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Resisting the risks of nuclear mission creep: UK deterrence and emerging strategic threats

Policy brief

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Executive summary

- In recent years both the United States (US) and the United Kingdom (UK) have confirmed the possibility that they might deter threats arising from emerging and disruptive technologies (EDTs) with nuclear weapons. A similar situation is believed to have occurred in other nuclear weapons states.
- This policy shift signals both an increased emphasis on nuclear deterrence and a disregard for the uniqueness of nuclear weapons and the effect that any use of theirs would have. It also brings potentially damaging effects for the UK's non-proliferation and disarmament commitments as enshrined in the Non-Proliferation Treaty (NPT).
- Instead of aiming to deter the extreme use of EDTs with nuclear weapons, this report argues that the UK and other nuclear weapons states should consider national resilience as the backbone of their mitigation strategy. This does not preclude conventional deterrence and prevention measures.

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1. Introduction: what has prompted this paper

In recent years both the U.S. and UK governments have confirmed the possibility that they might use nuclear weapons to deter or respond to the threat of weapons of mass destruction (WMD) or emerging technologies that might constitute a “comparable impact”¹ to nuclear use or cause “high consequence, strategic-level attacks”². This posture has been enshrined in the 2021 UK Integrated Review as well as in the U.S. Nuclear Posture Reviews of two consecutive administrations. Other nuclear-armed states may also be including EDT threats in their conceptions of the “vital interests” or “existential threats” that might justify nuclear use, but this is typically shrouded in secrecy and ambiguity. All the nuclear states have committed not to target non-nuclear weapons states with their nuclear weapons, but the UK has suggested that could be reviewed in future if non-nuclear weapons states acquired high-impact EDT threat capabilities.

The UK Integrated Review of 2021³ states:

“The UK will not use, or threaten to use, nuclear weapons against any non-nuclear weapon state party to the Treaty on the Non-Proliferation of Nuclear Weapons 1968 (NPT). This assurance does not apply to any state in material breach of those non-proliferation obligations. However, we reserve the right to review this assurance if the future threat of weapons of mass destruction, such as chemical and biological capabilities, or emerging technologies that could have a comparable impact, makes it necessary.”

The UK Integrated Review Refresh of 2023⁴ maintained this approach, stating:

“We would consider using our nuclear weapons only in extreme circumstances of self-defence, including the defence of our NATO allies. Only the Prime Minister can authorise their use. The UK’s negative security assurance remains unchanged.”

These policies in the UK and U.S. have emerged in the absence of public debate or even open parliamentary scrutiny. They come at a time of rising nuclear risks, where nuclear threats have been used in a ‘hot’ war for coercion, not just deterrence; Russia has hinted at the possibility of using nuclear weapons against Ukraine, a non-nuclear weapons state under the NPT. At such a time, it may be tempting for all of the nuclear-weapons states to become more reliant on their nuclear arsenals for a broader range of security threats - it may also be tempting for some countries without nuclear weapons to try to obtain them. This is a dangerous path to go down. Instead, states should respond to EDT threats by other means, most importantly through strengthening national resilience and building redundant systems (systems that are able to operate even in the event of a major systems failure, through alternate paths and back-ups).

In the context of Russia’s aggressive nuclear rhetoric around the war in Ukraine it is imperative that a possible broadening of the UK nuclear mission is accompanied by a robust public debate on the possible legal, practical, and moral implications. Most importantly, long-term consequences for arms control, disarmament, and non-proliferation (ADN) processes such as the NPT need to be critically assessed. The same applies to the implications of such a policy for

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the relationship between nuclear weapon states and non-nuclear weapon states.

The ELN has, over a series of workshops and exchanges with officials and parliamentarians in 2021-2023 considered this complex problem and the rationale behind nuclear deterrence against non-nuclear states in the current context. In private conversations with government officials from the UK and U.S. these policies have been described by some as a pragmatic approach to a problem that is both complex and rapidly evolving. Others fear a blurring of the lines between nuclear deterrence and non-nuclear threats.

Findings from these workshops have fed into this report, alongside insights from relevant UK documents such as the Resilience Framework and the National Risk Register. The report is aimed to address these problematic policies. In the first section, it will explore the uniqueness of nuclear weapons and whether EDTs can have a 'comparable effect'. This will be followed by an assessment of the threat from emerging and disruptive technologies that the UK sees itself confronted with according to key documents. The report will be rounded up by a summary of potential alternative approaches that Britain might consider when dealing with EDT-related threats.

2. The unique nature of nuclear weapons and nuclear deterrence

This section will explore the characteristics that make nuclear weapons fundamentally different from other weapons of mass destruction but also from weapons based on the misuse of EDTs.

The UK has recognised the unique nature of nuclear weapons in several policy statements. Notably, the UK joined China, Russia, France, and the US (the five NPT nuclear weapon states) in their first ever joint statement in January 2022, emphasising that “a nuclear war cannot be won and must never be fought”⁵. This reaffirms the unique nature of nuclear deterrence and any scenario that would involve the use of a nuclear weapon.

Most of all, the destructive power of a nuclear weapon is unique. Today, states like Russia and the U.S. have nuclear weapons in their respective arsenals with potential yields of several hundred - or even thousand - kilotons of TNT equivalent. Even some tactical nuclear weapons, like the Russian SSC-1B⁶ or the American B61-3⁷, have a potential destructive power of more than 100 kilotons (as a point of comparison, the atomic bomb dropped on Hiroshima had an estimated yield of around 15 kt TNT equivalent⁸). Although non-strategic nuclear weapons are sometimes framed as “small” and therefore less destructive, their impact is by no means comparable to a conventional strike. This is particularly true as there is a realistic chance that the use of a nuclear weapon would cause a spiral of escalation. In addition to the direct impact of a nuclear weapons, the radiation released by nuclear explosions would be significant and cannot be contained in either space or time.

Nuclear weapons are, importantly, also unique in terms of their long-term effects. The use of less than 0.1 percent of the global nuclear arsenal could have a significant impact on the climate.⁹ It is hard to imagine a scenario where the use of EDTs alone could have comparable consequences. The UK National Risk Register (NRR)¹⁰ acknowledges the regional impacts of a limited nuclear conflict between two states, which would not only be catastrophic because of the high number of casualties and fatalities from the strike itself, but also in terms of famine resulting from the event, caused from the fallout and the impact on the climate affecting food production.

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3. Can EDTs have comparable effects?

The UK, in its Integrated Review, refers to the threat from EDTs and keeps open the option to respond to events that have an impact 'comparable' to that of nuclear weapons or other weapons of mass destruction, such as biological or chemical weapons. However, the document does not offer any definition or quantification as to what the criteria defining a comparable effect would be. There is an urgent need to fill this theoretical gap. It is far from obvious that the potential damage from an EDT attack, however serious, would be comparable to a nuclear strike. Nevertheless, we do not know yet whether future application of EDTs could have a significantly more damaging effect which could create an impact comparable to nuclear weapons.

In the same line as the UK, the 2018 U.S. Nuclear Posture Review (NPR)¹¹ gives limited guidance insofar as the document leaves open the option for the U.S. to deter "significant non-nuclear strategic attacks". The 2022 NPR¹² is consistent with this assessment and notes that "nuclear weapons are required to deter not only nuclear attack, but also a narrow range of other high consequence, strategic-level attacks". Nevertheless, the insight that this language offers is limited because we lack a universally agreed definition of what renders an attack "significant" or "strategic".

The UK National Risk Register (NRR) offers some idea on what the British Government considers a civil contingency event with "significant" or "catastrophic" impact. The document is an assessment of the most serious risks facing the UK, including threats stemming from malicious actors such as terrorism and cyberattacks, as well as non-malicious risks such as accidents and natural hazards. The NRR, as the unclassified risk assessment of the Government, does not include nuclear attacks on the UK, but it refers to risks related to the malicious use of EDTs. The document is therefore not very helpful when it comes to exploring the distinction between strategic and non-strategic attacks. But it offers some precise numbers on what the Government would consider a significant/catastrophic amount of casualties and fatalities as well as economic cost. According to the NRR, anything between 200 and 1,000 *fatalities* as well as anything between 400 and 2,000 *casualties* would be considered "significant". Anything above 1,000 *fatalities* and above 2,000 *casualties* would be categorised as "catastrophic" impact.

According to the NRR, there are several events that would qualify as having potential 'significant' implications, yet only a few that would have 'catastrophic' impact. However, the NRR identified only four risks that could have potentially significant or catastrophic impact and are related to EDTs: 1) loss of positioning, navigation, and timing (PNT) services, 2) deliberate disruption of UK space systems and space-based services, 3) nuclear miscalculation not involving the UK (although the circumstances under which such miscalculation could happen are not further specified in the NRR, we can assume that it could result, e.g., from EDTs interference with NC3), and 4) failure of the National Electricity Transmission System (NETS). Apart from the risk of nuclear miscalculation (highly unlikely, with a percentage chance of 5-25%), all risks are categorised as being of remote likelihood (with a percentage chance 0-5%). Failure of NETS is the only EDT-related scenario that could have catastrophic impact according to the authors of the NRR.

Nuclear deterrence against EDTs would be a violation of the political commitments made by the UK and other nuclear weapons states in the NPT at the 2010 Review Conference.

The other relevant question is what makes an attack ‘strategic’. The U.S. Air Force Doctrine Publication – Strategic Attack¹³ of 2021 offers some detailed insights on the term ‘strategic’ from the standpoint of military planners. “Strategic”, according to the document, “refers to the highest level of an enemy system that, if affected, will contribute most directly to the achievement of our national security objectives”. Strategic effects against an enemy’s centre of gravity (that is, physical targets like leaders and critical infrastructure as well as non-physical targets like the morale of the enemy) can thus be conducted with nuclear and non-nuclear weapons. Strategic attacks can achieve, the document lays out, cumulative, cascading effect against the adversary’s system through indirect effects, they can affect conflict-sustaining resources and the enemy’s strategy, as well as their ability to fight. It can deny strategic options or choices and can provide strategic leverage.

Since the UK’s IR has not specified what would make an EDT attack comparable to a nuclear attack, it is unclear whether there would be a specific threshold—for example in line with the numbers of fatalities and casualties that the NRR provided.

The question of whether an EDT attack could have a comparable effect to nuclear weapons is hard to answer insofar as we do not know whether there will be EDT-related scenarios in the future that could have significantly more damaging effects compared to the scenarios we consider today. It is, nevertheless, fair to mention that any use of a nuclear weapons would be crossing a red line and cause unparalleled terror amongst not only the part of the population that is immediately affected but also more widely. As a consequence, a scenario involving nuclear weapons might create a different psychological effect and cause long-term disruption in societies.

Since we cannot exclude that EDTs might have an impact comparable to the use of nuclear weapons, it is worthwhile approaching the question of whether the UK (and other NWS) should consider deterring EDTs with nuclear weapons from a slightly different angle.

First, is nuclear deterrence of EDT compatible with UK legal obligations? The NPT does not take a position on this question. However, the advisory opinion on the Legality of the Threat or Use of Nuclear Weapons¹⁴ of the International Court of Justice of 1996 gives some (though limited) guidance. The ICJ advisory opinion argues that for reasons of proportionality the use of nuclear weapons would be “contrary to the rules of international law applicable in armed conflict, and in particular the principles and rules of humanitarian law”. Nuclear deterrence of EDTs does currently not meet the requirement of proportionality under the IHL – though it cannot be assumed that this would apply in the future.

Second, is nuclear deterrence of EDT compatible with UK political obligations? Nuclear deterrence against EDTs would be a violation of the political commitments made by the UK and other nuclear weapons states in the NPT at the 2010 Review Conference. In the outcome document adopted at the 2010 RevCon, states parties agreed, in Action 5 (c.) of the 64-point action plan¹⁵, to “further diminish the role and significance of nuclear weapons in all military and security concepts, policies and doctrines”. Increasing the role

of nuclear weapons does not just increase risks, it also undermines the credibility of NWS in the NPT. In order to avoid harmful effects on the NPT in general, NWS have a particular responsibility to refrain from taking actions that could further create tensions in the NPT community. This applies even more in the current circumstances in which ADN processes are under greater stress than in the decades since the end of the Cold War.

Third, would nuclear deterrence against EDT be feasible/effective? An important aspect that makes EDT-related attacks different from the use of nuclear weapons is the problem of attribution. While it is almost impossible that the responsible actor behind any nuclear weapons use remains undetected, cyber-attacks in particular suffer from a lack of clarity regarding the responsible actors. Also, cyber-attacks might not be carried out by state actors, but by state-sponsored groups or non-state actors. In the case of Russia, a number of different state-sponsored groups¹⁶ supported by the Russian intelligence agencies are carrying out cyber operations against Ukraine and states that support Kyiv. Although many of these groups are known, it is hardly imaginable how these groups could be deterred with nuclear weapons (also given their geographical spread and lack of insight into what extent they operate independently or with the Kremlin's guidance).

Fourth, what unintended consequences might arise if the UK deters EDT with nukes? Such an expansion of the concept of nuclear deterrence might result in an increase in the interest of states and malign actors in EDTs. Also, if the role of nuclear weapons is elevated rather than diminished, it might further weaken the NPT. Not least, this might give a pretext for other actors, including Moscow and Beijing, to argue that they might need to increase their arsenals of very low-yield nuclear weapons in order to effectively deter EDT-related threats.

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4. Alternate approaches to deterring EDTs: building up resilience

More research is needed to investigate how on a larger scale, societies might be able to build up resilience against more 'exotic' threat scenarios.

Perhaps the most comprehensive defence against malicious use of EDTs is better resilience. Thus, NWS should consider alternate and more effective approaches to mitigate the effects of non-nuclear strategic attacks on societies. Resilience could encompass a wide range of measures including cyber defence, robust pandemic health preparation, redundancy in key systems, education against disinformation and fake news and strengthening of democratic systems.

As for cyberattacks, a resilience-focused approach would need to include building redundant systems—systems that are able to operate even in the event of a major systems failure, through alternate paths and back-ups—instead of trying to deter cyber actors. These malign actors—in the rather remote case in which attribution is possible—are more likely to be (government-backed) groups, or smaller groups of individuals and non-state actors. Also, they might be spread across the globe so that nuclear deterrence would not be applicable at all. Even if cyberattacks could theoretically have an immediate effect comparable to that of a nuclear weapon (e.g., power outages/failure of NETS), it might not be possible to effectively deter the actors behind such an attack with nuclear weapons.

There are, nevertheless, scenarios which still lack a clarity when it comes to how to build up societal resilience against them. For instance, it is hard to foresee how societies could respond to combined EDT attacks (e.g., AI combined with nano bots). More research is needed to investigate how on a larger scale, societies might be able to build up resilience against more 'exotic' threat scenarios. The rapid pace with which technologies are advancing makes it necessary to think even about remote scenarios.

If we consider the EDT-related scenarios which the UK NRR perceives as potentially significant or even catastrophic, it is hard to foresee how the UK would deter the malign actors responsible with nuclear weapons. Total failure of NETS could have catastrophic consequences. Such a failure could be caused by a cyber-attack. In this situation, the attribution problem applies.

Nuclear miscalculations which do not involve the UK could realistically be a result of EDTs targeting against NC3 structures. Also, such a scenario could have significant impact for the UK, the NRR states. But it does not involve the UK as a direct actor and thus British deterrence might not play a role at all.

Loss of PNT services, the NRR concludes, might result from a severe technical failure or it might be instigated by jamming and spoofing activities. In those cases, as the NRR notes, resilient backup systems which rely on space-based services alongside greater space situational awareness would be an efficient approach to deal with the threat. And finally, deliberate disruption of UK space systems and space-based services might be the result of an attack by a hostile state or proxy. Depending on the method, the attribution problem might apply, which again emphasises the need for secure and resilient systems.

Although politicians might acknowledge that strengthening resilience of critical systems is the only way to mitigate risks stemming from malicious use of EDTs in the absence of a realistic prospect to deter them, said measures are often discounted as too

expensive. However, their potential synergies with defence against natural events, conventional threats, commercial hazards, and other existential risks such as climate change should be exploited. The UK Government Resilience Framework¹⁷, which draws upon the risks outlined in the National Security Risk Assessment, and its public counterpart - the NRR -, is a step in the right direction. For the first time, the framework articulates how the UK Government plans to deliver its new strategic approach to resilience. It is based on the following three principles: 1) a developed and shared understanding of civil contingency risks, 2) greater emphasis on prevention and preparation, and 3) understanding of resilience as 'whole of society' endeavour. Also, the document calls, amongst other things, for strengthening partnerships with the private sector and experts.

Alongside improving resilience of its most critical and potentially vulnerable systems it would still be of highest importance for the UK to uphold its NPT commitments, including the commitment to decrease the role of nuclear deterrence in declaratory policy and national security. It would also be crucial for decision-makers and experts to raise an awareness that when it comes to EDT-related risks, it is hard to foresee how they can be effectively deterred with nuclear weapons. They should, therefore, acknowledge the uniqueness of nuclear weapons and that the logic of nuclear deterrence cannot easily be transferred to other technologies which do not benefit from the same body of understanding and groundwork. A policy shift of this sort would also disrupt the fundamental bargain of the NPT by blurring the distinction that all nuclear weapons states parties have made between nuclear weapons possessors and non-nuclear weapons states. In the end, this could result in a watering down of the fundamental obligations and assurances that NWS have made in the NPT context and could have damaging effects for ADN processes more broadly.

Finally, resilience must be the backbone of a mitigation approach, but we also must not discount conventional deterrence. The latter is certainly not applicable in all (or indeed many) scenarios, but for instance precision-strikes – perhaps based on AI-enabled intelligence of the source of a cyber-attack – might be possible. This is not a panacea and much more work is required to study and evaluate the subject. In addition to deterring and mitigating EDT-related risks, we might also be able to prevent (at least to some extent) EDT attacks. While measures like arms control, legal frameworks, voluntary agreements, counter-proliferation etc., need to be thought about differently than in a nuclear setting, these instruments need to be taken into consideration. However, more work is required to understand the mechanisms and possibilities, which could be done in a follow-up study.

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