be effective.
5	Emergency communications warning systems should specify the required response level.
6	Emergency communications warning systems should indicate whether a hazard is increasing or not.
7	Emergency communications warning systems should indicate whether a hazard is mobile or static.

Table 1: Summary of Key Findings

Some novel material was produced however within this study's findings with respect to the necessary relay of critical information requirements regarding cordon and evacuation measures through all phases and levels of crisis management operations. Figure 4 highlights the range of primary findings obtained through the qualitative mixed methods research conducted. These findings emerged from the analysis of eight specific themes that had emerged from the Literature Review of the Study. Section Four will expand on the main findings of this research, exploring it's implications, and provide recommendations based on these findings.

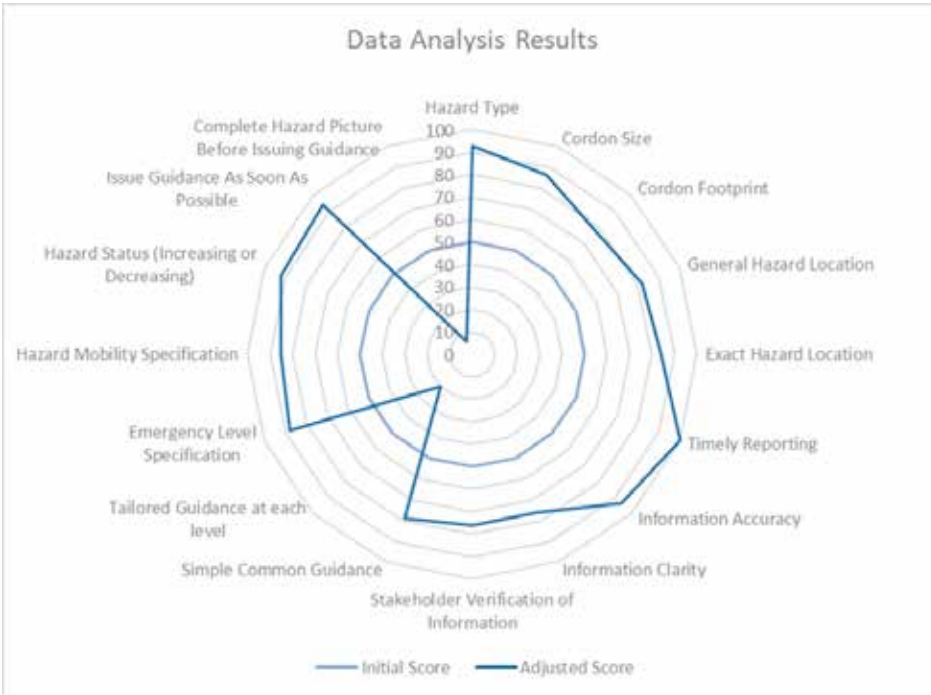


Figure 4: Collective Data Analysis Post Normalisation of Data.

The key findings of this research outlined that the strategic requirements of a Public Warning System should also incorporate information on hazard mobility, status, and the required response capability in addition to the critical cordon and evacuation requirements identified. These findings have been utilised to frame a new emergency communications reporting template that could be potentially used at all levels of crisis management operations whilst being still easily understood by all Agencies, Departments, and Sectors, to include also the public. This will be discussed in further detail in Section 4.

Discussion

An existing Emergency Management Situation Report (SitRep) template is embedded within the SEM Guideline 2-Emergency Communications Document which was designed to facilitate the provision of emergency information from a Local (Tactical) level upwards to the next appropriate level. From here, it should be transmitted by the most available means into Departmental/Agency information management systems as early as possible. [31] This Template is bottom up driven and possibly not fit for transmission in a National Public Warning System.

31 Department of Defence, Strategic Emergency Management, Guideline 2 – Emergency Communications, Version 1.2, Feb 2023, For Decision, (Dublin: Office of Emergency Planning, Department of Defence, 2023), 10.

The Author believes that the key findings of the Kerslake Report in relation to emergency communications are of special relevance in this regard. This report identified that almost every organisation involved in response to the Manchester Arena attack found that improvements needed to be made in it's ability to communicate within the organisation and externally. Furthermore, it was found that several official agency communication channels were not user friendly during the response. Hence a number of unofficial means were utilised (informal WhatsApp groups for example). Whilst these systems served a function, they were obviously far from ideal. One of the key findings in this regard was that all information channels and emergency communications systems became saturated. The crucial recommendation of this report in this regard was that response agencies were informed to explore the utility of encrypted social media networks to augment and improve their internal emergency activation arrangements, and internal communication systems for the purposes of increasing responder's situational awareness at all stages of subsequent emergencies.[32]

The research conducted by the Author has enabled the derivation of a new Emergency Management Situation Report Template that may be easily understood by all stakeholders to include the public. This Template may also be easily assimilated into any information management system due to it's inherent simplicity and may be therefore useable on a wide range of information platforms to include the mobile phone network. This Template uses the acronym 'DALTA' and is shown in Figure 5.

Fig 5: The 'DALTA' Emergency Management SitRep Template proposed by this research.

It is posed in addition that the 'DALTA' emergency communications template has been designed to enable information flow throughout all phases and levels of crisis management operations. This research focussed on National efforts in this regard. The Template Model could additionally be further refined through analysis of other international

32 Deeming, Hugh. (2018). The Kerslake Report: An independent review into the preparedness for, and emergency response to, the Manchester Arena attack on 22nd May 2017, 207, Available at: https://www.researchgate.net/publication/324603423_The_Kerslake_Report_An_independent_review_into_the_preparedness_for_and_emergency_response_to_the_Manchester_Arena_attack_on_22nd_May_2017.

Public Warning System campaigns and emergency communications efforts. It may also be of potential use in the development of the Irish National Public Warning System. This would require it's promulgation to the Government Task Force Subgroup on Emergency Communications for review. [33]

Conclusion

Von Moltke is widely reputed to have written that "*no plan of operations can with any certainty reach beyond the first encounter with the enemy*". In the field of emergency management, it is a simple fact that emergency plans rarely survive contact with real world circumstances. This is irrespective of whether the emergency in question requires a Tactical, Operational or Strategic level response. As such, there is inherent value in keeping emergency response plans as simple as possible. The simple but effective relay of lifesaving information such as cordon and evacuation requirements in response to any hazard posing a threat to life was the central focus of the research conducted by the Author. This research further corroborated that the best mechanism for enabling emergency management efforts is by ensuring that a common operational picture is maintained at all phases and levels of crisis management operations. The best method of achieving this is through using communications systems that can share simple, timely and accurate information that can be delivered across multiple channels, whilst effectively engaging with all stakeholders including the public, thereby saving savable lives.

33 The SEM Guideline 1- National Emergency Coordination Group (NECG), (2021) specifies that Lead Government Departments and the NECG, in consultation with the Government Information Services, are responsible for developing public information strategies to ensure that the public is updated and advised constantly as an emergency situation evolves. Department of Defence, Strategic Emergency Management, Guideline 1 – National Emergency Coordination Group, (Dublin: Office of Emergency Planning, Department of Defence, 2021), 5. One very specific focus for future research could be the utility of this Template in communication of emergency information to the public in this regard.

Major Emergencies, Climate Change and the ATCA Role of the Irish Defence Forces

Col Timothy O'Brien

"Given our island location, it takes too long to drive emergency crews from elsewhere to Ireland, or vice versa. While we may have been able to rely on the RAF in the past to provide logistical support, in the future they may be otherwise occupied, and we may need to build up the capacity of our own Defence Forces to undertake this role. Unfortunately, climate change may mean that such extreme events will occur with increasing frequency."

Prof John Fitzgerald[1]

Introduction

In their 2022 report to the government, the Commission on the Defence Forces, commenting on the organisation's Aid to the Civil Authority (ATCA) role, outlined their belief that it makes eminent sense to maintain a Defence Forces that can also deliver non-military outputs using dual-use capabilities and that the delivery of such outputs should be appropriately valued when considering the requirements for the appropriate capabilities, structures and staffing of the Defence Forces.[2]

The Commission added that ATCA tasks allow the Defence Forces to demonstrate it's capabilities in delivering practical and helpful operational outputs to Irish citizens in difficult circumstances. While noting that ATCA operations are, according to the 2015 White Paper on Defence, carried out on an 'as available'[3] basis, the Commission commented that the urgency and importance attached to these tasks means that in many cases they must be prioritised by the Defence Forces. Of note to this paper, the Commission also remarked that ATCA deployments are likely to increase in the future due to a range of factors, including climate change. Specific examples of ATCA operations, which are, according to the Commission likely to grow in importance due to *"the already predictable consequences of climate change"* include aerial firefighting and assisting flood victims.[4]

Emergency Management Documentation and the National Risk Assessment

The State's 2023 National Risk Assessment (NRA) provides a systematic overview of national-level strategic risks which may arise for Ireland over the short, medium or long term.[5] The Assessment forms part of a comprehensive collection of Emergency Management documentation in Ireland, dating back to the 2006 publication, *A Framework for Major Emergency Management*.[6] This Framework tasks three State Agencies, An Garda Síochána, the Health Service Executive (HSE) and the Local Authorities as Principal Response

1 Fitzgerald, John. "We need to prepare now for future natural disasters," *Irish Times Business This Week Supplement,* October 22, 2021,
2 Commission on the Defence Forces. *Report of the Commission on the Defence Forces*, (Dublin, 2022). 22-23.
3 The *Report of the Commission on the Defence Forces* defines this term by stating that other, more obviously military tasks are seen as having a priority. As a result, Defence Forces capabilities are not "On Call", on defined states of readiness, for Emergency Management related ATCA Operations.
4 Commission on the Defence Forces. *Report of the Commission on the Defence Forces*, (Dublin, 2022). 21.
5 Government of Ireland. *National Risk Assessment 2023 – Overview of Strategic Risks*, (Dublin, 2023).
6 Government of Ireland. *A Framework For Major Emergency Management*, (Dublin, 2006).

Agencies (PRA) to prepare for and make a coordinated response to, major emergencies, resulting from events such as fires, transport accidents, hazardous substance incidents and severe weather. The 2006 Framework also highlights how the Defence Forces are an additional resource which can assist the PRAs in responding to major emergencies and states that the Defence Forces can provide a significant support role in a major emergency response with capabilities that can be employed across a wide spectrum of activity.

The NRA, which has been produced and updated by the Government since 2014, seeks to identify risks in order that they be appropriately considered, pre-empted and planned for. Climate Change, one of twenty-five identified risks in the Assessment, is described as an unavoidable global risk (Table 1). All twenty-five present potentially significant risks to Ireland, our society and our economy. By identifying Climate Change as a potential strategic risk, the NRA seeks to inform risk management exercises and strategic planning carried out across government Departments and Agencies.

Geopolitical Risks	Disruption of the multilateral system Future direction of the European Union Northern Ireland Armed conflict, terrorism and hybrid security threats
Economic Risks	Fiscal Sustainability Inflation and the transition to higher interest rates Disruption to a secure and sustainable energy supply Concentration in Ireland's enterprise mix Protectionism and deglobalisation Capacity constraints and infrastructure deficits
Societal Risks	Social cohesion Housing Migration and integration Demographic change Digital exclusion
Environmental Risks	Climate Change Biodiversity loss Extreme weather events and other disasters Pandemics Antimicrobial resistance Food safety and security
Technological Risks	Data flows, storage and security Disruptive technology Cybersecurity Chemical, Biological, Radiological and Nuclear Threats

Table 1–The list of twenty-five strategic risks outlined in the 2023 NRA.

Climate Change

The 2023 NRA categorises Climate Change as an environmental risk and states that this category of risk is amongst the most diverse and complex.[7] The Assessment adds that directly related to the climate change risk, natural disasters and extreme weather events remain a risk for Ireland. This may take the form of storms, flooding, coastal inundation and erosion, extreme temperatures and prolonged periods of drought. Climate Change is happening at an accelerating and alarming rate, increasing the urgency for countries, including Ireland, to step up efforts to mitigate it. Changes in Ireland's climate are in line with global trends, and extreme weather events domestically in recent years have

7 Government of Ireland. *National Risk Assessment 2023 – Overview of Strategic Risks*, (Dublin, 2023).25.

demonstrated the potential far-reaching risks to Irish society and the economy. As a result of Climate Change Ireland will face increased risk of rising sea levels and coastal change. We will also face an increased likelihood and magnitude of river and coastal flooding.

The ATCA Role of the Defence Forces

When assigning roles in the 2015 White Paper on Defence, the Government tasks the Defence Forces to contribute to national resilience, through the provision of a range of Department of Defence agreed, ATCA supports to other government departments and agencies. In particular, the Defence Forces are tasked with responding to major emergencies. Defence Forces support is provided to other government departments in line with Memorandums of Understanding (MOU) and Service Level Agreements (SLA) drawn up by the Department of Defence.[8]

The 2019 White Paper Review confirmed this ATCA role for the Defence Forces, outlining how it maximised value for money achieved from defence expenditure, for the broader benefit of the State,[9] while the Defence Organisation's[10] 2023-2026 Strategy Statement lists the successful delivery of ATCA operations as an organisational strategic goal.[11] That Strategy Statement gives particular emphasis to the delivery of Defence Forces support during major emergencies, including severe weather events.

The 2024 Defence Policy Review affirms that defence policy will continue to support a whole of government approach to national resilience through the development of an agile, modern and fit-for-purpose Defence Forces, with planning and mitigation against the likelihood and impact of identified strategic risks. The Defence Forces will continue to have a role to assist the Civil Authorities, within means and capabilities, during responses to large-scale national emergencies.[12] In particular, the Review outlines how the Defence Forces will carry out ATCA support to other Government Departments and the PRAs to address climate change challenges and extreme weather events.[13]

MOUs and SLAs

An up-to-date list of existing MOUs and SLAs is published annually in the Defence Organisation's Annual Report. The 2022 iteration of the report listed a total of 24 MOUs and 26 SLAs. As outlined above, these are between the Department of Defence, the Defence Forces and a wide variety of other Government Departments and Agencies, with some containing specific ATCA output targets for the Defence Forces.[14]

8 Government of Ireland. *White Paper on Defence* (Dublin, 2015). 59.
9 Government of Ireland, *White Paper on Defence – Update 2019* (Dublin, 2019).78.
10 The term used to describe both the Department of Defence and Defence Forces.
11 *Department of Defence, Department of Defence and Defence Forces Strategy Statement 2023-2026* (Dublin 2023). 18.
12 Department of Defence, *Defence Policy Review 2024*, (Dublin 2024). 4 & 25.
13 Department of Defence, *Defence Policy Review 2024*, (Dublin 2024).34.
14 Department of Defence, *Department of Defence and Defence Forces Annual Report 2022* (Dublin 2023). 147-148.

The State's Emergency Management Architecture

The Government, in coordinating Emergency Management at the strategic level, operate a Lead Government Department (LGD) model, whereby planning for and response to an emergency or crisis is the responsibility of the Minister and his/her department, which has functional responsibility for that particular event.[15] Additionally, the following structures and arrangements are in place to enable the delivery of national and regional level emergency management, including activation of the Defence Forces in an ATCA Role.

Government Task Force on Emergency Planning

The Government Task Force (GTF) on Emergency Planning provides strategic direction and coordination of emergency planning.[16] The GTF is chaired by the Minister for Defence who is assisted in that role by the Office of Emergency Planning (OEP). It meets bi-monthly and is comprised of Ministers and/or senior officials from all government departments and key public bodies. The GTF also includes senior officers of An Garda Síochána and the Defence Forces,[17] in addition to senior officials from other key public agencies and authorities, which have a lead or support role in government emergency planning.

Office of Emergency Planning

The OEP is a joint civil-military office within the Department of Defence, established to support the work of the GTF on Emergency Planning. The military component consists of two staff officers. The OEP supports the Minister for Defence in his/her role as Chair of the GTF on Emergency Planning. The Office works with all departments and agencies involved in emergency planning and carries out a cross-departmental oversight function, which forms the basis of an Annual Report to Government. To support this work, the National Emergency Co-ordination Centre (NECC), located in the Department of Agriculture on Kildare Street, Dublin 2, provides a robust and resilient facility where Ministers and others involved in responding to national emergencies/crises can convene to co-ordinate national responses. The OEP is located in and manages the NECC on behalf of the Government.[18]

National Emergency Coordination Group

When an emergency or crisis occurs, the LGD may convene a National Emergency Coordination Group (NECG), chaired by the Minister responsible for that Department or a senior official, to ensure a 'whole of government' approach is brought to the national response.[19] A typical example of a NECG are those assembled to deal with emergencies caused by severe weather events. The Defence Forces are represented on NECGs by the staff of the Planning and Capabilities Section, DJ3&J5, who participate along with colleagues from the Department of Defence.

15 Government of Ireland. *A Framework For Major Emergency Management*, (Dublin, 2006).56.
16 For additional information on the GTF see *Department of Defence, Department of Defence and Defence Forces Annual Report 2022 (Dublin 2023).* 27.
17 Staff of Planning and Capabilities Section, DJ3&J5 represent DCOS (Ops) at the bimonthly meetings.
18 For additional information on the OEP see *Department of Defence, Department of Defence and Defence Forces Annual Report 2022 (Dublin 2023).* 27.
19 For additional information on the NECG see *Department of Defence, Department of Defence and Defence Forces Annual Report 2022 (Dublin 2023). 28.*

Emergency Management at the Regional Level

Under certain specific circumstances, regional-level major emergencies may be declared, with a Plan for Regional Level Co-ordination activated. This will provide for mutual aid, support and co-ordination facilities to be activated in a region, the boundaries of which are determined to suit the exigencies of the particular emergency. Regional Steering and Working Groups are also established and these groups may invite others that they deem appropriate, such as the Defence Forces, the voluntary emergency services, utilities and private sector organisations, to attend and participate in their work. Members of the Defence Forces attending these meetings are normally G3/5 staff from the relevant Army Brigade HQ.[20]

ATCA Operations Resulting from Climate Change

As outlined above, the 2023 NRA directly linked the risk of Climate Change to an increased number of extreme weather events taking place annually in Ireland. The Defence Forces 2023 ATCA Doctrine provides guidance to those responsible for the planning, force generation, training and command and control of the Defence Forces capabilities and resources tasked to provide support to the civil authorities, including during severe weather events.[21] The example given in the doctrine of a large-scale severe weather-related ATCA operation, in support of the PRAs, is 2018's Storm *Emma*. That storm and an accompanying cold spell struck Ireland between 28 February and 04 March. The result was a significant snowfall event resulting in widespread disruptions to road, rail and air travel, with work and school closures. During the five days in question, a period which included a red weather warning, only issued by Met Éireann when there are rare and very dangerous weather conditions, the Defence Forces deployed 2,637 troops across 22 counties on a range of transport and route clearance tasks, that included transporting HSE staff to work and to visit patients in their homes, conducting patient transfers for the HSE, clearing snow for the local authorities and assisting An Garda Síochána with the provision of 4x4 vehicles.

20 For additional information on the regional structures see Government of Ireland. *A Framework For Major Emergency Management, (Dublin, 2006).*62-63.
21 Defence Forces. *Defence Forces Aid to the Civil Authority Doctrine*, (Dublin, 2023).

The following vignette, taken from the ATCA Doctrine, gives the reader an idea of how one army unit, 3rd Infantry Battalion, responded to the request for ATCA support during Storm *Emma*.

> *During 2018's five-day Storm Emma the 3rd Infantry Battalion were tasked by HQ 1 Brigade, with conducting ATCA tasks in support of the PRAs in the South-East of the country. As part of their preparations in the lead-up to the storm, the unit pre-positioned troops and stores from it's headquarters in Kilkenny to RDF locations in Wexford and Waterford. When the storm hit, unit personnel, at the request of the National Ambulance Service, conducted patient and staff transfers for the HSE, with priority given to eighty patients requiring dialysis. They also delivered medical supplies to Wexford General Hospital and outlying clinics throughout Wexford. As weather conditions deteriorated, the Battalion cleared routes with engineer plant machinery and a snow plough and continued transport operations using snow chains on their 4x4 vehicles. Finally, as conditions started to improve, the Battalion deployed manpower to conduct road and path clearance in Enniscorthy, Bunclody and other villages throughout Wexford.*[22]

Preparing the Defence Forces for an Increase in ATCA Operations

Training

The Defence Forces 2023 ATCA Doctrine outlines a range of emergency management training opportunities available to Defence Forces personnel to prepare them for operating in support of the PRAs during emergency management ATCA operations. These include participating in training events organised by LGDs, the PRAs and the Regional Steering and Working Groups. On an annual basis, these training events include tabletop and field exercises, as well as a range of seminars and conferences.[23]

An example of an annual emergency management training opportunity, available to Defence Forces operations and planning staff at DFHQ and Formation/ Service level, is the All-Island Disaster Risk Reduction Conference series. Each annual conference, normally a two-day event, focuses on a different theme that is of relevance and interest to attendees who come from a wide range of government and Northern Ireland Departments and Agencies. The 2023 iteration focused on crisis communications and included addresses by both the Minister for Defence and the Secretary General of the Department of Defence, both of whom, as highlighted above, play a leadership role in the GTF on Emergency Planning.[24]

22 Defence Forces. *Defence Forces Aid to the Civil Authority Doctrine*, (Dublin, 2023).34-35.
23 Defence Forces. *Defence Forces Aid to the Civil Authority Doctrine*, (Dublin, 2023).31.
24 The Conference Agenda can be seen at *file:///C:/Users/timot/Downloads/277840_7d5b64ed-f8f4-49db-8c78-6370a456c4d9.pdf.*

Personnel and Equipment

As highlighted in the introduction to this paper, the Commission on the Defence Forces stated that the delivery of ATCA outputs should be appropriately valued, when considering the requirements for the appropriate capabilities, structures and staffing of the Defence Forces. The government's acceptance of Level of Ambition 2, will according to the Commission report, facilitate the Defence Forces in meeting their regular ATCA tasks and provide a significant contribution to national resilience.[25]

In highlighting a Level of Ambition, the Commission has identified the evident need for capability development to be pursued over the long-term, thereby ensuring that the Defence Forces remains capable of responding to the evolving strategic environment. The Commission again recommend that, where possible, future capabilities should be dual use, therefore allowing them to be used in delivering ATCA, in addition to core military functions.[26]

In terms of mobility requirements for on-island Land Component ATCA operations, the Commission report noted that there is only sufficient organic motorised transport available in each Infantry Battalion to transport approximately one company at a time and that a reliance exists on Brigade Transport assets to move personnel. As a result, the Commission recommended the development of an organic transport capability, in each Infantry Battalion location, sufficient to meet on-island operational movement of personnel and equipment for training, as well as ATCA operations. From an air perspective, the Commission stated that the acquisition of additional helicopters for the Air Corps[27] would enhance the Defence Forces on island troop transport capabilities and provide additional capacity for ATCA taskings.[28]

Regional Footprint

The Defence Organisation's Annual Reports provide detailed information on emergency management-related ATCA Operations conducted by the Defence Forces.[29] The geographical spread of these operations is nationwide and therefore to be able to respond effectively to any increased requests for ATCA support, the Defence Forces may require a regional footprint, larger than that provided by the current network of Permanent Defence Forces (PDF) installations.

The 2023 ATCA Doctrine outlines how there are circumstances where operational demands may exceed the capacity of the PDF and require the deployment of the Reserve Defence Forces (RDF). These circumstances include, what are described in the 2015 White Paper on Defence as *"certain civil contingencies"* that could require large-scale Defence

25 Commission on the Defence Forces. *Report of the Commission on the Defence Forces*, (Dublin, 2022). 27.
26 Commission on the Defence Forces. *Report of the Commission on the Defence Forces*, (Dublin, 2022). 31.
27 The Air Corps currently operate a rotary wing fleet of six Augusta Westland AW139s and two Eurocopter EC-135s. See https://www.military.ie/en/who-we-are/air-corps/. The 2023 Detailed Implementation Plan for the Report of the Commission on the Defence Forces, outlines plans for the procurement, by 2028, of additional Rotary Wing Medium Lift aircraft and to also potentially replace that capability, with a super medium capability.
28 Commission on the Defence Forces. *Report of the Commission on the Defence Forces*, (Dublin, 2022). 33-38.
29 For example, the 2022 Annual Report outlined operations conducted in Counties Mayo, Wicklow and Dublin.

Forces' support. As highlighted in the vignette above the use of RDF facilities, provides the PDF with greater flexibility, when either pre-positioning troops and equipment for ATCA operations, or using those locations as Forward Operating Bases.[30]

Joint ATCA Operations

While severe weather-related ATCA Operations are generally single-service in nature,[31] the Defence Forces are also experienced in conducting when required, complex Joint ATCA Operations. As an example, a detailed description of Operation *Fortitude*, the Defence Forces joint response to the COVID-19 crisis, is outlined in the 2023 Defence Forces ATCA Doctrine. It describes how between March and December 2020, the first year of the crisis, a total of 53,930 troops, sailors and aircrew had been deployed in support of the HSE and how extensive use had been made of the Army's soft skin transport fleet, Air Corps fixed and rotary wing aircraft and, at the beginning of the crisis, Naval Offshore Patrol Vessels.[32]

Conclusion

Climate Change is an unavoidable global risk which poses significant risks to Irish society. It is likely that climate change will result in Ireland experiencing more extreme weather events in the coming years. The State has a sophisticated emergency management planning architecture for responding to extreme weather events and both LGDs and the PRAs recognise that Defence Forces capabilities are a valuable resource which can provide a significant support role in a major emergency response across a wide spectrum of activity. The publication of a new ATCA Doctrine provides an opportunity for Defence Forces planners to refamiliarize themselves with how the Defence Forces prepares for and executes what are often complex major emergency extreme weather-related ATCA operations.

30 Defence Forces. *Defence Forces Aid to the Civil Authority Doctrine*, (Dublin, 2023).30.
31 For example, the army normally respond to flooding and snow relief operations, while the Air Corps take the lead in aerial firefighting operations.
32 Defence Forces. *Defence Forces Aid to the Civil Authority Doctrine*, (Dublin, 2023).45-50.

Abstracts

6th Joint Command and Staff Course

Benefits of Mentoring Programmes in the Defence Forces

Lt Cdr Patricia BUTLER MSc

Military organisations like the Irish Defence Forces (DF) face the growing challenge of personnel retention. Mentoring Programmes have emerged as a potential strategy to address this issue by fostering personal development, enhancing job satisfaction, and promoting a culture of commitment. This research aims to investigate the potential benefits that a robust Mentoring Programme could offer within the unique context of the DF. It seeks to illuminate how mentoring can contribute to enhanced performance, leadership development, the transfer of tacit knowledge, and increased satisfaction among DF personnel.

With an understanding of both the benefits and challenges of implementing such programmes, this research will provide the DF with actionable recommendations for designing, implementing and maintaining a mentoring initiative aligned with their specific organisational needs, ultimately addressing their retention goals and contributing to the effectiveness of the organisation.

Drawing insights from an extensive literature review, the study explores mentoring's role in cultivating leadership, knowledge transfer, and organisational performance. A qualitative research approach utilising semi-structured interviews was employed to gain a deeper understanding of the perspectives and experiences of DF personnel and experts from other militaries and civilian organisations. Thematic analysis revealed several key factors essential for a successful Mentoring Programme within the DF. These include the importance of building trust and confidentiality, targeted communication strategies to raise awareness, the involvement of mentors at varying ranks, and integrating mentoring into career progression paths. Findings also highlighted the potential of informal mentoring to complement structured programmes.

This research offers actionable recommendations for Mentoring Programmes in the DF. Specific recommendations include: promoting trust and confidentiality, engaging senior leaders as champions, incentivising mentor and mentee participation, and aligning the programme with existing talent development initiatives. Further research is suggested to explore specific mentee motivators and to track the long-term impact of mentoring on performance and retention.

Preparing for the Concrete Jungle: Adapting Irish Army Doctrine and Training for Urban Operations

Comdt Brian CAHILL BA, HDip, MSc

This thesis examines the readiness of the Irish Army for future urban operations, explicitly addressing land force organisation and doctrine. It posits that Ireland's neutrality policies and reliance on UN Security Council resolutions for intervention in conflict zones pose unique challenges for a small military force operating in complex urban environments. The thesis begins with a historical analysis, highlighting how the Army's traditional focus on conventional field operations reflects it's origins in the War of Independence and the Civil War. The legacy of these conflicts contrasts with the complexities of modern urban warfare, demanding adaptability and decentralised small-unit tactics.

The thesis critically examines the Irish Army's current force organisation and doctrine, considering it's stated national defence mission and participation in overseas peace support operations. It identifies a significant doctrine and training gap in the preparation for urban operations (UOs), which is expected to be a dominant feature of future conflict. To address this, the thesis draws on current research to investigate commanders' cognitive challenges in urban environments. Theoretical models like Bounded Rationality and Prospect Theory illuminate decision-making under pressure, limited information, and heightened risk perception.

The thesis advocates for wargaming as a vital training tool to enhance decision-making skills, explore doctrinal concepts, and simulate UOs within Ireland's resource constraints. Both military and commercially available wargames are assessed for their potential to familiarise Irish Army personnel with the intricacies of urban operations. The research culminates in proposing specific doctrinal and force design recommendations to prepare the Army for potential urban defence scenarios within Ireland and it's participation in potential international stabilisation operations.

Beyond Rhetoric: Building a Culture of Diversity and Inclusion in the Irish Defence Forces

Comdt Michael CAMPBELL

Similar to many militaries, the Defence Forces (DF) is on a journey and to better reflect the society which it represents, the DF must ensure that Diversity and Inclusion (D&I) is embraced, and authentic D&I values are inculcated. Only by doing so can the DF move away from the traditional military construct which commentators such as Torgersen and Carlsten (2019) have described as *"relatively closed and mechanically organised"* (p.138). The recent Report of the Commission on the Defence Forces (Commission on the Defence Forces, 2022) pointed to organisational failings when it came to D&I describing the culture as masculine, gendered, and patriarchal.

This research, qualitative in nature, engaged with six participants–four internal to the organisation and two external–through the use of semi-structured interviews. Using interpretative phenomenological analysis, the data gathered from the internal participants provided context and insights into the DF's D&I journey, while the data from the external participants provided alternative perspectives and lessons which the DF should consider. Thematically, the research focused on areas such Exclusion and Inclusion; Representational Diversity; Invisible and Visible diversity; Employee Voice; Leadership; D&I challenges; and the role of D&I allies.

The findings show that D&I has become important to the DF, but the organisation's current diversity priority is primarily greater female representation with the ambition of achieving thirty-five per cent. The findings also highlight that greater understanding and awareness of D&I is required, particularly when it comes to distinguishing between both terms. Going forward, this research has proposed several recommendations which include the launch of a D&I awareness campaign, the rollout of the Voice of the Employee initiative, and the expansion of the Office of the Gender Equality and Diversity Advisor.

Climate Action: A Leadership Opportunity for the Defence Forces

Comdt Eoghan CARTON BEng, CEng, MIEI

Climate leadership is about taking action to reduce emissions but also encouraging others to take action. The Climate Action Plan requires the Defence Forces, a public-sector body, to lead by example in driving far reaching climate action. Beyond mandated targets, the organisation has other climate-related roles and obligations including influence in climate governance and climate security operations.

Acknowledging the organisation is active in climate and sustainability, the purpose of the study is to identify how the DF can take the lead in climate action by examining climate leadership in Defence and the implementation of climate action. This qualitative study primarily draws on literature in climate leadership, climate security and CSR/ESG and is supported with primary data, including three expert interviews providing political, industry and Defence perspectives.

Climate leadership in Defence was found to be the delivery of substantive and effective climate action across all of it's relevant climate-related areas. At organisational level, this is facilitated by a polycentric approach, involving all personnel and encouraging experimentation and innovation. Exemplary climate leadership, required of public bodies, was found not to act in isolation, but in conjunction with structural, entrepreneurial and cognitive leadership.

Potential barriers to successful climate action were identified for Defence, with 'leadership commitment' and 'knowledge' being the most influential. A Defence-specific framework for implementing climate action was developed with five components (leadership commitment, context, policy, implementation and results). The other key outputs of the study are a model for conceptualising climate leadership in Defence and a set of climate leadership principles.

Four main recommendations are presented for the DF to implement effective climate action. It should prioritise the adoption of the identified five-part framework for implementing climate action. It should consider developing a unified civilian/military unit for climate and sustainability. It should consider developing a Defence-specific training and education suite for it's employees. It should encourage an experimental approach to climate action, exploiting existing resources such as the Research, Technology and Innovation Unit. By seizing this leadership opportunity, the DF can continue to protect Ireland and it's citizens, encouraging others to follow suit and therefore becoming the exemplar required of it in the Climate Action Plan.

An Examination into Russia's Use of Private Military Contractors As a Tool to Achieve Their Geoolitical Goals in Africa.

Comdt Mark CONWAY BSc MSc

This thesis examines Russia's use of Private Military Contractors (PMCs) in Africa, particularly it's impact on diminishing Western influence. Existing research on PMCs often overlooks the specificities of Russia's approach and therefore this research addresses this gap by employing a mixed methods approach, combining document analysis and quantitative data. It investigates the historical and legal context of Russian PMCs, their deployment strategies in Africa, and their impact on established Western interests. Case studies of Mali and the Central African Republic (CAR) explore operational dynamics, geopolitical motivations, and the consequences for regional stability, human rights, and democratic governance.

The findings reveal a calculated Russian strategy leveraging PMCs to counter Western influence and establish spheres of power. While this approach weakens Western influence, it also exacerbates instability and undermines human rights. The blurring of lines between state and non-state actors further complicates accountability. The research highlights the need for a multifaceted international response, including condemning human rights abuses, strengthening sanctions, and reevaluating Western military aid models to emphasise adherence to international law. Acknowledging limitations due to the opacity of PMCs, the thesis recommends future research on African perspectives, potential shifts in Russia's strategy, and robust regulatory frameworks to enhance accountability and transparency. By illuminating the destabilising effects of Russia's PMC strategy, this thesis underscores the urgency of safeguarding international norms for peace, security, and human rights.

Mentoring in the Irish Defence Forces: Opportunities and Challenges

Comdt Shane COURTNEY MA

This study explores the contemporary mentoring practices and opportunities that align with mentoring challenges in the Irish Defence Forces. Mentoring is integral to the current Irish Defence Forces Leadership Doctrine, relevant from tactical to strategic levels. However, there appears to be a disconnect between the stated aims of the DF Policy and the lived experience of mentoring within it's personnel. This study aims to bridge the gap between the objectives of the mentoring policy and it's real-world operation.

A mixed-methods approach encompassing qualitative and quantitative research methods was employed to achieve the study's aim. By conducting a workplace survey and semi-structured interviews, this study identified significant themes that shed light on the perceived limitations of the program, providing valuable insights for improvement. The research findings, crucial in the context of the Irish Defence Forces mentoring program, indicate that a motivated and committed group of mentors is available to enhance the careers of military personnel through mentoring. However, the study also highlighted numerous obstacles that must be addressed to improve the program's effectiveness. These include a lack of awareness and understanding of mentoring, accessibility issues, cultural barriers, inadequate resources, and limited integration with career development initiatives. While positive mentor-mentee relationships exist, the study also highlights the 'dark side' of mentoring, necessitating awareness and mitigation strategies. It also identified contemporary mentoring methods such as Flash Mentoring and E-Mentoring, which, when employed appropriately, can enhance the mentoring experience for both mentor and mentee.

This study offers actionable recommendations to enhance the Defence Forces mentoring program, including improved advertisement campaigns, training, cultural shifts, resource allocation, and appraisal integration. By implementing these recommendations, the Irish Defence Forces can foster a robust mentoring program that significantly benefits personnel development among all ranks.

The Impact of Psychological Safety on Retention: Realising Mitigation Potential in Organisational Crisis

Major Michael W. DABECK BSc, MSc

An organisational crisis is looming across multiple Western militaries. Over the last several years, commands have struggled to meet their objectives in recruiting and retention. The inability to dissuade voluntary turnover of these service members presents both a loss in the financial capital committed and, more detrimentally, a loss in experiential knowledge across an organisation. This loss of experiential knowledge is not just a statistic; it is a potential blow to the very core of military effectiveness.

This research examines the mitigating potential of psychological safety's influence on retention. Underpinned by theory and established literature, the study formed five central propositions to interrogate the research question. Through the development of the research model, each proposition was then assessed in a progressive exploratory study.

Grounded in the research philosophy, the research strategy used a mixed-methods approach to conduct quantitative questionnaires before expanding upon them in a qualitative focus group study. Retained American and Irish junior officers were chosen as the study's target population (N = 45). Participants were further subdivided into gender, nationality, and time in service subgroups and analysed for proportional variance.

The research findings were indicative of the validity of the research model and it's associated propositions. The findings established the mitigating presence of psychological safety's mediating influence on the psychological climate. Within the established servant leader and retention relationship, the psychological climate was then seen to moderate the core mediating mechanisms of team cohesion, job satisfaction, and embeddedness with their improvement directly related to improved retention rates. Further, these findings were found to be legitimate and applicable across the assessed subgroup populations.

The research concludes with a discussion of the finding's implications and limitations as well as recommendations for future research and immediate implementation. The recommendations, derived from the research, allow for the desired organisational change through minor behavioural adjustments at all levels of the military. By creating a psychological sense of safety among service members, mitigation of organisational retention crises may be realised.

The Path to Senior Leadership. An Exploration of the Experiences of Motherhood in the Irish Defence Forces

Lt Cdr Grace FANNING BSc

Motherhood is a defining experience for women, it presents unique challenges for career progression within male-dominated environments like the military. Despite the Defence Forces' goal of increasing female participation, the retention and career progression of mothers remain a hurdle. This thesis explored the experiences of mothers in the Defence Forces, aiming to illuminate the barriers and challenges they faced and address recommendations for change.

This research employed a mixed-methods approach with surveys and semi-structured interviews, the research investigated how motherhood impacted career progression in the Defence Forces. It was positioned within a social constructionist paradigm and conducted through a feminist lens, prioritising the lived experiences of mothers. Fifty-one participants returned surveys out of a total population of two hundred and thirty-two mothers (22%). Four mothers participated in in-depth semi-structured interviews.

Key findings highlighted motherhood guilt, work-life balance struggles, and a pervasive gendered organisational culture that hindered mothers' advancement. Participants emphasised the need for flexible work arrangements, support for career development opportunities, and a cultural shift valuing motherhood within the Defence Forces.

This research underscores the need for the Defence Forces to move beyond policy updates and actively support mothers. Recommendations included comprehensive work-life integration policies, addressing unconscious bias, and fostering a truly inclusive culture that embraces and celebrates motherhood as an asset to the organisation.

Saving Salvable Lives: The Derivation of an Information Management Framework to Enable Irish Emergency Communications at All Phases and Levels of Crisis Management Operations

Comdt Denis FLYNN BSc (Hons). M Sc. M Eng. MSEM

All forms of emergency share one specific characteristic. They all constitute either a direct or indirect threat to life, health, property, the natural environment, or societal normality. This Research is primarily concerned with Irish National emergency management at Tactical, Operational and Strategic levels across Government. It examines the best mechanism for saving salvable lives in environments that are volatile, uncertain, complex and ambiguous. It is posed that the simple action of increasing the distance of vulnerable actors and assets from the prevalent threat (cordon and evacuation) will enormously increase the survivability of any vulnerable actors in these unstable environments. Emergency incidents evolve quickly, often with resulting complex cascading effects. Effective management of these incidents require operative decision making and leadership at all levels of response, often in an extremely time sensitive manner, and a failure to act rapidly within this response environment can often expose those whom require assistance to further unnecessary risk. This is often further compounded through a complete lack of situational awareness in the developing emergency environment. As such, combating this problem requires the utilisation of effective emergency communications processes and frameworks. When response agency commanders, leaders, and decision makers at all levels are provided with timely and accurate information, they are by extension, prepared to act immediately within an evolving situation to protect life. The absolute best protective measure in this case is the effective implementation of cordon and evacuation measures but efficient inter-agency crisis communications are vital in order to get this powerful but simple action right. Despite this simplicity, this coordination across all aspects of societal and Government actors is immensely difficult to achieve. This research analyses some of the current barriers and enablers in relation to effective emergency communications in the inter agency emergency management environment and proposes a new Emergency Management Situation Report Template that could enable and optimise emergency communications at all phases and levels of National crisis management operations. The proposed Template is simple in design and in line with the requirements of the strategic National Public Warning System under current development. The usage of a simple emergency communications measure such as this provides simple measures by which a common threat picture can be rapidly disseminated across all levels of society and stakeholder response, thereby contributing to complete comprehension of the hazard posed and a common societal unity of effort. Thus, National efforts aimed at the effective protection of life, property and the environment can be further optimised, thereby augmenting national resilience, while restoring society to normality as soon as possible following the disruptive effects of emergency incidents.

Crew Resource Management (CRM) – Does the Application of Crew Resource Management in the German Navy Provide the Potential to Improve Leadership and an Effective Leader-Follower Relationship?

Commander Rouven GRUENHAGEN

Naval forces operate in complex environments with various risks. This requires functionally cooperating crews (teams) and effective performance. Navy leaders and followers must interact in demanding and changing circumstances effectively, complemented by an emphasis on the security and safety of personnel. Furthermore, the safety and security of the warship is of high importance to maintain the ability to accomplish the given mission and to avoid potential damage or loss of the warship and thus capabilities linked to the warship as a high-value system. Therefore, it is crucial to emphasize on safety in general, and additionally on the effectiveness of leadership and team performance.

This thesis discusses the key principles and interactions of leadership, team theories and Crew (Bridge) Resource Management (CRM/BRM) in order to tease out the effectiveness of CRM/BRM and the added-value of CRM/BRM to leadership and teams. The focus is on the military naval domain and the German Navy. It introduces the accident of the Norwegian frigate HNoMS Helge Ingstad (HING) and discusses the role of the human element and related human factors in the maritime domain. Embedded in this thesis is the discussion about the conditions to be considered implementing CRM/BRM and CRM/BRM training in the military naval domain.

Finally, complementing a discussion about the evolution of CRM/BRM and it's objectives, it discusses the acceptance and effectiveness of CRM/BRM training in the maritime domain.

"The Illumination of Motivation" Lessons from Motivational Theory: Irish Defence Forces Privates Who Remain in Service

Comdt Thomas HOLMES

The Defence Forces (DF) continues to struggle to retain personnel with a turnover rate of 10% in 2023. A total of 750 personnel were discharged and 415 personnel were inducted in 2023. Rather than focussing on those that have departed, this thesis aims to understand motivations of Privates in the DF that chose to remain in service and understand the factors influencing their decisions. It is important because the research facilitated an understanding of motivational levels across a broad spectrum of factors and examined the implications from a DF perspective. My research focussed on firstly examining established motivational theories and applying them to the modern soldier using a social constructionist paradigm. This approach examines the processes by which social phenomena are perceived, understood, and given meaning through social interactions.

The study utilised a quantitative survey complemented by qualitative open-ended questions to gain a deeper understanding of the Privates' perspectives. This mixed methodology allowed for a comprehensive analysis of the factors that contribute to their continued service and overall engagement within the military. The study revealed key motivators and de-motivators that influence Privates' decisions to continue service in the DF, including intrinsic and extrinsic factors that contribute to job satisfaction and dissatisfaction. The research largely found that extrinsic factors were considered most important, comparatively speaking.

Implications for DF leadership and the Defence Organisation include balancing financial incentives with initiatives that enrich the soldiers' work life and personal growth opportunities. Addressing both types of motivators can enhance overall motivation and retention. Early-career soldiers place greater emphasis on pay and financial benefits, but this importance gradually decreases as the length of service increases. Pension and job security are more valued by those in the middle to later stages of their careers, suggesting shifting priorities towards long-term financial security and stability. Promotion opportunities did not rank as a high priority across any service length, suggesting either satisfaction with the career progression system or a lack of emphasis on promotions as a motivational factor. Soldiers with more than 20 years of service are the most satisfied group, indicating that those who remain long-term find substantial value or fulfilment in their roles.

Recommendations include reviewing financial packages and career progression paths. Information campaigns around career development opportunities and further engagement through two-way communication to include targeting members at the midway point of their careers are also considered important. This thesis underscores the need for targeted strategies that address both the professional and personal aspirations of soldiers, aiming to foster a more motivated and committed workforce.

Enhancing Ireland's Defence Forces Cyber Capability

Comdt John KENNY BSc MSc

This thesis examines the ongoing efforts to enhance cyber defence capabilities within the Irish Defence Forces (DF), focusing on the integration of these capabilities with traditional military operations and the development of a resilient cyber workforce. As the digital domain becomes increasingly central to national security, the DF faces unique challenges and opportunities in strengthening it's cyber defence posture.

Chapter 1 outlines the existing cyber defence framework and illustrates it's critical role in national security. The DF's transition from isolated networks to highly interconnected systems highlight the increasing importance of robust cyber defence mechanisms. This chapter discusses the necessity of modernising defence strategies to include digital capabilities, which not only improve operational efficiency but also expand the cyber threat landscape.

Chapter 2 delves into the complexities of integrating cyber defence with traditional military operations. It argues that cyber defence must support all domains of warfare—land, air, sea, and space—to enhance the DF's operational resilience and effectiveness. The chapter emphasises the importance of strategic frameworks that align cyber defence initiatives with national security objectives, highlighting successful collaborations with NATO and other international bodies to bolster Ireland's cyber capabilities.

Chapter 3 focuses on building a resilient cyber defence workforce, crucial for the long-term sustainability of cyber capabilities. It discusses the challenges of recruitment and retention within the DF, proposing strategies to develop a skilled and motivated workforce capable of handling sophisticated cyber threats. This includes enhancing training programs, establishing clear career paths, and fostering a culture of continuous learning and adaptation.

Throughout the thesis, it becomes evident that enhancing Ireland's cyber defence capabilities involves not only upgrading technological infrastructures and operational strategies but also investing in human capital. The dynamic nature of the cyber threat landscape requires ongoing adjustments to defence strategies, making flexibility and adaptability key features of successful cyber defence initiatives.

In conclusion, the thesis underscores the necessity for the Irish DF to not only keep pace with technological advancements but also anticipate future challenges in the cyber domain. The establishment of a robust cyber defence framework, integrated with traditional military operations and supported by a resilient workforce, is paramount in safeguarding national interests and maintaining national security in the digital age.

Physical Activity As a Tool to Build Resilience and Good Mental Health in the Defence Forces

Comdt Ian KILBRIDE

This thesis investigates the intricate relationship between physical activity, mental health, and resilience within the Irish Defence Forces (DF). It addresses the concerning trend of attrition of personnel and explores the anecdotal observation that personnel engaged in DF sports exhibit lower stress levels and appear more resilient to challenges. The research delves into the DF's Mental Health and Wellbeing Strategy (2020-2023), examining it's implementation challenges and it's limited reach within the wider DF population.

The literature review highlights the well-established link between physical activity and mental well-being, emphasising exercise's potential to mitigate stress, anxiety, and depression. It also explores the concept of resilience, advocating for a term that encompasses not only recovery from adversity but also the ability to withstand challenges without experiencing a decline in wellbeing or performance. The research employs a mixed-methods approach, combining survey data from DF personnel with interviews of key stakeholders.

Survey findings reveal that a significant proportion of personnel have sought mental health support within the DF, but concerns remain regarding anonymity, service range, and access to external resources. A persistent stigma surrounding mental health issues is identified as a barrier to seeking help. Notably, physical activity emerges as the most common coping mechanism for stress, with the majority of respondents reporting regular exercise and acknowledging it's positive impact on their mental state. However, challenges such as heavy workloads, limited time for training, and a perceived lack of support for physical activity are also highlighted.

Interviews with Lt Col Mark Lennon and Comdt Karl Connolly provide valuable insights into the practical implications of these findings. Lt Col Lennon emphasises the importance of recognising and formalising the resilience-building aspects of military training, while Comdt Connolly advocates for a proactive approach to mental fitness, promoting the role of physical activity in maintaining psychological wellbeing.

The thesis concludes by proposing recommendations for the DF, including the full implementation of the Mental Health and Wellbeing Strategy, enhanced support for physical activity, the development of a comprehensive resilience training program, addressing the stigma surrounding mental health, and fostering leadership engagement in wellbeing initiatives. It also suggests avenues for future research, such as exploring the long-term impact of resilience training, identifying the most beneficial types of physical activity for mental wellbeing in the military context, and examining the role of leadership and organisational culture in shaping attitudes towards mental health and physical fitness within the DF.

Is Ireland Europe's Weak Link for Maritime Surveillance? Can Artificial Intelligence Bridge the Gap?

Lt Cdr Claire MURPHY BBus (Hons), HDip

Maritime surveillance plays a crucial role in ensuring national security and safeguarding economic interests in the maritime domain. This research critically examines Ireland's current maritime surveillance capabilities and it's alignment with the European Maritime Security Strategy. By analysing European and national policy documents, the research identifies gaps in Ireland's approach to maritime security, highlighting a historical and current focus on economic aspects over security considerations.

The study investigates the potential of artificial intelligence to enhance Ireland's maritime surveillance capabilities and bridge existing gaps. Through a multi-faceted approach encompassing increased available technology and integration, stakeholder collaboration, and policy enhancements, the research explores pathways for Ireland to strengthen it's maritime domain awareness. Recommendations for legislative changes, resource allocation, and the potential for inter-departmental cooperation are identified to address the highlighted deficiencies and elevate Ireland's position within the European maritime security framework. This body of work aims to contribute to the discourse on maritime security and emphasises the importance of proactive measures to enhance Ireland's maritime surveillance capabilities in an evolving security landscape.

Keywords: Maritime surveillance, artificial intelligence, Ireland

Examining Remote Work in Militaries Post-COVID: Opportunities and Challenges for the Irish Defence Forces

Comdt Vincent McGRATH BSc MSc

This dissertation offers a comprehensive analysis of the implications of remote work within the Irish Defence Forces (DF) following the COVID-19 pandemic. It explores the transformative impact of remote work on organisational dynamics, productivity, employee well-being, and operational effectiveness. By critically examining the existing literature and drawing on insights from various organisations and military contexts, the unique challenges and opportunities remote work presents for the Irish DF become clear.

Key findings include the significance of fostering a supportive organisational culture, maintaining clear communication channels, and prioritising employee well-being to optimise remote work outcomes. The absence of a formal remote working policy, limited implementation of remote work initiatives, and challenges in recruitment and retention emerge as critical themes that require immediate attention within the Irish DF.

There is a need for a tailored remote working policy, proactive implementation strategies, and active engagement from senior leadership to bridge existing gaps and harness the full potential of remote work in enhancing operational efficiency and readiness. By embracing remote work as a strategic enabler of organisational resilience and agility, the organisation can adapt to evolving demands and cultivate a flexible work environment that supports mission readiness and employee welfare.

Overall, this research stresses the Irish DF's need to embrace remote work as a transformative tool for navigating the complexities of modern military operations and ensuring long-term operational effectiveness in a dynamic and uncertain global landscape.

How Does Ireland Inc. Develop and Maintain Resilience against Space-Based Threats?

Comdt Aonghus Ó HALMHAIN BEng in Aeronautical Engineering BSC in Management and Aviation Studies

The increasing reliance on space-based systems exposes modern societies to a range of threats, from extreme space weather and orbital debris to GNSS disruptions and targeted cyberattacks. This thesis investigates Ireland's position within this evolving threat landscape, examining it's unique vulnerabilities and opportunities, as a State with a nascent space industry. It assesses the potential consequences of space-based disruptions on critical sectors, emphasising the interconnected risks to Ireland's economy and infrastructure. The study delves into the evolving legal and regulatory frameworks governing the space domain, including foundational treaties and accords. Recommendations focus on proactive measures Ireland can adopt, such as continuous risk assessment, developing domestic space situational awareness, strengthening cybersecurity protocols, and collaborating actively with European partners. This thesis underscores the importance of a comprehensive approach to space resilience. By recognising the potential costs of inaction, ranging from economic losses to the erosion of national sovereignty, Ireland can grow it's space economy. Proactive engagement in this area presents an opportunity for the State to contribute to broader security initiatives within the EU.

Keywords: space-based, resilience, Irish Defence Forces, space weather, space situational awareness

Does Peer Influence Play a Part in the Decision-Making Process with Regards to Retention and Turnover of Personnel in the Irish Naval Service?

Lt Cdr David O'FLYNN

People live in an environment whereby the influences of those around them shape their outlook on life and have a direct impact on their decision making. As an enlisted person in the Naval Service, the sphere of influence changes with age and experience, ranging from the training staff and immediate colleagues on enlistment, through to charismatic peers and on to family, partners and offspring as private life begins to out influence professional life.

This research examines these influences and examines how they have affected the decision-making processes of a specific focus group with respect to their careers. This ranged from the decision they made with regards to their initial branches, through to changing branches and ultimately into terminating their careers in the Naval Service.

A qualitative approach was undertaken in the form of semi-structured interviews. The choice of qualitative methodology was guided by the aim to capture the nuanced perspectives and experiences of individuals navigating their careers within the Naval Service. In total six interviews took place. The interviewees included two subject matter experts, two serving personnel and two former members of the Naval Service. The gender balance was maintained throughout the research with male and female respondents equally represented.

The research findings were split into deductive and inductive analysis and illuminated several key areas and opportunities for improvement regarding the management of personnel within the Naval Service. This includes training in critical thinking for personnel, better informing personnel of the options and opportunities available to them in a non-biased manner, and the utility of a civilian career guidance counsellor in the formation.

Should the Irish Defence Forces Look to Rehire Retired Military Members to Fulfil Civilian Type Roles within the Organisation?

Comdt Ian O'RIORDAN BA, H-Dip

The premise of this thesis was to understand if re-employing retired or ex members of the Irish Defence Forces to carry out administrative tasks could be considered as a viable option in dealing with ongoing staffing issues.

Several key areas were considered during the research phase, such as re-employing workers who have retired on age grounds and whether this was a viable option. By examining recent Dutch research into the effect this has on, the organisation hiring those who have reached national retirement age, the other members of staff and the retired person re-entering the work force it could be argued that this should be viewed positively.

Another facet to the research question was the effect the ex-member of an organisation has on it upon their return. Current research quantifies this phenomenon as Boomerang employment and a number of studies were examined from various employment models such as I.T, Financial and Sport. The research would point to this model becoming a more accepted form of employment.

Several other examples of employees returning to an organisation was also researched such as the case for contracting and the impact of having an Alumni network on an organisation. This academic research was than considered against the findings of a qualitative research study which utilised interviews as part of it's methodology. The research participants were drawn from retired members of the Defence Forces who have left to pursue a new career; those who had retired on age grounds. Military and civilian management who could have an impact on approving such an innovation and finally those who had retired on age grounds but had being re-employed or contracted back to work for the Defence Forces.

A Case for Robustness in Cadet Training

Comdt Aidan RYAN BSc MSc

"The main focus of cadet training is absolutely to develop robustness. Military socialisation and long periods in the cadet school develops mental robustness." Research Participant D (DF)

This study explored robustness and resilience from a multifaceted approach, in order to make the case to have robustness included as a core tenet of cadet training.

The term resilience is used daily throughout in the Defence Forces, including as a competence during cadet interviews and as metric for scoring cadets during training. However, for all this discourse on the topic, how well do members of the organisation that use the term or are subject themselves to assessment on it understand what it means? Alternatively, have they confused the term with robustness and is robustness a more appropriate term for placing at the centre of cadet training?

The research was positioned within an interpretive paradigm using a phenomenological methodology. In-depth interviews were conducted with five senior officers from both the US Military and the Defence Forces, that provided rich descriptions of their experience of robustness, based on their extensive experience of robustness at the strategic, operational and tactical level, both at home and overseas.

The findings indicate that there is conceptual overlap in understanding by members of the Defence Forces in relation to robustness and resilience. Additionally, the findings reveal that the main aim of cadet training is actually focused on the development of robustness not resilience. Structured failures in a supervised training environment can help develop robustness, however the annual intake of cadets makes this difficult to implement correctly. Finally, the study shows that there are different levels of resilience based on one's own experiences, underpinning the inappropriateness' of having resilience as a core tenet of cadet training, as it is so difficult to standardise and assess.

In light of the findings, recommendations are made that emphasise the importance of robustness in cadet training. Adjusting the selection criteria to include robustness as a competence in place of resilience, and amending the syllabus of training to ensure that robustness is the key tenet, ensures that those selected to undergo a cadetship have their robustness enhanced during training, thus improving the overall training experience.

In Sport and in Life, Be the Best You Can Be Representing Your Country. Is the Irish National High-Performance Boxing Unit Delivering World Class Athletes to it's Maximum Potential and Can Elements of This Set-up Be Transferred to the Defence Forces and the Defence Forces Boxing Infrastructure.

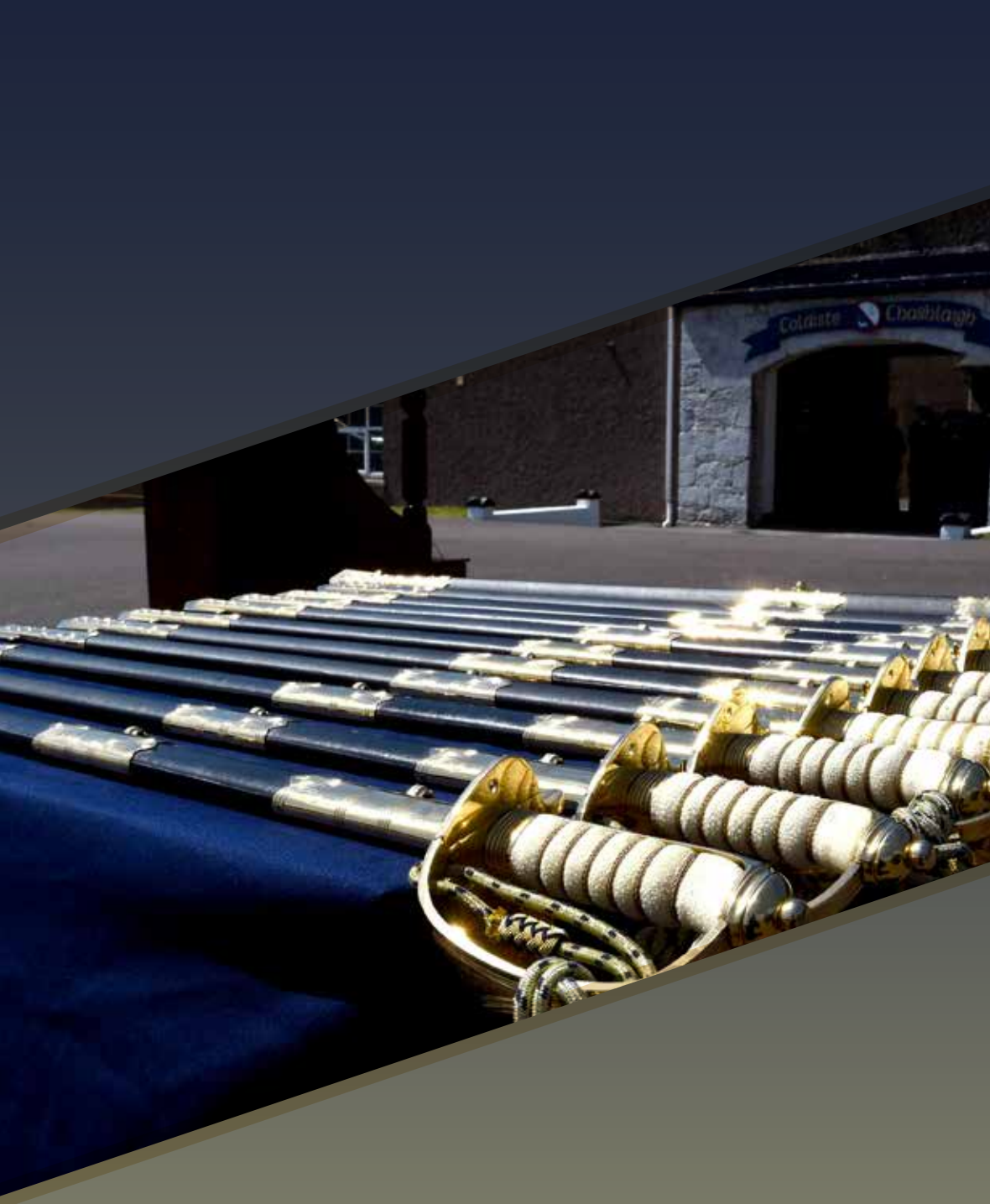
Comdt Adrian WATSON

This is an evaluative research study on the high-performance boxing models both in Sport Ireland and the Defence Forces. The core objective of this study is to investigate the capability of both high-performance models to develop athletes to be the best they can be in representing their countries. The research thesis has three primary objectives; to evaluate if the model in place for high performance sport in Boxing Ireland can develop national and international standard athletes into world class boxing; to determine if elements from the operations management literature can be utilised to improve the delivery of elite sporting models to enhance the output of national world class boxing athletes; and to ascertain the transferability of any elements, of such an elite high-performance setup to the DF and associated implications for the enhancement of leadership skills in the DF.

To effectively evaluate these objectives the author focuses on four pillars of research specific to the core of the research subject; athletic development pathways; coaching structures and coaching development pathways; sport science and athletic development. Relevant academic research provides a solid grounding to the importance of appropriately resourcing and administrating these pillars. This combined with the study's benchmarking against other areas internation best practice and business operations management in the field demonstrates the essential requirements for success in high-performance sport.

Research executed by the author provides some alerting results and highlights some obvious deficiencies in the processes reviewed. These compared and contrasted against existing knowledge provided in the paper provides for strong arguments for change in the high-performance models and the larger organisations.

Central to all these pillars and nodal to the core of this paper in the topic of leadership, Leadership in the Defence Forces and the lessons to be learned by Sport Ireland and the IABA from the Defence Forces are invaluable. While the research is comprehensive in it's design and execution the study leaves some unanswered questions to which recommendations are made to carve out a more successful path for athletes to be the best they can be in representing their country.



Contributor Biographies

Ian Hughes is Senior Research Fellow at MaREI Centre, Environmental Research Institute, University College Cork, Ireland. He is leading the Deep Institutional Innovation for Sustainability and Human Flourishing (DIIS) initiative at UCC which comprises a Trans disciplinary community of over 30 academics and practitioners. His recent books include Disordered Minds: How Dangerous Personalities Are Destroying Democracy (Zero Books, 2018) and Metaphor, Sustainability, Transformation: Trans disciplinary Perspectives (Ed.) (Routledge, 2021).

Richard Wood is author of A Study of Malignant Narcissism: Personal and Professional Insights (Routledge, 2022), Narcissism: A Contemporary Introduction (Routledge, 2024) and author and editor of Psychoanalytic Reflections on Vladimir Putin: The Cost of Malignant Leadership (Routledge, 2024). He is a psychoanalytically oriented clinical psychologist based in Ontario, Canada, with over 45 years of experience. He was educated at Cornell University and Wayne State University. He is a founding member of the Canadian Association of Psychologists in Disability Assessment (CAPDA).

Dr Brendan Flynn is the current head of political science at University of Galway. He teaches, research and writes on the intersection between Defence, Security, Maritime and Energy policies. He has been a frequent contributor to both the Defence Forces Senior Command and Staff, course and the Land Component Command and Staff course.

Colonel Timothy O'Brien is the Executive Coordinator in the Office of the Chief of Staff. As a Lieutenant Colonel he spent three years as OIC Planning and Capabilities Section in DJ3&J5, where which he was the principal Defence Forces representative on the Government Task Force on Emergency Management. During this time he also participated in several National Emergency Management Coordination Groups to respond to severe weather events. As OIC Planning and Capabilities Section, Lieutenant Colonel O'Brien was also responsible for assisting the Department of Defence in updating a range of ATCA related MOUs and SLAs. In December 2023, at the request of the Defence Forces Doctrinal Committee, he oversaw the publication of the first Defence Forces ATCA Doctrine.

Dr Kenneth Houston lectures in International Relations and Global Affairs at Mahidol University International College, Bangkok Thailand. His main research and teaching interests are in the areas of regional integration, political discourse, and conflict resolution. He was previously a serving member of the Irish Defence Forces.

Commandant Eoghan Carton joined the Defence Forces in 2003 with the 80th Cadet Class and was commissioned to the 27th Infantry Battalion. He joined the Corps of Engineers in 2010 where he has served in a number of appointments at home and overseas and is currently serving as Officer Commanding 506 Squadron, No. 5 Support Wing, Air Corps. He is a civil engineer, chartered through Engineers Ireland, with a number of third level qualifications including an MA in Leadership, Management and Defence Studies at Maynooth University and Level 9 Post Graduate Diplomas in Sustainable Energy at Trinity College and 'Nearly Zero Energy Buildings' (nZEB) at South East Technical University.

Commandant Paul O'Callaghan is a serving army officer. He was commissioned as a member of the 78th Cadet Class to the Transport Corps in 2003. He is currently serving as a Staff Officer in the Directorate of Education and Training (J7) DFHQ. He has served across a variety of roles in the Defence Forces domestically and overseas including service with MINURCAT, UNIFIL and KFOR. He holds a first-class honours BSc in Logistics and Supply Chain Management from Dublin Technical University, first-class honours MA in International Security and Conflict Studies from Dublin City University and first-class honours MA in Leadership, Management and Defence Studies from Maynooth University. He is a graduate of the Defence Forces Command and Staff School. He has an interest in all aspects of international security and geopolitics.

Dr Liam Coakley is a geographer, based in the Department of Geography, UCC. He teaches political geography, geopolitics and the geographies of migration/migration policy, in UCC. Liam's current/most recent research seeks to explore the spatiality's of Ireland's recent outreach to diaspora. Particular narrative constructions are seen to be targeted at particular international markets, and the Irish diaspora are engaged as a source of power for Ireland.

Cian Lynch is a PhD candidate in University College Cork's School of History. He has previously obtained an undergraduate degree with distinction in Politics and History and a master's degree in International History from Trinity College Dublin. His research focuses primarily on the societal and economic impacts of submarine warfare in the First World War on Ireland. Cian is currently a corporal in the Reserve Defence Forces and a member of the ongoing 6th Army Reserve Potential Officers Course. Cian is also a keen scuba diver and a member of Dublin University Sub Aqua Club.

Lieutenant Commander David Memery is a chartered engineer with 22 years' service with the Irish Navy. He is a graduate of the University of Dublin, Trinity College with degrees in Electronic & Computer Engineering and Mathematics, and holds an M.Sc. in Computer Science and an MA in Leadership, Management & Defence Studies. He has been the Formation Energy Manager in the Irish Navy since 2019, and has conducted graduate research in Remotely Piloted Vehicles, Electrically Powered Small Boats for use in Irish Navy vessels and the management of Organisational Cultural Change, and was short-listed for Chartered Engineer of the Year in 2008 for his work on Remotely Operated Vehicles in the Land Domain.

Sub Lieutenant Eoin McEnery is a graduate of the Limerick Institute of Technology, holding an Honours Degree in Electronic Engineering, and was commissioned into the Irish Navy in 2022. He has completed training with the Royal Navy, Collingwood as a Weapons Electrical Officer, specialising in Combat Management Systems. He is currently posted as second in command of the Electrical & Electronic Section, Weapons Electrical Unit and is a member of the Naval Service Energy Management Team.

Lieutenant (NS) Wietse Buwalda has served within both the Army (8 years) and Navy (6 years) as a Commissioned Signals Officer in the Permanent Defence Forces and 10 years in the Army Reserve. He holds a BEng in Mechanical Engineering (UL), MSc in Forensic Computing and Cybercrime Investigations (UCD), and a MEngSc in Electrical and Electronic Engineering (UCC) with a thesis titled *"Using Machine Learning to Detect Illegal, Unreported and Unregulated (IUU) fishing."* He has served with the United Nations in UNIFIL and UNDOF and served with EU Battlegroup 2016. He was IT project manager for Irelands National Fisheries Monitoring Centre and Systems Manager for the Navy's Operations and Intelligence IT systems.

Prior to joining the Permanent Defence Forces, he was a professional sailor and lead shore team engineer with the Volvo Round the World Yacht Race 2008/09 Team 'Delta Lloyd'. He has over twenty years of experience in marine engineering. He has also worked as a maintenance engineer with Pfizer Pharmaceuticals and facility engineer with the National Space Centre.

Zaur Gouliev is a PhD student at University College Dublin's School of Information & Communication Studies. He is researching disinformation within the context of Foreign Information Manipulation and Interference (FIMI) under the supervision of Dr. Brendan Spillane and Dr. Benjamin R. Cowan. His primary research areas include disinformation, influence operations, information warfare, and strategic digital communications. Much of his recent case studies are on disinformation related to military, conflict, and war. Prior to his PhD, Zaur has worked as a Crime & Data Analyst for An Garda Síochána.

Siena Cicarelli is Research Fellow at the Centre for Climate and Security (CCS), an institute of the Council on Strategic Risks (CSR). In this role, she serves as Program Director at the Nexus25 project, a transatlantic initiative focused on sustainable security carried out in partnership with Istituto Affari Internazionali.

Commandant Denis Flynn is an Ordnance Technical Officer with 19 years' service in the Defence Forces. He has a first class honours degree in Microbiology and a Research Masters of Science degree in the field of Molecular Genetics, both from the University of Galway. In addition, he also holds a Masters degree with distinction in Mechanical Engineering from South East Technological University, a Masters of Science degree with distinction in Strategic Emergency Management from Dublin City University, and a Masters of Arts degree with distinction in Leadership, Management and Defence Studies from Maynooth University. This article describes the research findings of a study he conducted whilst completing his Thesis on Emergency Communications during the recent 6th Joint Command and Staff Course.