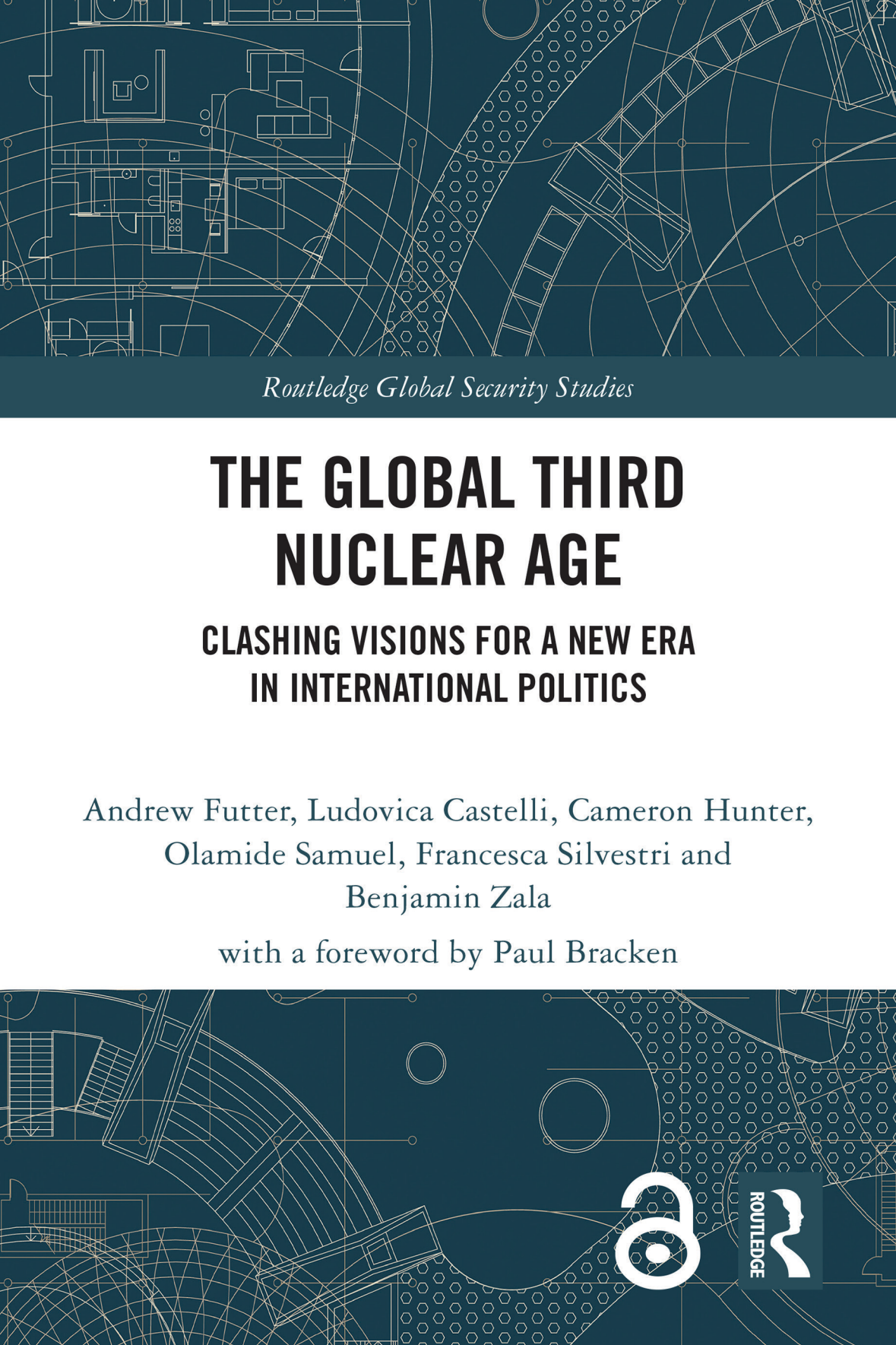


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Routledge Global Security Studies

THE GLOBAL THIRD NUCLEAR AGE

CLASHING VISIONS FOR A NEW ERA
IN INTERNATIONAL POLITICS

Andrew Futter, Ludovica Castelli, Cameron Hunter,
Olamide Samuel, Francesca Silvestri and
Benjamin Zala

with a foreword by Paul Bracken



‘Nuclear strategists across the globe are grappling with a new global nuclear landscape dotted by many players, and facing simultaneous headwinds from plummeting political trust levels, galloping technological advancements, vanishing treaties and fraying norms. This book uses an inclusive lens to examine perspectives of 20 countries by categorising them on their affinity to nuclear weapons and their response to changing global nuclear politics. A novel take and interesting read.’

Manpreet Sethi, *Distinguished Fellow at the Centre for Air Power Studies, New Delhi, India*

‘*The Global Third Nuclear Age* advances our understanding of the full range of actors, technologies, and norms that are shaping the current nuclear age with its growing nuclear risks and eroding consensus on the ways to reduce them. Impressive in its scope, exhaustively researched, and clearly written, this book should be read by policymakers, academics, analysts, and students alike.’

James Acton, *co-director of the Nuclear Policy Program at the Carnegie Endowment for International Peace, Washington, DC, USA*

‘We have moved into a new technological and geopolitical configuration after the Cold War. The norms-based international order so painstakingly constructed since 1945 is being undermined and arms control treaties and recent norms concerning nuclear weapons lack universal support. This is the context of the new nuclear age described here. This excellent volume examines its impact on and the influence of 20 states with a fine feeling for the peculiarities of each.’

Beatrice Heuser, *Distinguished Professor, Brussels School of Governance, Vrije Universiteit Brussel, Belgium*



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The Global Third Nuclear Age

This book provides an in-depth examination of the technological, geopolitical and normative pressures driving the world into a new, more complex and potentially more dangerous Third Nuclear Age.

By adopting an innovative framework for analysis, the book challenges the constrained focus of much of the existing literature by explaining that the pathways to nuclear security for different actors across the globe will vary considerably in this new context. It argues that the Third Nuclear Age will be defined by friction and conflict between “Nuclear Traditionalists,” “Technological Transformers,” “Hedgers and Balancers” and “Activists and Protestors,” as different interests and visions of the nuclear future clash. The book draws on dozens of interviews and non-English language sources to provide a global approach and looks at the security politics driving the political debate in 20 different countries across the globe.

This book will be of much interest to students of nuclear politics, security studies and International Relations.

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The Global Third Nuclear Age

Clashing Visions for a New Era in
International Politics

**Andrew Futter, Ludovica Castelli,
Cameron Hunter, Olamide Samuel,
Francesca Silvestri and Benjamin Zala**



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Foreword

No analyst in history immediately comprehends the logic of their own situation in periods of transition; a long epoch of disorientation and confusion is usually necessary to learn the rules of the new era. Observers of the current period of strategic transformation are no exception. Now, three prominent features of change must be added to this condition.

One is technology. Most salient here are the tremendous advances in AI, hypersonic missiles, drones, cyberwar and space war. New military technologies develop at a rate not seen since the early Cold War when jet aircraft, nuclear propulsion, satellites, sensors, computers and atomic weapons first appeared. Another conspicuous feature today is the breadth of advanced military technology's spread to so many countries. Iran has drones and long-range missiles; North Korea has a sophisticated cyberwar effort; and China has everything. Even the Houthis have ship-killing weapons. This is a fundamental change. In the past, the West held a dominant advantage in most war technologies. Finally, and most ominous of all, the major powers' monopoly over nuclear weapons has ended. North Korea, Pakistan, Israel and Iran show this. Never have the smaller and medium states in the international system held the ultimate trump card against larger powers, and against each other.

The international order that follows from these features is a soup of different ingredients. All agree that this world is more complex. What should be added is that the complexity is unorganised. To comprehend the rules of this world is a daunting challenge. Many observers simplify it in extreme ways by skipping over some of the major elements. The security debate is streamlined: to the United States versus China, or to the need for greater emphasis on non-proliferation. Such simplification is understandable and well meaning. But we frequently simplify too much, and in the process, skip over how different countries react to the challenges. This creates a danger because of the lethality of modern war, conventional and nuclear, which requires us to understand how different countries behave.

Over-generalised answers to the question of international security are neither honest nor advisable. To insist that "there is really no alternative to cooperative security" makes a certain amount of sense when you first hear it. It emphatically shows that one is against war, and for peace. But in strict logic, this maxim means

capitulation as an alternative to war – even as the world’s worst regimes acquire the world’s most dangerous weapons. Nor does the adage recognise the hazards from so many countries transforming their militaries with technology. World War III may be unlikely, or not. But advanced weapons do exist. Some of them are nuclear. Crises, shocks, accidents and just getting the technology wrong are likely. Indeed, one or more of these possibilities looks certain in the next few years.

The answer to this problem lies at the core of *The Global Third Nuclear Age*. We cannot solve the problem of world order. But we can raise the level of discussion about it by bringing improved frameworks to bear that clarify distinctions and offer a more expressive vocabulary to describe the choices. This is especially important in the multipolar nuclear order we are in. The over-generalisations of the Cold War were acceptable because they were good enough. They reflected the views of the two superpowers, and this took care of everyone else. The taut, disciplined blocs of the Cold War allowed for easy generalisation. But that world is gone.

As *The Global Third Nuclear Age* argues, now there are fundamental differences between countries. It groups nations into identifiable, empirically supported categories. This is a major contribution of the book. Conflict and cooperation between them offer a way to frame the dynamics of national security and world order in the 21st century. There are “activists and protestors,” countries like Austria, Indonesia and South Africa. They reject the whole concept of deterrence based on nuclear and other threats. In their view, accepting deterrence is how we got to the present condition. It only guarantees a continued arms race that will lead to catastrophe. Next, there are “hedgers and balancers,” like Iran, the United Kingdom and Germany, who see the fundamental uncertainty of the strategic environment. They would like a different regime, yet they doubt this will happen anytime soon. Their response is to hedge with new weapons and to play a power-balancing strategy where they can. “Technological transformers” take this several steps further. They modernise around advanced military technologies. Examples are Japan, Australia and South Korea. But they do not cross the nuclear divide to get these weapons. Some could “go nuclear” in the future. This choice must be taken account of in the way it affects others. *The Global Third Nuclear Age* makes a key point that is too often overlooked. It argues that restricting attention to the nine states with the bomb is short sighted. Because much of what policy and strategy are all about is keeping the technology transformers out of the nuclear game. “Nuclear traditionalists,” like the United States, France and Russia, double down on their nuclear bets. In the case of the United States this occurs even as its declaratory policy is to rely on advanced conventional technology, and less on nuclear weapons. This convoluted position may appear contradictory to many people. But it is better seen as America’s response to the changing security environment taking shape.

The Global Third Nuclear Age offers a new conceptual framework to facilitate systematic and precise discussion of the complex security challenges of our time. Some of the controversies and issues associated with this new era will be familiar to the reader, such as counterforce, the arms race and non-proliferation. But they look different to the four groups of countries. Other issues are raised that have not received the attention they deserve. Particular attention is paid to the *criteria* of

strategic choice, which differ from the activist and protestors to the transformers. Key security issues are often less about strategic choices themselves than they are about the criteria used to make these choices.

Technology has moved all countries, not just nuclear weapon states, to a new world whose contours and conflicts we are only beginning to be understand. This landscape is described in *The Global Third Nuclear Age* with a globalist approach. Its distinctive features are that it is interdisciplinary. It brings history, strategy, culture and technology together in the framework. Most important, it is not dominated by a major power worldview, whether American or Chinese.

This framework is useful to explore issues overlooked by more standard approaches. An example is how major powers deal with smaller, developing powers. A nuclear traditionalist (the United States) deals with hedgers and balancers (like China and India), and technology transformers (like Japan and Taiwan), at a number of levels. It asks if the military programme of a traditionalist power is solely about military or bargaining advantage, or whether it is also about halting structural change in the international system. The United States does not want Japan to go nuclear. It does not want Germany to trade too much with Russia. And it does not want China to expand its nuclear arsenal. Washington would like to “freeze-dry” the global order to its 1990s form. The United States was perfectly willing to overthrow Saddam Hussein in Iraq and to attempt democracy building in the Middle East. But China, Germany, India and Japan fundamentally changing their strategic position in the world by changing their military posture is an altogether different matter. This lies at the core of international order.

Another big issue the book’s framework speaks to is how the diverse groups of countries would react to a nuclear shock. Here, I do not mean better crisis management. Rather, to shocks of a degree that are pivots for historical change. Such branch points lead to altered paths in the global order. Tsushima Straits, Sarajevo, Munich and Pearl Harbor fundamentally shifted the international order.

Not only does this book’s framework raise the level of discussion about the transition period we are in, but also, importantly, it offers distinctions, terminology and better thinking for the challenges ahead.

Paul Bracken
Yale University, September 2024

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Abbreviations

ABACC	The Brazilian–Argentine Agency for Accounting and Control of <i>Nuclear</i> Materials
AFCONE	African Commission on Nuclear Energy
AI	Artificial Intelligence
AP	Additional Protocol for verification of nuclear safeguards
ASAT	Anti-satellite
ASEAN	Association of Southeast Asian Nations
AUKUS	Australia-UK-US security pact
BMD	Ballistic Missile Defence
BRICS	Brazil, Russia, India, China, South Africa
CBM	Confidence Building Measure
CSTO	Collective Security Treaty Organisation
FMCT	Fissile Material Cut-Off Treaty
GCC	Gulf Cooperation Council
IAEA	International Atomic Energy Agency
ICBM	Intercontinental Ballistic Missile
ICJ	International Court of Justice
ISR	Intelligence, Surveillance and Reconnaissance
JCPOA	Joint Comprehensive Plan of Action (“The Iran Deal”)
LEU	Low Enriched Uranium
MTCR	Missile Technology Control Regime
NAM	Non-Aligned Movement
NATO	North Atlantic Treaty Organisation
NPT	Non-Proliferation Treaty/Treaty on the Non-Proliferation of Nuclear Weapons
NSG	Nuclear Suppliers Group
NWFZ	Nuclear Weapons Free Zone
QUAD	Quadrilateral Security Dialogue between Australia, India, India, Japan and the United States
SDG	UN Sustainable Development Goals
SEANWFZ	Southeast Asian Nuclear Weapons Free Zone

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SMR	Small Modular (Nuclear) Reactor
SNNW	Strategic Non-Nuclear Weapons
SSBN	Nuclear-Powered Ballistic Missile Submarine
TPNW	Treaty on the Prohibition of Nuclear Weapons (“The Ban Treaty”)
WMD	Weapons of Mass Destruction
ZOPACAS	The Zone of Peace and Cooperation in the South Atlantic

Introduction

Conceptualising a new era in global nuclear politics

Humanity is in danger of forgetting the lessons forged in the terrifying fires of Hiroshima and Nagasaki. Geopolitical tensions are reaching new highs. Competition is trumping co-operation and collaboration. Distrust has replaced dialogue and disunity has replaced disarmament.

(UN Secretary General Antonio Guterres, August 2022)¹

Our nuclear world is perhaps as contested and dangerous today than it has been at any point for a generation. And however unpalatable it may seem, there is a very real risk that nuclear weapons will be used again in anger.

The nuclear-armed “great powers” appear increasingly locked in geopolitical competition as the world moves from a unipolar to multipolar system; rapid technological change is creating the potential for enhanced nuclear and strategic non-nuclear weapons with different and destabilising mission sets; international norms, consensus and arms control edifices that have formed the bedrock of the global nuclear order are slowly eroding; state and especially NGO-based disarmament activism is on the rise at the same time as interest in – and the salience of – nuclear technology for both military and non-military purposes is firmly back on the political agenda; and we increasingly see a set of very different and contested visions of the nuclear future. Arguably, the global nuclear order – and the nuclear peace that this order is ostensibly designed to maintain – is under more pressure than ever. For this reason, we argue that the world is moving into a Third Nuclear Age.

The fact that our current nuclear world is changing, and changing in ways that appear worrying, destabilising and potentially dangerous, has of course been recognised by policymakers, professionals, activists and academics. But the majority of this scholarship and opinion has been limited by two key traits: first, an overwhelming focus on the United States, the so-called two-peer deterrence problem, and the centrality of trilateral great power competition between the United States, Russia and China.² And second, a tendency to focus closely on the impact that this has for *nuclear* deterrence and to a lesser extent vertical nuclear proliferation and arms racing among the major powers³ as the central challenges of this new epoch.⁴ These dynamics are of course intrinsic to understanding our current nuclear world and how it is changing, but they only capture part of what

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needs to be understood. The argument we make in this book is that a truly “global” approach is required to understand contemporary nuclear politics, and that this involves engaging with stakeholders beyond the nine-nuclear armed states and the handful of others that might seek this capability. Our goal is to move beyond a Western nuclear ethnocentrism – a certain cultural bias that tends to see global nuclear politics from a particular and often-blinkered perspective – that dominates the debate and often commingles a Washington beltway view of nuclear politics with a global view.⁵

We therefore take a different approach in this book that seeks to look more broadly at nuclear politics by including both nuclear-armed and non-nuclear actors, and at how these different actors are responding to the pressures of a new nuclear age. By doing this, we show how the “pathways to security” vary considerably between different political and military elites in different parts of the world. In this way, our approach is empirical-first and broadly interpretivist – we are not interested in measuring “variables” but rather in gathering qualitative data on the ideas and practices that constitute Third Nuclear Age politics. We want to study what different states conceive as possible (and desirable) in order to track why different activities take place at the state level, before we then try to make bigger claims about how they all interact in the global Third Nuclear Age. The work is therefore empirically driven and seeks to challenge wider trends and debates following details gathered from “real-world” observations. This allows us to focus not just on the most powerful actors, but also those that power is being wielded over, and to explore the contest and interaction between the two. It also allows us to look at how different actors are responding to the changes in the nuclear environment and why. It is important to focus on those that power is being wielded over because this conditions the possible and most likely responses of different actors to the dynamics of the Third Nuclear Age. Understanding and engaging with a multiplicity of responses also allows us to better understand the multifaceted nature of global nuclear order and move beyond the Western-focussed canon of the literature. Our basis is that change (and complexity) is coming unpredictably from many smaller sub-systems interacting. What makes the Third Nuclear Age potentially more complex than what has gone before is the greater number of interactions between stakeholders with quite different views of the future of nuclear order; the uncertainties produced by the intermingling of nuclear and strategic *non-nuclear* weapons; the breakdown of orthodoxy and consensus; and the more prominent voice and normative power of non-nuclear-armed actors.

We seek to understand this by applying a three-part analytical framework to each of the country case studies that asks: how are elites shaping, responding to or embracing technological change; how are they adapting to shifts in polarity and global power balances; and how are they seeking to engage with international nuclear norms? This allows for a genuinely novel way of capturing what is happening in the global nuclear order, and a way of engaging with different perspectives and important nuances. By applying an ideographically grounded methodological lens to understand systemic trends, we argue that actors within each state are pursuing one of four pathways to nuclear security in the Third Nuclear Age: the Nuclear

Traditionalists that continue to see a central role for nuclear weapons in deterrence and defence; the Technological Transformers that are embracing *non*-nuclear technologies to meet nuclear security challenges; the Hedgers and Balancers that in different ways are not committing fully to one of the other three pathways; and the Activists and Protestors who are seeking to challenge the centrality of nuclear weapons and/or push for access to nuclear technologies for non-weapons purposes.

We therefore argue that to understand the Third Nuclear Age that is unfolding, and in order to wrestle with the concomitant questions of what this means for nuclear use, strategic stability, proliferation and disarmament, it is essential to look beyond the current literature and focus on how different stakeholders are responding to these pressures, understand their nuclear political goals, and appreciate how these often-competing pathways interact. Ultimately, as the title of this book suggests, the unfolding global nuclear order will be intrinsically contested and perhaps characterised by friction, disagreement and division. Only by engaging with this complexity and discord in good faith can we hope to build the conceptual, material and ideational structures that will help us survive the nuclear future.

A Third Nuclear Age?

One way to think about today's shifting global nuclear order is as the latest iteration in a story that goes back to the first use of nuclear weapons in 1945. It has become popular – especially in Western literature and debate – to split nuclear history in two “ages”: a First Nuclear Age that is said to have existed between 1945 and 1990, where the gravest concern was major nuclear war between the superpowers, and a Second Nuclear Age that began in 1991, where the focus shifted to the threats posed by the proliferation of nuclear technologies to regional, “rogue”⁶ and non-state actors. A central argument of this book is that a strong case can be made that we are now living in a Third Nuclear Age, where the central risks and focus of global nuclear order have shifted again.

The value of thinking in terms of nuclear ages is that it highlights and captures both the central pressures and principal risks within the international system at any particular moment, and also shows how this risk hierarchy can change over time. For example, political, academic, media and public attention focussed largely on the Cold War nuclear arms race between the United States and the Soviet Union during the First Nuclear Age, and was characterised by concerns about flashpoints or crises that could lead to full-scale nuclear war. The canon of scholarship focussed on deterrence, escalation, crisis management, strategic stability and arms control.⁷ In the Second Nuclear Age, the focus shifted to “regional” challenges such as those posed by India and Pakistan, North Korea, Iran, Iraq, and Libya, and after the Al Qaeda attacks in September 2001, “nuclear terrorism.” Accordingly, the canon of scholarship focussed more on non- and counter-proliferation, nuclear security, and nuclear reductions.⁸

Our argument is that during the 2010s, the central challenges and pressures at the heart of the nuclear order began to shift again. Specifically, we began to see a new focus on great power nuclear competition between the United States, Russia

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and China, the deployment of new or enhanced strategic weapons systems, and at the same time a breakdown and weakening of many of the institutions, behaviours and norms central to the First and Second Nuclear Ages. This arguably in itself is sufficient to warrant a shift in thinking towards a “new” or “Third” nuclear age as a handful of scholars and experts have suggested.⁹ But our argument goes further. We suggest that moving into a Third Nuclear Age involves not only a transition from horizontal nuclear proliferation threats to great power nuclear competition, but also a number of other fundamental dynamics as well. Specifically, we make the argument that to understand the Third Nuclear Age we must move beyond the rather narrow focus on the major nuclear powers and proliferation to consider the wider dynamics and interactions that are shaping the global nuclear order. The five pillars of the Third Nuclear Age are therefore as follows:

- Competition between the major nuclear powers and a shift in global power balances that is transforming the international system.¹⁰ In addition to great power nuclear competition, a move towards deeper multipolarity increases the influence of aspiring great powers, provides more room for key “middle powers” to balance and bandwagon, puts pressure on alliances, and creates opportunities for non-Western states and organisations to shape nuclear politics.
- A process of massive technological innovation over the past three decades that has facilitated the diffusion of a range of novel weapons systems (especially in non-nuclear weapons systems) that could be used for strategic missions.¹¹ This is highly significant because it creates the possibility of relying on sophisticated non-nuclear means (rather than, or in addition to, nuclear weapons) for deterrence of nuclear threats. It also creates a range of new escalation and miscalculation risks due to the commingling of these capabilities.¹²
- A gradual weakening and breakdown of agreements, norms and institutions built up over previous decades. In recent years, we have seen the United States withdraw from the Joint Comprehensive Plan of Action, the end of the Intermediate-range Nuclear Forces and Conventional Forces Europe Treaties, the suspension of the New START Treaty, the increased erosion of the Outer Space Treaty, Russian de-ratification of the Comprehensive Test Ban Treaty, and increased disharmony and dissatisfaction at the 2015 and 2022 and Non-Proliferation Treaty Review Conferences. We are a long way from the disarmament optimism of the 1990s and 2000s.
- A more conspicuous clash between those wedded to nuclear deterrence and those pushing for nuclear disarmament. The most prominent manifestation of this is the agreement of the Nuclear Ban Treaty in 2017, but this is reflective of a more proactive and vocal approach taken by anti-nuclear states (and their NGO partners), who have shifted from making their own nuclear free zones in the past, to now tackling the nuclear-armed states directly. The nuclear ban treaty’s meeting of states parties increasingly serves as a forum of states ostensibly seeking to delegitimise the very practice of nuclear deterrence.
- A growing interest in nuclear technology for economic development, energy security and Net Zero, especially in the Global South, which creates pressures

regarding the supply of reactors and material, the security of facilities, and future weapons proliferation.¹³

The key is that each of these pillars represents a significant and important change from what has gone before in the First and Second Nuclear Ages. What we appear to have witnessed is a gradual shift over the past decade or so from a world of US unipolarity and nuclear preponderance, an overriding Western concern about nuclear-armed “rogue” actors, regional nuclear flashpoints and horizontal proliferation, a “golden age” of arms control and both nuclear and conventional force reductions, to one of great power nuclear competition, the threat of nuclear use in interstate war, the vertical and horizontal proliferation of strategic weapons systems, multiple nuclear flash points, and an increasingly fractured and weakening system of global nuclear governance. This is not to say that Western-shaped Second Nuclear Age problems and challenges have disappeared (such as nuclear proliferation to “rogue” actors, including terrorist groups), but rather that they have been superseded and augmented by a new suite of developments.

This book is very deliberately titled the “Global” Third Nuclear Age because one of its key motivations is to understand the current flux in the global nuclear environment as a holistic and differentiated phenomenon. The predominantly Anglophone and Western scholarship, thought and focus of the past is of course incredibly insightful and useful when it comes to understanding the nuclear condition, but too often fails to engage with and understand nuances from other parts of the world and the experience of other types of actors within the system. This is why this book is not just about “competition” between the three nuclear-armed “great” powers, the nine-nuclear armed states, or the enduring nuclear challenges in the Euro-Atlantic, South Asia, the Middle East and Northeast Asia, but about a range of different actors and their interests from across the world – including the sometimes-overlooked role of states in Africa, South America, Southeast Asia and Central Asia. Looking at the global nuclear context in this way allows for a much wider understanding of the functions and interaction with and within the global nuclear order by different actors. It also importantly allows for reflection on how different types of actors are responding to and potentially shaping the contours of the Third Nuclear Age, and avoids an inherent regionalism that often shapes studies of the Second Nuclear Age.

Of course, the concept of nuclear ages is not unproblematic, and it may be criticised as grandstanding to describe the current nuclear world as experiencing a fundamental shift, significantly different from other moments of noteworthy change in the past. Moreover, the notion of splitting previous nuclear history into two phases either side of the end of the Cold War may – with some justification – be seen as an overtly Western/Euro-Atlantic ethnocentric view of nuclear order and nuclear history. But breaking the nuclear story down into different eras can be an incredibly useful tool in focussing attention on what might be changing, and perhaps more importantly, highlighting the need to understand and respond to that change. As Colin Gray put it, while nuclear ages are “intellectual constructs, these concepts are both massively supportable empirically and above all else, they are useful.”¹⁴

A change in nuclear ages doesn't mean that the ideas and lessons from the past are no longer valid or useful, but rather that we must test these assumptions and not become overconfident in what we think we know or have achieved. Thus, the main aim of this book is to add our voices to the embryonic but powerful literature seeking to unpack what the Third Nuclear Age will mean, and above all, how we can manage the enduring challenges posed by nuclear weapons and nuclear technologies in the years ahead.

Technology, geopolitics and norms

In order to examine and understand how and why particular actors are responding to the pressures of the Third Nuclear Age in the manner that they are, we utilise a three-part analytical framework for each case study chapter. This involved looking at the importance of technological change, geopolitical realignment and nuclear norms for each actor, and asking the same set of guiding questions across all of the case studies.

- How is technological change impacting threats to national security, decisions about which military systems to develop and deploy, and the role of nuclear technology more broadly?
- How are changes in global power structures impacting the perception of threats to national security, what does this mean for alliances, partnerships and the practices that are believed to constitute security?
- What is the role of different international norms, agreements and frameworks to minimise and manage global nuclear risks?

This approach allowed us to compare and contrast how these pressures are impacting and shaping different actors within the system.

The impact of two decades of rapid technological change, often subsumed under the moniker “emerging and disruptive technology” has been widely recognised as both a driver and a product of the move into a Third Nuclear Age. Numerous studies and commentaries have pointed out the potential for technological developments to challenge strategic balances, arms control and proliferation, either through new or enhanced nuclear delivery systems or by the deployment of strategic non-nuclear weapons systems such as long-range precision and “hypersonic” missiles, hit-to-kill missile defence systems, counter-space weapons, Computer Network Operations (cyber), Directed Energy Weapons and autonomous weapons platforms, each often facilitated by advances in AI, that could be used for strategic missions across different domains.¹⁵ But what often gets lost among this fanfare is the subtle differences that exist between different actors, especially why and how such capabilities are being pursued and deployed. Therefore, it is essential to examine how military modernisation is impacting the security calculations of military and political elites; assess to what extent technological change is being embraced as a response to these pressures and how; and perhaps most importantly, study what form this takes. As explained in the following pages, for some states

technological change means doubling down on nuclear weapons, for others it potentially opens up new ways of deterring nuclear-armed adversaries without needing nuclear capabilities, for another group it is seen as a dangerous development likely to exacerbate nuclear risks. Technological change in the global nuclear order also includes developments in non-weapons applications of nuclear technologies. On one hand this involves the diffusion of nuclear technology for (for example) non-nuclear-armed submarine propulsion, on the other it involves seeking nuclear technology for energy generation and development, often as part of moves towards “Net Zero.” Both of these applications have implications for the shape of the Third Nuclear Age.

The Third Nuclear Age has become synonymous with both the “return of great power competition”¹⁶ and the perception that the global system is becoming increasingly multipolar. The big change is that while the Second Nuclear Age was characterised by US and Western preponderance and a focus on regional and “rogue” nuclear threats, the Third Nuclear Age has seen a return to thinking about major power war and deterrence. The risk that the Ukraine war could escalate to involve NATO and the possibility of future war over Taiwan between the United States and China both have overt nuclear dimensions. The nuclear challenges posed by the US-Russia-China rivalry are unquestionably important to the Third Nuclear Age, but often seem to mask several other significant developments. Firstly, the three-power model tends to ignore the central role of India as an aspiring great power in shaping global nuclear norms. Secondly, this focus ignores the role of significant non-nuclear-armed regional “middle powers” such as Brazil, Indonesia, and South Africa, and how they seek to shape the global nuclear order, often through non-Western organisations, especially the Non-Aligned Movement. Thirdly, it ignores the pressures that moves towards multipolarity place on multilateral security guarantees and extended deterrence, causing leaders to rethink how best to achieve security, and how this incentivises balancing and band wagoning. Lastly, it ignores the role of the vast majority of states within the international system and their views of what is a fair and equitable nuclear order. Consequently, geopolitical realignment means asking which actors/actions represent a threat, in what way, and what are the best ways to combat this.

The third variable that is essential to understanding the Third Nuclear Age is the function and centrality of norms, agreements and institutions to minimise and manage nuclear risks for different actors within the global nuclear system. There is a growing concern that the loose consensus built up over decades that consisted of a nuclear taboo and norm against issuing nuclear threats, a commitment to nuclear reductions and reducing risks through arms control, and a desire for all to work in good faith towards a nuclear disarmed world, has begun to unravel.¹⁷ This can be seen in the demise of important treaties, a lack of rhetorical restraint by numerous leaders and officials, significant nuclear modernisation programmes and in some cases nuclear build-ups, as well as an unprecedented split between those that continue to see a role for nuclear weapons in deterrence and those who want a nuclear-disarmed world. The clearest (but not only) manifestation of this is the agreement of the Treaty on the Prohibition of Nuclear Weapons in 2017, which none of the

nuclear-armed states have currently signed (or appear willing to engage with), but which at the time of writing has 70 full members. Nuclear norms are also about making sure that the global nuclear order is fair and equitable for all, particularly when it comes to the balance between non-proliferation and the right for all to access the peaceful benefits of nuclear technologies. Thinking about nuclear norms in this way reminds us that large parts of the world exist as Nuclear Weapons Free Zones (Africa, Antarctica, Central Asia, Mongolia, Southeast Asia, South America and the Caribbean, South Pacific, the Seabed and Outer Space), and that it is those with nuclear weapons that are the minority.

Structuring the analysis of each of the case studies in this way allows for a much deeper appreciation of the key dynamics (both internal and external) shaping the thinking of political and military elites in different parts of the globe.

Pathways to security

What makes this book particularly novel is the adoption of a framework that seeks to categorise different states based on their position within the international system and how they are seeking to respond to and shape the pressures outlined earlier. This directly challenges the inherent – possibly unconscious bias – that somehow nuclear order is experienced and understood homogeneously, and provides a tonic to those studies that just focus on the nuclear-armed states and nuclear deterrence. We can learn little about the wider nuclear order if we do not seek to understand the different viewpoints of different types of actors – especially the viewpoints of the vast majority of states that do not have nuclear weapons.

Accordingly, we argue that responses to the pressures of the Third Nuclear Age can broadly be split into four “pathways.”¹⁸ But unlike most of the nuclear studies canon, this book is deliberately structured from the outside-in, starting with those actors that are largely emblematic of the majority of states within the international system that are not nuclear-armed and have a strong interest in disarmament, but that are often on the periphery of the nuclear debate within and between the great and nuclear-armed powers. In this way, the book begins with the most ardently anti-nuclear views of Austria in Chapter 1 and culminates with the actor that we believe is most wedded to nuclear weapons, North Korea, in Chapter 20. Structuring in this way also allows us to explain the subtle differences between actors along this spectrum and unpack the different reasons for the direction of travel, objectives, and the speed and coherence within which this is unfolding.

The activists and protestors (Austria, Kazakhstan, South Africa, Indonesia, Brazil)

The book therefore begins with the states that we classify as “Activists and Protestors.” These states are quite different to those in the other categories, and exist in a different space within the global nuclear order because they are not nuclear-armed nor have any obvious desire or rationale to proliferate, and (with the exception of Austria) are part of Nuclear-Weapons Free Zones.¹⁹ Political leaders in these countries are broadly united in their desire to (i) protest against perceived

unfair practices and double standards by the established nuclear powers; (ii); advocate for disarmament and challenge the global context that accepts nuclear deterrence as a key ordering mechanism in global politics; and (iii) for some, protect their rights when it comes to civilian nuclear technology transfer and indigenous nuclear capabilities. But there are important differences between these actors too. Most notably, Austria is representative of a number of actors (including Ireland, New Zealand and many Pacific Island states) that seek to ban all nuclear activity – not just weapons, while Indonesia, Brazil, South Africa and Kazakhstan (and many states in the “Global South”) all have interests in securing and expanding civilian (and in Brazil’s case military) nuclear applications. Likewise, these states are split when it comes to adherence and the value placed on institutions such as the NPT and the IAEA and their role vis-à-vis the Treaty on the Prohibition of Nuclear Weapons: Brazil (alongside Argentina and Vietnam) have pushed back against what is seen as excessive regulation and intrusion in domestic programmes, while Indonesia (like many states in Southeast Asia) has been broadly supportive of current frameworks. These Activists and Protestors often see their primary allegiance to non-Western and regional groupings and organisations such as ASEAN, BRICS, the New Agenda Coalition, the Non-Aligned Movement and the African Union, and are increasingly transactional in their nuclear engagements with the major nuclear powers.

The hedgers and balancers (Iran, Germany, India, the United Kingdom, China)

The second group of states are quite different in that their governments may list working towards nuclear disarmament as an ultimate goal, but are nevertheless either suspected of seeking a nuclear capability, are nuclear-armed, are members of a nuclear alliance, or have an extended nuclear deterrence relationship. We classify these states as “Hedgers and Balancers” – although these phrases do not imply that their actions are somehow homogenous: hedging and balancing can take many different forms. What unites them is a reluctance, uncertainty, inability or “wait-and-see” approach to forging a particular path, often the result of seeking to balance a number of different foreign and domestic policy objectives as they slowly engage with new technological, geopolitical and normative pressures. But again, there are important differences. Iran is the archetypal hedger in the classical nuclear sense because it is suspected of manoeuvring into a position of nuclear latency whereby it could potentially build a nuclear weapon – but as far as we know has not yet done so. Germany is hedging by doubling down on its role as member of the NATO nuclear sharing mission and as a host for US medium-range missiles, while at the same time seeking to advance new risk reduction and disarmament measures in the Euro-Atlantic. The United Kingdom and India are hedging by slowly modernising their “minimum” nuclear deterrent capabilities and gradually engaging in the development of advanced or strategic non-nuclear weaponry with key partners: the United Kingdom through NATO and AUKUS and India with Russia and Israel. China is hedging by investing heavily in all types of weaponry for both strategic and regional deterrence and warfighting missions. Some of

these states exhibit characteristics of “technological transformation” as discussed below, but importantly don’t appear to have made this a major strategic objective. Other hedgers could include Saudi Arabia as its interest in both nuclear and conventional technology continues, and Finland and Sweden following their decision to join NATO in 2022.

The technological transformers and conventional warfighters (Japan, Australia, Israel, South Korea, Taiwan)

The third group of states looked at in the book are united by their interest in the development and deployment of advanced/strategic non-nuclear weaponry for deterrence and war fighting. We label these states the “Technological Transformers” because they are all prioritising high-technology conventional capabilities such as precision missiles and bombs, air and missile defences, and integrated support systems across all domains, as the major response to their immediate security needs. Australia, Japan and South Korea have formal extended nuclear deterrence arrangements with the United States, Israel has its own undeclared nuclear programme, and Taiwanese security is closely linked with the nuclear-armed United States. We argue that this an important factor in their relative decisions to pursue advanced/strategic non-nuclear capabilities to meet perceived security needs. Taiwan and South Korea are the best examples of states where political and military elites are seeking to ramp up conventional capabilities to meet the challenges posed by their nuclear-armed neighbours: China and North Korea – albeit in slightly different ways. Israel is seeking technological solutions to meet an array of different security threats ranging from non-state actors to a possible nuclear-armed Iran, allowing it in turn to keep the nuclear threat implied rather than overt. While Japan and Australia have recently moved to place greater emphasis on their commitment to conventional military forces for regional security and particularly meeting the perceived threat/challenge from China. This arguably moves them from hedgers to transformers – at least in their ambitions and direction of travel. While each of these states face slightly different immediate security threats, and are transforming at different speeds and scale, they appear united by the belief and notion that planning for – and potentially undertaking – conventional warfare will be a major component of the Third Nuclear Age.

The nuclear traditionalists (the United States, Russia, France, Pakistan, North Korea)

The last group of states are what we might think of as the nuclear hard-liners. Unlike all the other actors looked at in this book, they have essentially doubled-down on nuclear weapons as a key response to the challenges of the Third Nuclear Age. But this is not to say that they all adhere to one specific “nuclear tradition”: nuclear capabilities are being pursued in different ways and for different reasons. For North Korea, Pakistan and Russia, achieving nuclear security is through the development of *new* nuclear capabilities or *expanded* roles for nuclear weapons and nuclear missions. The same general trend might also be underway in the United States albeit

more slowly, and primarily as a way of both addressing the two-peer deterrence problem and reassuring allies of extended nuclear deterrence guarantees. While for France nuclear weapons are about maintaining the status quo and bolstering deterrence by punishment. This doesn't mean that other factors and levers of military power aren't important, but that they are ultimately subordinate to nuclear weapons as the ultimate pathway to security for this small group of states. The "Nuclear Traditionalists" are united by the fact that nuclear weapons remain central to national security, whether directly due to a perceived deterrence value, for coercion, or as part of perception of nuclear weapons as essential to national identity. However, there are notable differences in terms of the role of nuclear weapons: for some actors, tactical/battlefield/sub-strategic nuclear forces have a role to play in local and regional warfare, for others the tactical-strategic distinction is unhelpful, and nuclear forces are principally political and for strategic deterrence.

These categories are not intended to be value-laden, and we do not seek to suggest one particular approach or pathway is better than the others, or that states cannot move between categories over time. Neither does the book seek to argue that each country case study is a perfect fit to the four categories, or that military and policy elites are motivated solely by one particular pathway to security in the emerging security environment. Rather we argue that we can classify states by the most influential and prominent factors characterising their approach to the Third Nuclear Age and place these in a hierarchy. This allows us to develop an unconventional typology which groups nuclear actors in different ways to most other works in the field: not all nuclear-armed, nuclear umbrella or non-nuclear-armed states are responding in the same manner or have the same nuclear political objectives. This is also significant because it suggests that the pressures shaping the landscape of the Third Nuclear Age are not just technological, political and normative, but also underpinned by contrasting views and desires about the global nuclear order in general. Above all, this structure highlights just how diverse the pressures, interests and dynamics of the Third Nuclear Age are likely to be.

Outline of the book

The book is structured across the four pathways to security explained earlier, and proceeds in a roughly linear fashion from those most stridently opposed to the current nuclear order (or at least the current direction of global nuclear politics) to those very much at the heart of it. Each of the four sections is followed by a summary – this is designed to highlight the relationship between the states within the categories, and unpack the major similarities and differences. Accordingly, Part I focusses on the activists and protestors: Austria, Kazakhstan, South Africa, Indonesia and Brazil; Part II on the hedgers and balancers: Iran, Germany, India, the United Kingdom and China; Part III on the technological transformers: Japan, Australia, Israel, South Korea and Taiwan; and Part IV on the nuclear traditionalists: the United States, France, Russia, Pakistan and North Korea. Together, the four sections consist of 20 individual country case studies representing very different visions for and requirements of the global nuclear order.

Clearly, these cases are not exhaustive, but they have been chosen to reflect: (i) the key players in the global nuclear order; (ii) regional, geographic and cultural differences and variation; (iii) different types of actors based on their influence, position or goals within the global nuclear system. Structuring the cases in this way not only allows for comparison across different actors but also highlights the importance of different factors for different actors.

The activists and protestors

- 1 Austria: Austria is the best example of a state seeking to completely change the global nuclear order by its staunch opposition not just to nuclear weapons but also to the use of nuclear energy. In this way, policy elites in Vienna are representative of a growing number of officials in other parts of the world (as well as a number of prominent NGOs) that seek to reorganise – and upend – the current architecture of global nuclear politics. Austrian officials seek to change the nuclear status quo that has in their view represented the preferences of a small group of nuclear-armed states and their allies. The approach of the Austrian government is to facilitate a discursive shift in the perceived role of nuclear weapons. This discursive shift seeks to recast nuclear weapons as a primary source of insecurity, while simultaneously foregrounding the potential humanitarian impacts of nuclear weapons use in order to situate nuclear weapons within the boundaries of international humanitarian law. Austrian officials seek to achieve these goals by financially and politically supporting anti-nuclear civil society organisations and coalitions of states in various multilateral fora – most notably through the TPNW. Austria's pathway to security in the Third Nuclear Age therefore reflects a radical rejection of both nuclear weapons *and* nuclear technologies.
- 2 Kazakhstan: Kazakhstan's response to the changing nuclear order appears similar to other non-Western non-nuclear-armed states. Kazakh officials pursue a dual focus on nuclear disarmament and the spread of civilian nuclear technologies, and have a proactive track-record in supporting the global nuclear non-proliferation regime. It is home to a Low Enriched Uranium Fuel Bank designed to guarantee access to nuclear fuel for civilian applications, and is a member of the Central Asian Nuclear Weapons Free Zone after giving up Soviet nuclear weapons in the 1990s. Kazakhstan is one of the few states that maintain significant economic, military and strategic relations with Russia, the United States, China, the European Union (EU) and Iran, but the complex global landscape is putting leaders in Astana in an uncomfortable position. Given that Kazakhstan is an actor whose continuing cooperation with the United States is crucial for the denial of nuclear technologies to the South Asian “arc of proliferation,” the loss of Kazakh strategic autonomy will have significant implications for the wider nuclear order.
- 3 South Africa: South Africa's role in the transition into a Third Nuclear Age appears to be dominated by normative concerns focussed on accelerating nuclear disarmament and the distribution of nuclear technologies for civilian

use in the Global South. While the Apartheid government was closely aligned with the “West” during the First Nuclear Age and even built an independent nuclear weapon capability, post-Apartheid South Africa became a – if not the – disarmament champion in the Second Nuclear Age after giving up the bomb and joining the NPT in the 1990s. South African officials leverage this prestige and Pretoria has become an outspoken supporter of nuclear disarmament, nuclear technology transfer and stronger non-proliferation mechanisms. It has effectively leveraged its new-found moral authority on issues of nuclear disarmament to increase its political footprint in the global nuclear order and especially in Africa and the Global South. South Africa’s role in the global nuclear order should be contextualised within the wider trend of state and non-state actors increasingly participating as norm entrepreneurs that are eager to shape the normative contours of the emerging global nuclear landscape.

- 4 Indonesia: Officials in Jakarta remain steadfastly supportive of the central frameworks of global nuclear governance, but are reflective of a number of countries in Southeast Asia in their concern about the lack of genuine progress on nuclear disarmament. The NPT is still seen as essential – if perhaps imperfect – but Indonesian leaders have emerged as strong supporters of the TPNW as an alternative – and complementary – mechanism to reduce global nuclear risks, and put significant emphasis on spreading and strengthening Nuclear Weapons Free Zones. Indonesia is slowly modernising its conventional military capability and increasingly sees its security through the membership of ASEAN, but is also seeking to balance a number of different strategic relationships with key players in the region. Elites in Jakarta appear to be moving towards acquiring nuclear power generation capabilities as part of a broader move to “Net Zero,” and have traditionally been strong defenders of the right of states to access nuclear technologies for peaceful purposes.
- 5 Brazil: The pathway to nuclear security for Brazil in the Third Nuclear Age is not about utilising nuclear weapons for security (as some have feared in the past), but is instead characterised by a commitment to disarmament and a more equitable global nuclear order. At the centre of the Brazilian approach is a determination to make the country independent when it comes to nuclear technology and avoid reliance on other states and established governance architectures that are often seen as unfair and unjust towards non-developed and non-Western countries. At the same time, there is clearly a desire to protest against the rules and regulations that define the current nuclear order and the established “nuclear club,” and to make sure that the structures of global nuclear governance work for all states within the system not just the most powerful. The indigenous Brazilian nuclear submarine programme, support for the TPNW, and resistance to intrusive inspections and safeguards, will all have a significant impact on the evolving shape of the Third Nuclear Age.

The hedgers and balancers

- 6 Iran: The approach of Iranian policy elites to the global nuclear order – which they see as Western-designed and Western-led – has been defined by defiance and resistance, but also ultimately hedging. In the Third Nuclear Age, Iranian security thinking will be dominated by the military technological sophistication of its two main nuclear-armed adversaries, Israel and the United States. Continuity rather than change best describes Iran’s approach to changes in the global nuclear order, especially technological change, and the re-emergence of great power competition. While portraying themselves as traditionally pro-disarmament advocates, Iranian leaders continue to pursue a strategy of nuclear latency. At the same time, the re-emergence of great power competition has given Iran a wider degree of flexibility, which has allowed the Islamic Republic to adopt a more confrontational attitude with the international community over its nuclear ambitions when needed. At the moment, Iran appears to be choosing a conventional deterrent over a potential nuclear one. Despite its rivals being two nuclear-armed states, hedging appears to be a costly but effective strategy.
- 7 Germany: German leaders have responded to the pressures of the Third Nuclear Age with a mixture of continuity and change, which is reflective of a complicated political outlook. On one hand, officials in Berlin are committed to a role for nuclear weapons as part of NATO membership and Germany plays a key part in the nuclear sharing mission through its Dual Capable Aircraft. Membership of NATO also means the involvement of the Bundeswehr in the Alliances’ plans to incorporate strategic non-nuclear weaponry into the Euro-Atlantic defence posture – notably US medium-range missiles able to hit Russia. On the other hand, Germany has traditionally seen itself as a bridge between the West and Russia, has recently phased out the use of nuclear power for energy generation, and sent observers to the first meeting of the TPNW. However, the Russian invasion of Ukraine in 2022 does appear to have shifted the debate back in favour of extended nuclear deterrence and the necessity of being part of a strong military alliance. While the commitment to arms control, confidence building and risk reduction measures remains, these seem largely rhetorical at the time of writing. In this way, the mainstream German political elite exhibit classic hedger and balancer characteristics: uncertain of how best to assure security in a new nuclear era, and unwilling to do anything that might upset the existing nuclear order further.
- 8 India: The transformation of the global nuclear landscape and the increasing international competition among the great powers, together with the challenges posed by rapid changes in the South Asian security context, have a strong influence on how India is responding to the Third Nuclear Age. While nuclear weapons continue to play an important role in Indian security strategy, military leaders have been investing resources to develop and acquire more sophisticated technologies, such as missile defences, hypersonic missiles, nuclear-powered submarines and ASAT capabilities. But this does not necessarily reflect a deliberate “counter-force” capability as some have suggested, but rather a policy

of technological and political hedging. Likewise, officials in New Delhi have sought to deepen strategic and defence ties with both the United States and Russia (and Israel), cement links with the non-aligned world, and at the same time balance against an increasingly more powerful and influential China. The Indian role in the Third Nuclear Age seems likely to be significant, but as yet, it isn't clear exactly what form that will take.

- 9 The United Kingdom: There is a recognition among the UK policy elite that the global nuclear order is changing, and that the best response to this uncertainty is to continue to hedge with the recapitalisation of a "minimum" nuclear weapons capability, reinforce key strategic relationships, and seek new mechanisms of "integrated" arms control. The approach of the UK government is therefore best characterised by continuity rather than change, and by pragmatism rather than transformation. Despite a recent marginal increase in the number of nuclear warheads that might be kept in the stockpile, the UK government has not elevated the importance or expanded the role of nuclear weapons for national security, or made any major commitment to expand the development of strategic non-nuclear weaponry (beyond through NATO and AUKUS). Instead, the pathway for security for the United Kingdom seems to be about business as usual when it comes to military capabilities, bolstering key military alliances to balance against competitors, and seeking to find ways to restrain disruptive pressures in the international nuclear environment.
- 10 China: China's rise had been remarkably untinged with major nuclear weapons developments until the late 2010s. With a seemingly sudden build-up of delivery vehicles capable of nuclear missions, China watchers have pointed to a major shift in Chinese elites' thinking about nuclear politics. However, a more careful analysis points to China continuing its hedging strategy. The Chinese military has also procured new supporting technologies, such as sensors, missile defences and counterspace capabilities, that widen the possibilities for decision-makers in hypothetical future crises and wars. Great power competition and political wrangling is at the heart of the People's Republic of China's (PRC's) need to hedge. As India grows more powerful, regional primacy cannot be taken for granted. The relationship with the United States continues to deteriorate, and Russia's precipitous position presents its own questions. The leaders of the Communist Party have only pursued a hedging strategy in regard to technology, however: the support for the Ministry of Foreign Affairs' multilateral initiatives is in reality fairly limited. With so many possible policy and technology paths forward, China's security elite have so far made their response "wait and see" when it comes to the Third Nuclear Age.

The technological transformers and conventional warfighters

- 11 Japan: Japan occupies a Janus-faced position in the global nuclear order: vehemently anti-nuclear due to its history, while maintaining a significant nuclear hedge and an extended nuclear deterrence partnership with the United States. Tokyo remains focussed on preserving the status quo in the global order more

broadly in its preference for US primacy over a balance of power created by the rise of China and others. However, Japanese leaders are particularly concerned that China is advancing beyond Japan and its allies technologically. This is why Japan has recently shifted its security posture to give greater emphasis to strategic non-nuclear capabilities and the reality of fighting a conventional war in Northeast Asia – albeit progress towards this aim will undoubtedly be subject to budgetary constraints. The speed and material reality of Tokyo's transformation is therefore unlikely to be the same as Taiwan, South Korea, Israel or even Australia, which means a concurrent need to reemphasise its alliance (and extended nuclear deterrence relationship) with the United States and embed itself in alliances and partnerships even further throughout the region. While it reserves the right to hedge against the future possibility of having to stand alone in the nuclear order by maintaining a degree of nuclear latency, for now Japan's decision stands to face the Third Nuclear Age firmly anchored to others.

- 12 Australia: Australia is responding to the shift towards a Third Nuclear Age with a mix of continuity and change, but also a growing interest in advanced conventional weaponry. Recent developments in Australian defence and security policy suggest a move away from the type of hedging and balancing described in the previous section. Instead, Canberra is doubling down on its existing defence posture of conventional deterrence backed by the extended nuclear deterrence offered by its formal ally, the United States. However, part of this includes a far greater reliance on high-end strategic non-nuclear capabilities such as hypersonic missiles, theatre missile defences, and research into military uses of AI. It also includes embracing a new and controversial position on proliferation safeguards through its pursuit of nuclear-powered submarines under the AUKUS security pact. While officially eschewed by government, the prospect of a more contested Asian security environment has ensured that even a future Australian nuclear weapons capability is once more a subject of serious public debate.
- 13 Israel: Israel's pathway to security has been intrinsically linked to cutting-edge technology, whereby policymakers in Tel Aviv have actively sought to maximise the benefits of technological innovation, and this applies to advanced and strategic non-nuclear weapons today. Notwithstanding the unacknowledged nuclear weapons capability, Israeli officials appear determined to pursue non-nuclear technological solutions in order to enhance the country's national security vis-à-vis a changing regional environment in the Third Nuclear Age. While nuclear deterrence remains a vital element within Israel's military doctrine, prioritising advanced strategic weaponry (both offensive and defensive) seems to be the country's chosen pathway to security. Whereas Israel's approaches to technological and normative shifts have been linear and consistent, elites have been cautiously adjusting to China's "rise" and carefully positioning the country in its triangulation between the United States and China. Israel consistently resists the nuclear non-proliferation and disarmament normative framework and this seems unlikely to change in the Third Nuclear Age.

- 14 South Korea: While questions come and go as to whether the Republic of Korea (ROK) will pursue its own nuclear weapons in the future, for now the response to changing nuclear politics has been to overwhelm the nuclear threat from the North with conventional warfighting capacity. The ROK is the posterchild for the spread of precision weapons capabilities beyond the great powers and the new strategies or postures that such technologies can enable. The ROK's suite of long-range conventional precision-strike capabilities and missile defence systems lend major credibility to its doctrinal goals of conventional counterforce and decapitation against the Kim regime. Despite its growing military and economic capabilities, however, the ROK has yet to show a major move to engaging in the emerging great power dynamics of the 21st century. The North poses such a massive threat that the deterioration of US-China relations (the former the ROK's biggest security partner, the latter its largest trade partner) is not an attractive arena for radically new ROK foreign policy. Norms and institutions, beyond the alliance with the United States, have also provided the ROK with little security benefit. For these reasons, it is the hope for conventional dominance that best characterises the ROK's response to changing nuclear politics.
- 15 Taiwan: For Taiwanese decision-makers, the changing nuclear landscape is of secondary importance to the looming threat of Chinese aggression or an invasion. Taiwan's adoption of new technologies has taken place under the backdrop of preparations to fight a conventional war. In response to the Chinese military's successful modernisation efforts, the Taiwanese government has responded by procuring conventional long-range precision strike capabilities, missile defences and hardened shelters for strategic sites. The key nuclear threat is indirect, namely the prospect of the PRC using nuclear threats to deter the United States from intervening on Taiwan's side in the event of a cross-Strait war. Taiwan's approach to the return of "great power competition" is the pursuit of closer ties with the United States and advertising its importance to US supply chain security, especially for semi-conductors. The "global nuclear order" provides little solace for Taiwan's leaders: although Taiwan adheres to international norms and treaties, strengthening normative and legal structures would not meaningfully increase Taiwan's security. Although it stands at odds to Taiwan's increasingly liberal domestic politics, Taiwan's decision-makers see no other option than to prepare their country for a major conventional war.

The nuclear traditionalists

- 16 The United States: For the past few decades successive US administrations have pursued non-nuclear capabilities to augment nuclear weapons for certain national security functions and missions. But as the 2022 Nuclear Posture Review makes clear, nuclear weapons continue to fulfil major strategic functions for the United States. Because US military planners have been keen to maximise the benefits of technological change, particularly for conventional deterrence and warfighting, the United States could also fit

the bill of a “Technological Transformer” (especially in the past). However, the emergence of a new context whereby Washington is confronted by two major nuclear-armed “revisionist” powers in Russia and China has fundamentally strengthened the role of nuclear weapons for both homeland and extended deterrence. Indeed, it is arguably US nuclear capabilities that allow for its allies to pursue non-nuclear technological solutions to their immediate security concerns. The United States remains committed to maintaining the shape of the current nuclear order through established governance and arms control architectures centred on the NPT, but there is also a recognition that the Third Nuclear Age will be defined by competition rather than cooperation, and possibly a greater rather than reduced role for nuclear weapons.

- 17 France: The French response to the pressures of the Third Nuclear Age is overwhelmingly characterised by continuity, and by a resolute commitment to French nuclear weapons as the ultimate guarantors of security in a more complex environment. There is some limited interest from the French military (and in Parliament) in advanced non-nuclear weaponry but this is seen as subordinate – and separate – to the nuclear force. In fact, with US power appearing to be on the wane, Russia challenging the post-Cold War Euro-Atlantic security complex, and following the UK withdrawal from the EU, French officials see the nuclear force as increasingly central to European security. For French political and military elites, stability, predictability and continuity are the chief objectives when it comes to managing the challenges of the emerging Third Nuclear Age, and this remains focussed on a secure nuclear deterrent against both regional and great power threats, and on the NPT as the cornerstone of the international nuclear arms control edifice.
- 18 Russia: Despite an extensive, multi-decade conventional military modernisation programme and interest in strategic non-nuclear capabilities, Russia’s approach to the Third Nuclear Age remains inherently nuclear. There are three parts to this: (i) nuclear weapons (both battlefield and strategic) remain fundamental to deterrence in the Euro-Atlantic, and especially to the balance and relationship with the United States and NATO; (ii) having a large nuclear stockpile is seen by Russian elites as being an important component of Russia’s claim to great power status; and (iii) state-owned Rosatom is playing an increasingly influential role as a supplier of civilian nuclear reactors, cementing links with many countries in the developed and developing world. For these reasons the pathway to security and influence in the Third Nuclear Age for leaders in Moscow remains nuclear. Somewhat paradoxically a strong nuclear force is seen as both useful for stability through the status quo and at the same time a key way to compete with and perhaps challenge the West and intervene in “local” conflicts.
- 19 Pakistan: Pakistan’s response to the transformation of the global nuclear order is characterised more by continuity than change. This is because nuclear weapons continue to have a crucial role in national security strategy for policymakers in Islamabad (primarily vis-à-vis its conventionally superior rival, India), and

in shaping its national identity more broadly. During the last two decades, the Pakistani military has devoted more resources and efforts to modernising the nuclear arsenal, and has been working to increase the size, sophistication, and precision of the weapons it deploys. This includes the development of tactical nuclear weapons that might be used on the battlefield, and that can compensate for qualitatively inferior conventional military forces. The strategic partnership with China and the relationship with the United States will undoubtedly frame the perceptions of Pakistani policymakers in the Third Nuclear Age, but ultimately nuclear weapons remain the most important tool in combatting the security risks that Pakistan faces.

- 20 North Korea: North Korea (DPRK) committed to nuclear weapons as a path to security in the 2000s and has adopted a fairly orthodox nuclear strategy. A combination of countervalue retaliatory capabilities, both against South Korea and, increasingly the United States, as well as battlefield nuclear weapons point to two “complementary” strands of strategy: to deter the ROK and the United States, and to “repel” aggression if deterrence fails. While the DPRK’s conventional arsenal has improved significantly in the past two decades, there seems little prospect that the DPRK would fight a major war without detonating nuclear warheads. Furthermore, in light of the ROK’s posture of pre-emptive conventional counterforce, the North almost certainly has to wrestle with the prospect of “use them or lose them” dilemmas. It is the prospect of war on the Peninsula that looms largest in the DPRK’s nuclear calculations, leaving little room for the influence of changing great power politics or innovations in the realm of norms and institutions. Despite being the newest nuclear power, the DPRK is arguably the most attached to the “traditional” uses of nuclear weapons.

Each empirical section of the book is followed by a short reflective summary pulling together the insights from the cases looked at, and reflecting on the interaction between the countries grouped under each label. This allows us to further explore the differences and nuances between actors. The conclusion reflects on the lessons learned from the empirical material, and seeks to draw out some broader reflections about what this means for our nuclear future. In this way, it is designed to offer both conceptual insights into debates about how we understand our contemporary nuclear world, but also policy guidance on what this means for issues such as the likelihood of nuclear use, the shape and nature of proliferation, challenges to deterrence, and the key areas of tension and friction that must be addressed.

Notes

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 - 18 A possible fifth category might include a group of states that are effectively “indifferent” or disengaged from the global nuclear order. But by implication, these states will have little impact on Third Nuclear Age politics.
 - 19 Kazakhstan is part of the Central Asian NWFZ but may also be covered by a Russia nuclear guarantee as part of its membership of Collective Security Treaty Organisation.



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Part I

The activists and protestors



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1 Austria

Excellencies, the recent years have brought about a renewed focus on climate change and energy. In this context, I would like to underline – once again – that Austria does not consider nuclear fission power as a sustainable way to generate electricity nor to fight climate change.

(Ambassador Peter Launsky, September 2021)¹

Introduction: Austrian anti-nuclearism

As a small, neutral, non-nuclear state with comparatively few military and strategic capabilities, Austria was not considered a major player in the First and Second Nuclear Ages. However, Austria's rapidly increasing influence as an Activist and Protestor against nuclear weapons in the emerging Third Nuclear Age is so significant that it warrants special consideration within this volume. Austria has emerged as perhaps the most significant driver of anti-nuclearism, leveraging all the tools at its disposal to ensure that this norm against both nuclear weapons and nuclear energy becomes entrenched. Austria's support for the Treaty on the Prohibition of Nuclear Weapons (TPNW) can be understood within this wider context of total anti-nuclearism. In this regard, Austria is representative of wholly anti-nuclear states such as Ireland, Malta and New Zealand that consider the reliance on nuclear weapons (for security) or nuclear energy (for development) as inherently risky.

As a direct result of the geopolitical contestations between the Soviet Union and the United States in the First and Second Nuclear Ages, Austria was forced into a position of neutrality and has never entertained the idea of building nuclear weapons. Austria's consequent evolution into a state that embraces and projects the acquired identity of neutrality would eventually shape its responses to the pressures of the Third Nuclear Age. Austria is now one of the most influential advocates for the resurgence of the nuclear disarmament agenda, in part because of the accepted understanding that its neutrality does not provide any security guarantees in the case of nuclear conflict. As a result, Austria has sought to project its requirement for nuclear disarmament in the Euro-Atlantic through the advancement of the TPNW.

Austria's anti-nuclearism goes beyond the rejection of nuclear weapons and the practice of nuclear deterrence. It goes further to completely reject the consideration

of any large-scale civil uses of nuclear technologies for power generation. Austria has even occasionally projected its anti-nuclear stance on its neighbours. This wholly anti-nuclear identity of Austria is quite unique (even from many other anti-nuclear states), because unlike many of the states considered in this volume, changes in domestic politics are unlikely to alter their approach to nuclear politics. Ireland, for example, despite being a wholly anti-nuclear state that has prohibited the production of nuclear energy,² still considers policy debates regarding the feasibility of nuclear energy production in the country.³ In Austria, however, all political actors, from right to left, are decidedly anti-nuclear, as is the electorate.⁴

Ultimately, the significance of Austria in the Third Nuclear Age is twofold: it is an influential Western state without nuclear weapons that is firmly committed to global nuclear prohibition. In this vein, it leverages its significant economic and political resources to support non-state advocacy for nuclear disarmament. Secondly, it rejects the notion that there can be any benefits of developing civil nuclear technology for power applications, and maintains its opposition to the emerging pro-civil nuclear discourse that prevails in the Global South. Taken together, Austria has emerged as one of the incontrovertible proponents of nuclear disarmament, as it is not hindered by an accompanying requirement to secure access to nuclear technologies for developmental gain.

The threat of technological diffusion and proliferation

The transition to the Third Nuclear Age is shaped in large part by the spread of advanced conventional capabilities and nuclear-armed states embarking on nuclear modernisation programmes. The emerging nuclear age will also likely be characterised by an increased number of states pursuing nuclear energy programmes, especially in the Global South.⁵ Austria is particularly interesting to analyse because it perceives these trends of technology diffusion as threatening to its own territorial sovereignty and security. For the past five decades, Austria's opposition to nuclear weapons and civil nuclear energy has intensified even as these technologies have become more widespread.

Unlike other neutral European states (or other states we classify as Activists and Protestors), Austria's vehement opposition to nuclear technologies for civil uses sets it apart from the majority of anti-nuclear *weapons* states that support the TPNW. Most anti-nuclear weapons states actually perceive nuclear technologies for civil uses as a separate issue entirely.⁶ In Austria, however, this opposition to nuclear technologies emanates from highly influential civil society and grass-roots organisations. In this regard, government officials and representatives reflect the popular sentiment of the electorate, and pro-nuclear policy is extremely controversial.⁷ Opposition is so strong in Austria that neighbouring states have been affected by it. Switzerland was forced to abandon the construction of the Ruthi power plant and decommission others as a result of significant protests from the Austrian people.⁸ Similarly, the Zwentendorf nuclear power plant, which was completed in the 1970s, never entered into service as a result of popular opposition to nuclear energy, reflected in a referendum.⁹ Austria even brought a case to the European

General Court against the European Commission over Hungary's Paks II nuclear power plant in 2018.¹⁰ And, the government of Austria opposes the EC's decision to label nuclear power as "green" in the EU taxonomy.¹¹ In 2022, the mayor and citizens of Linz (Austria's third largest city) took to the streets to protest plans to build nuclear reactors in Temelin (a neighbouring Czech Republic town).¹²

Historically, Austria's opposition to everything nuclear is a consequence of the geopolitical interests of the major powers in the early years of the Cold War. After World War II, Austria was partitioned and occupied by France, the Soviet Union, the United Kingdom and the United States. It was re-established as an independent state in 1955, but this was contingent on its commitment to remain neutral and independent of any military alliances. The Austrian commitment to neutrality was a guarantee that neither bloc would be encouraged to utilise its territory as a staging point in any potential confrontation during the Cold War. The 1955 State Treaty *Österreichischer Staatsvertrag*, and the 1955 constitution prohibited Austria's possession of "special weapons" and constitutionally cemented its neutral status during the First Nuclear Age.¹³ More specifically, this prohibition of "special weapons" included atomic weapons, other weapons of mass destruction, self-propelled or guided missiles, torpedoes, submarines and a whole raft of military capabilities.¹⁴ The possibility that Austria could host any foreign military bases within its territory was also made constitutionally illegal. This partially explains why Austria has refrained from leveraging militarised technological capabilities to seek strategic advantage in the emerging nuclear age, as is the case for many other European states. Instead, Austria actively engages with other like-minded states, such as Switzerland and Ireland, in multilateral fora to prohibit the weaponisation of new and emerging technologies, including autonomous systems and drones. For example, in 2018, Austria led calls for the negotiation of prohibitions of autonomous weapons systems.¹⁵ This advocacy is based on the principle of humanitarian disarmament, as Austria seeks to refocus perceptions of military capabilities on their humanitarian impacts, and to highlight the protection of civilians during conflict.¹⁶

Taken together, Austria is a highly motivated player with historically situated principles of active neutrality and an aversion to nuclear technologies. The type of technological change and strategic modernisation that characterises the emerging nuclear age is in stark contrast with its preferences. As a result, Austria appears increasingly motivated to disrupt many of these trajectories in favour of an alternative vision of security and development which is decoupled from military and nuclear capabilities.

Demilitarising geopolitics

Despite the initially enforced nature of its geopolitical neutrality, over time Austria has internalised this concept. Austria's response to a changing geopolitical environment in the Euro-Atlantic, characterised by the recent return of great power hostility between NATO and Russia, is rather distinct. Domestic politics have spurred government decisions to pursue a more active version of its neutrality pledge,

with Austria seeking mediation roles between the United States and Russia on a number of issues to influence its immediate strategic environment.¹⁷ In this sense, Austrian policy elites seek security through extroverted advocacy for non-military solutions, and they prioritise the quest for multilateral diplomatic resolutions to security issues. As the Federal Ministry makes clear:

Nuclear disarmament, the non-proliferation of nuclear weapons and ultimately a world free of weapons of mass destruction are a priority of Austria's foreign and security policy. Austria takes the position that only a generalised abandonment and condemnation of such weapons can put a halt to their proliferation and the inherent risks and catastrophic humanitarian effects of using them. In support of the international efforts to eliminate nuclear weapons, Austria, like many other States, stresses the humanitarian impact of these weapons.¹⁸

Austria actively perceives other states' reliance on nuclear weapons as an existential security risk. This perception is historically situated, as it was firmly established during the Cold War. At the time, Austria was uniquely exposed to any potential tactical or strategic nuclear exchange between the East and West, as it was geographically and politically sandwiched between Soviet-US strategic "blocs." Recent research into both Soviet and US nuclear weapons targeting priorities demonstrates Austria's vulnerable position. Vienna remained a priority target for Soviet nuclear weapons, and STRATCOM's targets included cities in Hungary and Czech Republic within 60 kilometres of Austrian territory.¹⁹

The end of the Cold War did not necessarily improve Austria's security disposition, as it remained sandwiched between NATO and post-Soviet states. As a consequence, Austria sought to pursue a policy of active neutrality as a means to reclude itself from nuclear confrontation. Even though Austria favoured economic integration with the EU (which it joined in 1995), it ruled out the possibility that it would join NATO in 1998.²⁰ In 1999, Austria also sought to assert its "right" to abstain from potential nuclear conflict by declaring itself a non-nuclear territory in its "Federal Constitutional Act for a Nonnuclear Austria."²¹ However, its membership in the EU has meant that practically it engages with the common European foreign and security policies, which are somewhat synergistic with those of NATO.²² So while Austria has refrained from joining NATO, it has remained affiliated with NATO's partnership for peace (PfP) programme.²³ Austria has also routinely contributed a very small force for NATO overseas deployments.²⁴

The Russian invasion of Ukraine has caused dramatic realignments of historically neutral European countries like Sweden and Finland, both of whom subsequently decided to join NATO. Former Swedish Foreign Minister Carl Bildt stated in March 2022 that "There is no way back to a past of illusory neutrality," indicating his government's change of perception.²⁵ Nevertheless, Austria has rejected any speculation that it might follow this trend. Instead, it has proposed closer cooperation with other like-minded European states (Ireland, Malta and Cyprus) to develop a coordinated mediation strategy. Klaudia Tanner, Austria's defence minister, expressed her hope that this "neutral quartet" could someday mediate

peace between Russia and Ukraine.²⁶ However, because Austria has participated in Western sanctions on Moscow, Russia has rejected any prospects of Austrian mediation.²⁷

Convening the rejection of nuclear weapons

Austria is representative of a growing number of states that seek to reorganise the architecture of the global non-proliferation regime, with the NPT at its core. In this regard, the status quo nuclear order, which has, in the Austrian elite view, represented the preferences of a small group of nuclear-armed states and their allies, is being increasingly challenged in the emerging nuclear age.

At the heart of this dynamic, Austria is facilitating a discursive shift in the perceived role of nuclear weapons. This perception frames nuclear weapons not as providers of security but as significant security risks, which threaten humanity as a whole. This *humanitarian* narrative is being increasingly accepted, as there is growing distrust in the established systems of nuclear deterrence that have existed amongst nuclear armed adversaries. In the words of Austria's permanent representative to the UN, George-Wilhelm Gallhofer, in 2017: "In this period of ongoing geopolitical realignment, the States currently possessing nuclear weapons seem to be even less prepared to disarm, and one State even more eager to acquire these weapons."²⁸ In this regard, the worsening geopolitical environment, the return to violent great power competition characterised by (almost) explicit threats to resort to nuclear violence, and the weakening of the arms control architecture, all contribute to anti-nuclear states' anxieties about the ability of the existing architecture to manage nuclear risks.

Austria's advocacy has been central in refocusing discussions about nuclear weapons and their humanitarian impacts.²⁹ From the humanitarian perspective, the lasting impacts of nuclear weapons' use on humans and impacts which transcend the temporal confines of initial nuclear use by severely affecting future generations of nuclear conflict survivors greatly outweigh any proposed justifications for their use. In line with its active neutrality policy, Austria also advocates for the consideration of the cross-boundary, perhaps global implications of nuclear weapons use on the immediate environments and the wider climactic changes that arguably will follow a strategic nuclear exchange. These potential cross-boundary impacts have cajoled an ever-increasing number of states to perceive even distant nuclear weapons use as directly impinging on their survival. The perspectives advocated by Austria are in stark contrast with the status quo that views security through nuclear deterrence as a sustainable dynamic.

The discursive shift towards humanitarian impacts has been accelerated by the increasing availability of information regarding the potential impacts of nuclear weapons use on humans and on the environment.³⁰ Much of this information has been sourced by civil society activists and academics, whose findings increasingly make their way into official nuclear policy discourses and multilateral negotiating forums like the NPT Review Conference and UN General Assembly.³¹ Austria provides the political and financial support required to facilitate such research into

humanitarian impacts and assists in transmitting these findings into official fora. In terms of political and financial support, since 2010, the Austrian government has established and continues to invest in think tanks like the Vienna Centre for Disarmament and Non-Proliferation to facilitate research into nuclear disarmament and associated issues.³² International Campaign to Abolish Nuclear Weapons (ICAN) and ICAN Austria have also been active beneficiaries of Austrian financial support to promote nuclear disarmament.³³ In terms of political support, Austrian backing was vital for the eventual inclusion of humanitarian language into the Final Document of the NPT Review Conference in 2010.³⁴

Similarly, Austria has actively facilitated multilateral discussions on humanitarian impacts. In December 2014, Austria hosted the third international conference on the humanitarian impacts of nuclear weapons (HINW), where it made commitments to “identify and pursue effective measures to fill the legal gap for the prohibition and elimination of nuclear weapons.”³⁵ This followed its parliamentary decision earlier that year to actively pressure NATO to remove nuclear deterrence from its military doctrine.³⁶ The HINW conference yielded significant results, as the Austrian Pledge (subsequently renamed the Humanitarian Pledge), facilitated progress toward the eventual negotiation of the TPNW.³⁷ Following the entry into force of the TPNW in 2021, Austria hosted the first meeting of states parties to the treaty in Vienna. While there are ongoing discussions regarding the tangible security benefits of Austrian disarmament advocacy, several officials have highlighted the increased multilateral influence of Austria as a result. Some even point to “increased prestige” and recognition in the international community as a result of its efforts.³⁸

The NPT has been a central mechanism within which Nuclear Weapons States and Non-Nuclear Weapons States have managed their collective anxieties regarding the central threats of each nuclear age. However, in the Third Nuclear Age, the NPT is grappling with the fundamental question of whether the existing non-proliferation architecture remains fit for purpose. The increasing entropy of the existing non-proliferation architecture is apparent in the emergence of a nuclear threat environment that simultaneously encourages the increased reliance on nuclear weapons by the nuclear-armed states while encouraging a fundamental and accelerated rejection of nuclear weapons by Non-Nuclear Weapon States. The incompatibility of responses to this emerging threat environment has led states like Austria to propose the TPNW as a necessary extension of the existing architecture and one that is centred on extending the jurisdiction of International Humanitarian Law (IHL) to cover nuclear weaponry. The extension of IHL jurisdiction to nuclear weapons, brought about by the 1996 International Court of Justice advisory opinion on nuclear weapons, advised that nuclear-armed states were not exempt from adherence to IHL’s principles – principles such as the ability to distinguish between combatants and civilians, those of proportionality, military necessity and undue suffering.³⁹

However, as later chapters of this volume explain, the introduction of a nuclear prohibition treaty has been vehemently opposed by the nuclear-armed states and their allies, who view such a prohibition as indifferent to their subjective security

concerns and threat environments. Some nuclear-armed states have expressed interest in continuing engagement with the Humanitarian Initiative, but are cautious of the current coupling of the initiative with the TPNW. Austrian officials recognise the utility of this continued engagement with the nuclear-armed states and their allies and have been exploring ways to continue a Humanitarian Initiative that is independent of the TPNW.⁴⁰

Concurrently, Austria is at the forefront of efforts within the TPNW to address the security concerns of non-nuclear-weapon states. During the Second Meeting of States Parties in December 2023, Austria led initiatives to challenge the global security paradigm that relies on nuclear deterrence. The country has been instrumental in establishing a consultative process within the TPNW framework to articulate and promote the security perspectives of non-nuclear states. This process aims to highlight the humanitarian and environmental risks posed by nuclear weapons, juxtaposing these with the assumptions underlying nuclear deterrence.⁴¹ In this regard, Austria emphasises the need for a shift away from nuclear deterrence, arguing that it not only fails to provide genuine security but also increases global instability. The consultative process they are spearheading involves collaboration with various stakeholders, including the International Committee of the Red Cross, scientific experts and civil society, to develop comprehensive recommendations for future disarmament efforts.⁴²

In sum, it is clear that Austrian policy elites remain committed to a policy of neutrality, despite the emergence of a new nuclear age, which is characterised by the return to great power competition. This policy of active neutrality, as it relates to nuclear weapons, has led Austria to become one of the key drivers of nuclear disarmament within the Third Nuclear Age.

Conclusion: neutrality and anti-nuclearism

Neutrality and anti-nuclearism deeply influence the Austrian response to the security challenges of the Third Nuclear Age. Domestically, anti-nuclearism is so entrenched in the political psyche that this position is not up for reconsideration. Internationally, anti-nuclearism has created an important niche within which Austria has demonstrated an outsized influence on global politics and acquired immense prestige.⁴³

The wider geopolitical conflagrations of the emerging nuclear age are already rekindling existential discussions about the prospects of nuclear conflict and abolition. As a result, Austria has emerged as a key multilateral player, determined to facilitate the revision of nuclear order through the promotion of nuclear disarmament. Taking the overall implications of Austrian anti-nuclearism, the country has emerged to become one of the incontrovertible proponents of nuclear disarmament. Austria is representative of a growing number of states that seek to reorganise the architecture of the global non-proliferation regime, albeit still with the NPT at its core. It rejects the status quo nuclear order, which has historically represented the preferences of nuclear-armed states and their allies. However, Austria's anti-nuclear energy challenge to the established nuclear order sets it apart from many

other anti-nuclear states (and TPNW supporters), that view the spread of nuclear energy as one of the core benefits of the nuclear order writ large.

Notes

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2 Kazakhstan

As we know, due to the lack of progress in disarmament, the Treaty on the Prohibition of Nuclear Weapons has become an even more significant new reality. In the current situation, we believe that further advancing the Treaty seems to be the only right path. Likewise, we should build on our past and accelerate momentum for the speedy entry into force of the Comprehensive Nuclear-Test-Ban Treaty. We have to look for inspirational or critical moments as springboards for daring visions and pioneering initiatives, which is what Kazakhstan has always done.

(Ambassador Magzhan Ilyassov, August 2022)¹

Introduction: a multi-vectoral influencer

Kazakhstan is perhaps the least studied multi-vectoral power/influence-broker in the current nuclear order, but is nevertheless set to play an influential role in shaping the Third Nuclear Age. Part of this is historical. By relinquishing control of the extensive nuclear infrastructure, expertise and around 1,400 nuclear warheads left over from the Soviet Union in the 1990s and engaging extensively with the US-led Cooperative Threat Reduction programme and pursuing a non-nuclear armed path, leaders in Astana contributed to the management of proliferation risks and helped set a disarmament precedent in the Second Nuclear Age. This set the stage for Kazakh leaders to become champions of both nuclear power generation and a credible voice on non-proliferation and disarmament.

The policy elite in Astana have become champions for nuclear disarmament, and key driving forces behind initiatives such as the universalisation of the Comprehensive Nuclear Test Ban Treaty (CTBT), the entry into force of the Central Asia Nuclear Weapons Free Zone (Treaty of Semey). Additionally, they have leveraged experience with Soviet nuclear testing in support of the Humanitarian Impact of Nuclear Weapons (HINW) and the 2017 Treaty on the Prohibition of Nuclear Weapons (TPNW). Simultaneously, Kazakhstan benefits from being a significant player in the nuclear energy industry, which includes geological exploration, uranium production and uranium oxide powders and fuel pellets.² It also hosts the International Atomic Energy Agency (IAEA) Low-Enriched Uranium (LEU) Bank. Furthermore, its membership in both the Nuclear Suppliers Group

(NSG) and the Nuclear Exporters Committee (Zangger Committee) makes it a key player in the prevention of nuclear proliferation through multilateral export control regimes.³

However, contextualising Kazakhstan's role within the wider trend of disarmament norm entrepreneurs that are eager to challenge the established nuclear landscape obscures a much more complex reality. Kazakhstan is one of the few states that retains significant economic, military and/or strategic relations with Russia, the United States, China, the EU, NATO, CSTO and Iran, and security guarantees from both the United States and Russia. But by placing itself as a leading voice for nuclear disarmament, Kazakh elites are pushing for the sort of normative change that directly challenges the interests of the nuclear-armed states that guarantee the countries' security.

Thus, simply framing Kazakhstan as one of the major challengers to the current nuclear order is correct but also incomplete. Kazakhstan's significance lies in *how* it is responding to the changing geopolitical, technological and normative dynamics of the Third Nuclear Age.

Importance of nuclear technologies and fuel

The transition to the Third Nuclear Age is characterised by the role of technology and technological innovation in changing (and creating new) strategic missions, calculations and balances of power between actors across the nuclear order. But the dynamics of technological innovation can also be perceived with regards to non-weapon capabilities that have an impact on strategic missions, balances of power and calculations of nuclear security and risk. Although Kazakhstan possesses the largest defence forces of any of the central Asian states, it does not appear interested in advanced conventional weaponry. Instead, Kazakhstan's military doctrine orients its defence towards countering violent extremism and bolstering its border security.

The Kazakh approach to nuclear politics is encapsulated by H.E. Akan Rakhmetullin (then) First Deputy Minister of Foreign Affairs of Kazakhstan, in a speech at the Tenth Review Conference of the NPT:

I would like to point out the third pillar of the NPT, namely, the peaceful use of nuclear energy. By establishing the IAEA Low-Enriched Uranium Bank on its territory in 2017, Kazakhstan has made another significant contribution towards our common goal of safe and reliable use of uranium for peaceful purposes.⁴

Kazakhstan is responding to technological change in the emerging nuclear age by actively pursuing and housing innovative technologies that seek to bolster stability in the nuclear order and undermine future nuclear proliferation. At the same time, Kazakhstan continues its close cooperation with Russia and the United States, which has resulted in significant technological transfer and assistance to modernise its nuclear industry.⁵ Such technological cooperation has already yielded significant economic benefits. Kazakhstan accounted for 45% of the world's supply of uranium

in 2021 and has been the leading producer of U_3O_8 since 2012.⁶ Furthermore, its technological advancement has justified its membership in nuclear suppliers' clubs such as the NSG and the Zangger Committee.

Given the significant amount of HEU and associated nuclear technologies that remained on Kazakh territory during its formative years, countries like Pakistan and Iran considered obtaining Kazakhstan's nuclear material. Iran, for example, has continued using the prospects of cooperation in oil exports as an avenue to secure the kind of strategic partnership which would lead to nuclear cooperation with Kazakhstan. Although such a possibility seems highly unlikely today, overtures (and even subversive tactics by Iran) have always been a possibility.⁷ After all, Kazakhstan and Iran share a sea border via the Caspian Sea. The Kazakh city of Aktau, which housed the BN-350 fast breeder nuclear reactor⁸ is directly accessible by sea from Tehran.⁹ Pakistan, on the other hand, also regularly violated Kazakh airspace from the Caspian Sea when Soviet radar control centres inherited by Kazakhstan were rapidly dilapidating in the early 1990s.¹⁰ With these security considerations in mind, Kazakhstan's accelerated acquisition of military capabilities such as the Russian S-300PS SAM to boost its long-range air defence capability and its push to jointly produce military aircraft with European companies begin to make more sense.¹¹

However, the true impact of technological innovation vis-à-vis Kazakhstan's role in the Third Nuclear Age goes beyond its border security. Kazakhstan has become a key driving force behind initiatives such as the universalisation of the CTBT, which seeks to end all nuclear weapons testing. The universalisation of the CTBT is of particular importance to Kazakhstan, considering that the Semipalatinsk Test Site located within its borders, was the primary nuclear weapons testing site for the Soviet Union. Accordingly, Kazakh officials have contributed significantly to the technological innovation driving the verification of the nuclear test ban. Enforcing the global ban on nuclear tests relies on a global network of 321 hydro-acoustic, seismic and infrasound monitoring stations as well as 16 laboratories and an International Monitoring System (IMS) administered by the CTBTO.¹² Kazakhstan hosts numerous CTBT seismic stations and one infrasound station, which are uniquely designed to observe changes in atmospheric or earth conditions indicative of a nuclear test. Beyond site hosting, the calibration of the IMS is one area where Kazakhstan has actively contributed to the nuclear test ban effort by hosting several field experiments in its former nuclear test sites.¹³

Technology denial is also another means through which the role of technology has far-reaching implications for nuclear risks. The emerging nuclear age is likely to see an increase in the number of states pursuing nuclear energy programmes – especially in the Global South. The most immediate nuclear risk which would arise from such a dynamic would be that some states would pursue a complete nuclear fuel cycle, including particularly sensitive uranium enrichment capabilities. As the current crisis with Iran demonstrates, the proliferation of enrichment capabilities could become a major challenge in the near future, as such capabilities increase the ability of states to produce weapons-grade uranium for clandestine military programmes. Yet, many developing states (following the current accusations of

technology denial leveraged at nuclear supplier states) argue that the distribution of nuclear fuel is becoming increasingly politicised and that indigenous uranium enrichment capabilities will circumvent such politicisation of nuclear fuels. Kazakhstan's hosting of an IAEA-controlled depository for LEU fuel at the Ulba metallurgical plant seeks to lower the proliferation risk associated with uranium enrichment, by providing an alternative and safer source for states seeking to develop nuclear programmes.¹⁴

Alliance politics

Kazakhstan is one of the few states that maintain significant economic, military and strategic relations with Russia, the United States, China, the EU and Iran. These relationships have steadily developed as Kazakhstan, with extensive nuclear infrastructure inherited from the Soviet Union, became a primary source for proliferation concerns in the early Second Nuclear Age and a promising economic and strategic ally for all of the major nuclear states.¹⁵ Its relationship with the United States was primarily forged out of its cooperation with US policies on denuclearisation of post-Soviet states, and the United States was the first country to recognise Kazakhstan's independence.¹⁶ Cooperation was formalised through the 1992 Lisbon Protocol, the 1993 Safe Secure Dismantlement agreement signed between the United States and Kazakhstan, and the Nunn-Lugar Cooperative Threat Reduction programme. This enabled the joint development of frameworks for the destruction of Kazakhstan's nuclear weapons arsenal, the return of nuclear warheads (and their delivery systems) to Russia, the 1994 transfer of over 600 kilograms of highly enriched uranium to the United States (when Russia refused to accept the HEU for storage or processing) and the elimination of WMD-related infrastructure. Additionally, the United States offered Kazakhstan a vow of protection through the 1994 "Charter on Democratic Partnership between the United States of America and Kazakhstan," including some guarantees of security assistance in the event that Kazakhstan faced an external threat to its territorial integrity or political independence under Article V.¹⁷ Both states continue to maintain an "enhanced strategic partnership" today.¹⁸

Kazakhstan's relationship with Russia is extensive, as Russia continues to prioritise maintaining Kazakhstan as a close partner in *all* spheres. Relationships cover joint uranium enrichment and processing projects, joint ventures in mining and prospecting and significant military and economic partnerships. For example, Kazakhstan remains extremely reliant on Russia for Kazakh oil exports to other countries, with around 85% of its exports routed through Russia.¹⁹ Moscow retains control of the Baikonur Cosmodrome, where all of Russia's crewed spaceflights are launched.²⁰ In terms of strategic and military cooperation, Kazakhstan remains under Russia's military (and possibly nuclear) protection through its membership in the CSTO.²¹ Despite Kazakhstan's security arrangements with the United States, about 82% of Kazakh military equipment is of Soviet or Russian origin, with Kazakhstan remaining dependent on Russia for the maintenance, repair and

procurement of new equipment.²² Kazakhstan's military doctrines (published in 2000, 2007, 2011 and 2017) depict an increasing reliance on Russia as its preferred defence partner.²³ Some analysts suggest that Kazakhstan might even view the United States as an inconvenient partner in this regard.²⁴ However, it remains to be seen how the (relatively) new Kazakh President Kassym-Jomart Tokayev might influence this increasing alignment with Russia.

Kazakhstan's relationship with China, based on significant economic and energy cooperation (including the fabrication of nuclear fuels), has steadily grown since the establishment of the Kazakh-Chinese Committee for Cooperation in 2004.²⁵ This is a development that has piqued the interests of both Washington and Moscow in the context of an increasingly powerful China.²⁶ Kazakh leaders are also seeking improving relations with Iran,²⁷ South Korea,²⁸ Pakistan²⁹ and Japan.³⁰

Russia's invasion of Ukraine in February 2022 has plunged Kazakhstan into the centre of a geopolitical crisis. A month prior to the invasion, President Tokayev invited Russian troops (under the auspices of the CSTO) to quash popular unrest sparked by fuel price hikes in Kazakhstan.³¹ The swift and decisive deployment of over 2,000 Russian troops to Kazakhstan demonstrated the potential implications of Russian capabilities in the CSTO region. On the one hand, Tokayev's request for Russian troops illustrates his continuing dependence on Moscow's support for domestic stability. On the other hand, in light of the Russian invasion of Ukraine, many have expressed fears of an increasingly independent (and Western-aligned) Kazakhstan becoming Russia's next target as President Putin continues his nationalist expansionism in Russia's "near abroad."³² While it is unclear whether Kazakhstan's conundrum might further push it into the US's sphere of influence or compel Kazakh acquiescence, Kazakhstan continues to pursue the multi-vectoral strategy. While Kazakhstan has hardly condemned the Russian invasion of Ukraine in unambiguous terms, Tokayev has urged for restraint and compromise from both sides and has refused to recognise the independence of the separatist republics of Donetsk or Luhansk.³³ Russia's foreign minister, Sergey Lavrov, has indicated the possibility of hostile relations emerging between Kazakhstan and Russia by recently parroting unsubstantiated allegations of Kazakhstan jointly developing biological weapons with US finance.³⁴

Kazakhstan's strategy has made it deeply embedded in an emerging nuclear age which is characterised by intensifying great power competition. The progressively more complex global landscape, typified by the worsening relations between the United States, Russia and China, increasingly forces Kazakhstan into an uncomfortable and unenviable position where it might eventually have to unambiguously align with a great power. Unlike other multi-vectoral actors such as India (which is significantly more powerful and nuclear-armed), Kazakhstan's preservation of its strategic autonomy is much less certain in the emerging nuclear age. Given that Kazakhstan is an actor whose continuing cooperation with the United States is crucial for the denial of nuclear technologies to the South Asian "arc of proliferation," the loss of Kazakh strategic autonomy will have significant implications for the wider nuclear order.

Norm entrepreneurship

Kazakhstan has become a key driving force behind initiatives to restrain the impact of nuclear weapons, such as the CTBT.³⁵ It actively supported and signed the Central Asia Nuclear Weapons Free Zone, which was instigated by Uzbekistan in 1993.³⁶ Kazakh officials also leveraged the country's experience with Soviet nuclear testing in support of the Humanitarian Impacts of Nuclear Weapons initiative.

Kazakhstan has already played an important role in shaping the contours of the Third Nuclear Age due to its unwavering support for the Treaty on the Prohibition of Nuclear Weapons. Kazakhstan was one of the states that formally endorsed the humanitarian pledge in 2015, which called on states to “stigmatise, prohibit, and eliminate” nuclear weapons.³⁷ Kazakhstan has consistently voted in favour of the TPNW in the annual UN General Assembly resolution that considers the treaty.³⁸ Kazakh officials were also influential in the negotiation of the TPNW in 2017, which Kazakhstan signed in March 2018,³⁹ and ratified on 29 August 2019 – in a deeply symbolic move.⁴⁰ Having been subjected to Soviet nuclear testing from 1949 to 1989, the Kazakh people have shouldered the long-term human and environmental impacts of these tests.

Like other states that have suffered the impacts of nuclear testing, Kazakhstan views the TPNW as a forum where a community of states can operationalise victim assistance and environmental remediation. These are provisions which are unique to the TPNW, founded in the Humanitarian Impacts of Nuclear Weapons discourse concerning the human and environmental impacts of nuclear use. It is within this paradigm of remediation for nuclear weapons testing that Kazakhstan is regarded as one of the most significant advocates for nuclear disarmament. It has built a reputation upon the political capital and moral authority it gained from relinquishing its inherited nuclear arsenal and globally advocating for recognition of the harms suffered by its people from nuclear weapons.⁴¹ As one expert highlighted, “it’s not only a moral right for Kazakhstan to talk about it, but it is obligatory that we talk about it as we suffered from nuclear tests and we cannot keep silent.”⁴² While there are domestic victim assistance and environmental remediation programmes in the country, Kazakhs point to the necessity of international assistance in bolstering these programmes.⁴³

As part of its multi-vectoral foreign policy strategy, aimed at eliciting security guarantees for its continued existence in the nuclear hotspot that is Central Asia, Kazakhstan understands that these multilateral treaties – the CTBT, the TPNW and the Treaty of Semey – offer additional security guarantees. Guarantees that afford a degree of isolation from the nuclear deterrence relationships of its closest allies, the United States, Russia and China. Additionally, Kazakhstan understands that the HINW and TPNW both serve as amplification mechanisms, which allows it to engage in public diplomacy based on its past as a nuclear test subject. With Kazakhstan serving as the vice chair of the TPNW’s first meeting of state parties, it utilised this position to further push for the positive obligation provisions in Articles VI and VII of the treaty.⁴⁴ These provisions allow for other state parties

to assist Kazakh victims of nuclear testing, as its domestic assistance programmes are insufficient and have suffered from lack of resources. It remains to be seen how Kazakhstan might leverage this community of states in favour of putting pressure on Russia to provide increased assistance to victims of Soviet nuclear tests.

Taken together, Kazakhstan continues to proactively engage with all multilateral nuclear governance mechanisms, as it is a state that stands to benefit from the continuation of these mechanisms in the following ways: the TPNW and HINW offer the prospect of alleviating the immense financial burden it carries with respect to victim assistance and environmental remediation; the NPT offers a plethora of alliances and coalitions with developing and developed states; the IAEA through the LEU fuel bank increases its strategic and commercial importance in an emerging nuclear age characterised by an increasing dependence on nuclear energy; the CTBT provides security guarantees against future nuclear tests and offers an avenue for Kazakhstan to put its nuclear expertise to further use. In all, it is not far-fetched to argue that Kazakhstan seeks increasing integration into all spheres of the global nuclear governance architecture, as a multitude of allies and strategic partners, in a way, protects it from a loss of strategic autonomy to any one of its great power alliances.

Conclusion: shaping the normative nuclear order

Kazakhstan's significance to the Third Nuclear Age lies in *how* it is responding to the changing geopolitical, technological and normative dynamics of the current order. Normatively, Kazakh officials have consistently advocated for the end to nuclear weapons testing and have reaped significant results. This is reflective of the goals of those states which have suffered the harms of nuclear testing, such as Turkmenistan, Uzbekistan, Kiribati and the Marshall Islands.⁴⁵ Much like in other Activist and Protestor states, Kazakh political elites have engaged in extensive alliance building and multilateral diplomacy in support of nuclear disarmament. In this sense, it reflects the current trend of states challenging the accepted status quo of nuclear order.

Geopolitically, this snapshot reveals that Kazakhstan is significantly influenced by the growing multipolarity and diffusion of power in the emerging nuclear age. While simultaneously acting as one of the major challengers and upholders of the established nuclear order, the success of its multi-vectoral policy is dependent on a particular evolutionary track of nuclear order. One which sees the decline of great power competition, the strengthening of nuclear non-proliferation, a serious return to nuclear disarmament and the rise of civilian nuclear cooperation and development.

Given what we know about the evolutionary track of the emerging nuclear order, the re-emergence of great power politics threatens to restrict the strategic autonomy of Kazakhstan. However, given its significance to the stability of the non-proliferation regime, such a loss of strategic autonomy might not be in any of the great powers' interest.

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3 Republic of South Africa

South Africa's commitment to disarmament is based on our belief that international peace and security cannot be divorced from development. Global security cannot be achieved when enormous financial and other resources are still being diverted towards the acquisition of more and more destructive capabilities, while more and more people around the world continue to suffer from hunger and deprivation. Our ultimate goal is a world free of nuclear weapons and the Treaty on the Prohibition of Nuclear Weapons is an important addition to the disarmament and non-proliferation architecture, that takes us closer to that goal.

(Mr Alvin Botes, Deputy Minister for International Relations
and Cooperation of South Africa, June 2022)¹

Introduction: from proliferator to activist

In the early 1990s, the Apartheid South African government led by FW de Klerk dismantled the 6 nuclear bombs and associated weapons programme that had been built over the past decade and joined the non-proliferation Treaty (NPT) as a Non-Nuclear Weapons State. This would begin the transformation of the soon-to-be African National Congress-led South Africa from a major nuclear proliferation concern to a post-Apartheid central player in the global nuclear disarmament movement. South African officials would be instrumental in establishing the African Nuclear Weapons Free Zone (which came into effect in 2009) and in the agreement of the Treaty on the Prohibition of Nuclear Weapons (TPNW) in 2017. South Africa has also traditionally pushed and protested for the rights of developing and Global South states to secure access to nuclear technology for peaceful uses, including economic development. But at the same time, it has been reluctant to give up its stockpiles of enriched fuel and nuclear production facilities. This all suggests that South Africa will play an important role in contesting and shaping the Third Nuclear Age, not least due to its determination to retain control over nuclear fuel but also due to the “moral authority” that has accompanied the decision to disarm.

While the South African approach to nuclear security may have performed a *volte face* since the First Nuclear Age, many of the underlying drivers of South African foreign policy remain highly pertinent today. Perhaps most importantly,

while the Apartheid government sought close ties with the United States and the West, the ANC and other protest movements across Southern Africa increasingly found themselves drawn to the Soviet and non-aligned world. This in part explains the strong link with Russia today and perhaps explains the ANC's policy of resistance against what may be conceived of as a US-led Western nuclear order. Likewise, parallels can be drawn between the desire to build an indigenous nuclear capability in the past and the determination for strategic autonomy in nuclear technology today. These two dynamics underpin the South African approach not only to challenging established principles of nuclear deterrence and non-proliferation but also in actively working to bolster other partnerships, such as those with the "BRICS" countries, the Non-Aligned Movement (NAM) and the African Union. In this way, the role of South Africa in the Third Nuclear Age will be both as a disarmament norm entrepreneur – eager to shape the contours of the emerging global nuclear landscape to suit their security and ideological preferences – and as a key "middle power" balancing between the different poles within the global nuclear system.²

Capitalising on technological diffusion – a survival mechanism

Unlike during the First Nuclear Age, today the South African government finds itself in a relatively benign security neighbourhood beyond possible non-existential threats posed by non-state actors. While South Africa still has the largest defence budget in sub-Saharan Africa, military spending in real terms has stagnated for the past decade³; the defence industry faces severe liquidity challenges, and state-owned Denel remains unprofitable.⁴ While stockpiles of enriched nuclear material and a fairly advanced nuclear industrial base left over from the Apartheid years still exist, there is no consideration within South African policymaking circles about re-starting a nuclear weapons programme. Neither is there much interest in developing or procuring advanced non-nuclear military capabilities – beyond the maritime forces needed to counter piracy in the Indian and Atlantic Oceans.⁵ The major technological aspect of the Third Nuclear Age for Pretoria is therefore maximising the opportunities provided by technological diffusion for nuclear power generation and development rather than for weapons or hard security.

South Africa's nuclear infrastructure dates back to the 1960s as the then-Apartheid government sought advanced nuclear technologies from largely Western allies in return for uranium exports.⁶ In 1965, the South African Fundamental Atomic Research Installation (SAFARI-1) was established, under which South Africa acquired small quantities of highly enriched uranium (HEU) from the United States, and a small low-cost uranium enrichment programme began at the Valindaba plant in the 1970s.⁷ This laid the foundations for the weapons programme that began in the late 1970s⁸ and what is now (mostly) believed to have been a nuclear weapons test in 1979. The eventual production of six nuclear weapons, with aircraft deliverable warheads (by 1982), placed South Africa in the club of rogue nuclear-armed states.

A legacy of South Africa's (mostly) indigenous nuclear weapons programme is that the post-Apartheid government retained significant technical expertise, which was transferred to its civilian nuclear programme. For example, the SAFARI-I research reactor (which had been integral to South Africa's nuclear weapons programme) contained a HEU core. The reactor was only converted to utilise LEU in September 2008 – over a decade after the country's disarmament.⁹ This was an indicator that South Africa recognised and sought to retain the commercial advantages gained from its nuclear programme. The Nuclear Energy Corporation of South Africa (NECSA) confirmed this in its 2005 announcement, as South Africa manufactured HEU targets for the production of medical isotopes.¹⁰ As the George W Bush and Barack Obama administrations in the United States would subsequently come to realise, South African leaders had no intention of giving up the countries' HEU stockpiles, despite the sustained pressure from the United States.¹¹ Some US policy analysts have highlighted the significance of RSA's retention of its HEU stockpiles, pointing to the proliferation risks and the perceived ability of the country to secure this uranium.¹² However, RSA officials have responded to these comments by highlighting their NPT Article IV rights (occasionally, South African officials also highlight the even greater nuclear risks of United States and other nuclear-armed states' possession of actual nuclear weapons).¹³ While the risk of HEU theft remains a concern, Western attempts to confiscate this resource fail to account for RSA's desire to maintain its relative technological advantage.¹⁴

South Africa currently operates two nuclear power stations (at Koeberg) that, according to World Nuclear, produce approximately 5% of national electricity. Two further nuclear reactors are planned at Thyspunt.¹⁵ South Africa previously had the ability to produce nuclear fuel but currently procures enriched nuclear fuel from global markets (unlike most Global South and developing states, South Africa is a member of the Nuclear Suppliers Group¹⁶), but nearly half of this comes from Russia.¹⁷ However, as the 2020 Department of Defence Strategic Defence Plan makes clear (nuclear) self-sufficiency is becoming an important political issue again today in Pretoria.¹⁸

In comparison with other African countries, South Africa is significantly more advanced in terms of its nuclear technological capabilities and infrastructure. The foreign policy implications of this technological superiority are South Africa's hegemonic influence in its near-abroad. South Africa's nuclear diplomacy in Africa is premised on not only its history of nuclear disarmament but also its relative ability to encourage nuclear development on the continent through technology transfer and capacity development. While South Africa's standing is not directly premised on its possession of HEU, officials are reluctant to lose any potential technological advantages which might be gained from the discovery of new commercial applications of HEU in the future.¹⁹ South African officials also share the concerns of Brazil, Egypt and Argentina (to name a few) that relinquishing HEU to the United States might further bolster the understanding that uranium enrichment (and other fuel cycle) rights fall outside the guarantees of NPT Article IV. South African officials continue to encourage the increased spread of nuclear technologies for civilian use. This can be seen in the country's active participation in

hosting and supporting the African Commission on Nuclear Energy (AFCON) to enhance the spread of nuclear technologies to African states.²⁰

Geopolitical balancing: BRICS, NAM and the African Union

At the heart of South African foreign policy is a desire to counter the “unconstrained” and often “unfair” Western-led international order.²¹ This manifests in the increasing importance of South Africa’s relationships with the non-Western world, especially as part of its membership in the “BRICS” group (Brazil, Russia, India, China and South Africa), with the Non-aligned Movement, and as an influential voice within the African Union and on the African continent.²² South Africa’s minister for international cooperation and development (RSA’s equivalent of foreign minister) has argued for closer cooperation with other NAM members.²³ This contemporary preference for alternative non-Western alliance structures, and increasingly to challenge them in global multilateral forums, has important historical precedent: the United States and the West largely supported the Apartheid government during the First Nuclear Age, while the ANC sought support from the Soviet Union and other non-aligned states. This historical alignment and mistrust continue to shape South African geopolitical thinking today.

Like many Global South states, South Africa maintains significant economic, military and strategic relationships with the United States, Russia and China – regardless of geopolitical tensions between them.²⁴ Indeed, the South African Navy routinely carries out joint conventional military exercises with Russia, China, the United Kingdom and, until recently, the United States.²⁵ However, South Africa is unique from other Global South states in the sense that it formally engages in the various structures that comprise the BRICS group. The BRICS grouping represents around 41% of the global population and 24% of global GDP.²⁶ This grouping of states, involving countries that are united in their sustained contestation of US hegemonic influence on the global economy, simultaneously contains the most advanced non-Western states with nuclear technologies. It is projected that by 2040 the BRICS will account for over 45% of global energy consumption, and the countries have been pursuing enhanced intra-BRICS energy cooperation to safeguard energy security and economic development.²⁷ This energy cooperation has a significant nuclear dimension, with the BRICS “energy association,” including a nuclear fuel reserve bank, mooted at the inception of the BRICS’ New Development Bank.²⁸ It was within the auspices of BRICS cooperation that Russia and South Africa struck a \$76 billion nuclear energy deal, which was eventually scrapped in 2018.²⁹ BRICS countries have more recently signed a memorandum on nuclear cooperation.³⁰

In the wake of the Russian invasion of Ukraine in 2022, South Africa has been drawn into geopolitical debates about its continued cooperation with Russia. Prior to the invasion, South Africa’s various relationships with the nuclear-armed states had not raised discernible criticism. Its significant political, military and economic ties with Russia had not been called into question. However, the Russian invasion and the Putin regime’s thinly veiled threats to use nuclear weapons in

Ukraine increasingly jeopardise South Africa's longstanding position against nuclear weapons and its disarmament advocacy. For example, in the UN General Assembly, South Africa has consistently abstained from voting against Russia's ongoing invasion, even though their representatives regularly cite their concern for the "increased loss of life and the deteriorating humanitarian situation."³¹ Similarly, in the first meeting of state parties to the TPNW in June 2022, South Africa was among many African states that resisted the direct condemnation of Russia's nuclear threats.³² In the 23rd February 2023 UN General Assembly vote to demand Russia withdraw from Ukraine, South Africa again abstained. South Africa was simultaneously conducting joint naval exercises with Russia.³³ Much of South Africa's contemporary behaviour, however, appears confusing and inconsistent, without an appreciation of its recent colonial past.

South Africa's denouncement of Apartheid ideology and the historical allies of the Apartheid regime deeply influenced its foreign policy interests, preferred partners and behaviour in the Third Nuclear Age.³⁴ During Apartheid, the Cold War rivalry between the United States and the Soviet Union took place within a Southern African context where white minority rule was commonplace in the region. Rhodesia, Mozambique, Angola and South-West Africa all practiced variations of Apartheid. On the one hand, white minority governments in Southern Africa sought support from Western bloc countries.³⁵ On the other hand, liberation movements aligned with the Soviet Union, with Moscow providing weaponry and financial assistance to many of these organisations in an attempt to combat the activities of the United States and China in the Southern African region.³⁶ Thus, Southern Africa was the site of numerous conflicts which attracted interventions from both superpowers, as well as from states aligned with either the eastern or western bloc.³⁷

The eventual liberation of South Africa from Apartheid rule and the entry into power of the African National Congress party meant that Cold War allies of the ANC maintained deep and lasting connections with the post-Apartheid leadership. As academic Jo-Ansie van Wyk has suggested, "the trauma of colonialism, but then also the joy of support that South Africa received [from Russia] ...influences the way that South Africa considers the geopolitical landscape"³⁸ Likewise, Isabel Bosman argues that although "pre-democracy" South Africa was "stronger leaning towards the western bloc, alignment with Russia is becoming a not-so-subtle balancing act."³⁹ This is evidenced in the numerous statements of support and justification offered by the South African government regarding their continuing partnership with Russia despite the war. For example, South Africa's Minister for Foreign Affairs, Naledi Pandor, responded to criticism of South Africa's refusal to comply with Putin's arrest warrant issued by the International Criminal Court by stating:

there are some who don't wish us to have relations with an old historical friend. We have made it clear, that Russia is a friend and that we have had cooperative partnerships for many many years, including partnerships as we combatted the apartheid regime.⁴⁰

Lieutenant-General Siphwe Sangweni also defended South Africa's continued military partnership with Russia by stating that "Yes, there will be other countries who feel differently in how we have approached this, but... all countries are sovereign nations and have a right to handle things (as) they see fit."⁴¹

In sum, South Africa simultaneously maintains its strategic relationships with Russia, China and India while continuing to support global nuclear disarmament. It is a complex balancing act of somewhat conflicting interests, and one which will perhaps become ever starker as the Third Nuclear Age unfolds.⁴²

A protestor and norm entrepreneur

South Africa seems set to play a significant role in the Third Nuclear Age as a protestor against the established nuclear order, and particularly against the hegemonic position of nuclear deterrence and non-proliferation as central tenets of that order. At the same time, South Africa will be reflective and indicative of a large group of states that are concerned about the breakdown of strategic stability and arms control (such as the NAM), frustrated by the perceived lack of commitment to nuclear disarmament by the nuclear-armed states, and instead seek to propose new mechanisms and arrangements to manage the nuclear condition. South African security policy will also be driven by a determination to secure the rights for civilian technology transfer and use in the Global South and developing world – resetting the relationship between access to nuclear technology and nuclear security. But at the heart of South African policy will be a commitment to secure "strategic autonomy." Its contemporary reputation as a norm entrepreneur at the forefront of nuclear disarmament advocacy is connected to its historical experience of dynamic engagement with the global nuclear order.

When observing RSA's engagement with the nuclear order, there are many "firsts" to consider. South Africa was a founder member of the International Atomic Energy Agency (IAEA) in 1967 and was part of the Eight Nation Negotiating Group that negotiated the IAEA treaty text in 1955.⁴³ It remained active in IAEA founding negotiations as part of the eighteen-state Preparatory Commission until the IAEA's formal establishment in October 1957.⁴⁴ It was the first African state to be elected on the IAEA's board of governors, the first to be temporarily suspended from the agency,⁴⁵ the first to explore civilian uses of nuclear technology on the African continent,⁴⁶ the first to acquire nuclear weapons on the continent, and the first nuclear-armed state to unilaterally dismantle an indigenously developed nuclear weapons programme.

The verification of the disarmament of the South African nuclear weapons capability took place between November 1991 and September 1993 when the IAEA carried out several inspection missions to confirm the irreversible destruction of the programme.⁴⁷ This accompanied a reorientation of South African politics towards championing nuclear disarmament by leveraging its newfound moral authority gained by being the only state to have indigenously developed and dismantled a nuclear weapons programme.⁴⁸ Many scholars have documented this period in

terms of South Africa's departure from its reliance on nuclear weapons as a security guarantee.⁴⁹

South Africa has become an outspoken supporter of nuclear disarmament, nuclear technology transfer and stronger non-proliferation mechanisms. It has effectively leveraged its authority on issues of nuclear disarmament to increase its political footprint in the non-proliferation regime. Serving as the crucial link between the New Agenda Coalition, the TPNW core group, the Humanitarian Initiative core group, the IAEA Board of Directors, the African group of states and AFCONE (headquartered in Pretoria), RSA has found unprecedented access and influence. RSA as a global player in the nuclear order has been succinctly summarised by Jack Boureston and Jennifer Lacey:

Taking advantage of an unusual nuclear history; an innovative, domestic nuclear power industry; and strong ties with other strategic countries, South Africa is emerging as a crucial bridge between developed and developing countries on nuclear issues. South Africa's outspoken support for "all" country's rights to develop nuclear technologies for peaceful purposes and its renewed interest in developing its own nuclear fuel cycle puts it at center stage in non-proliferation debates. At the same time, its record as the only country to develop its own nuclear weapons and then renounce them has allowed it to challenge the nuclear-weapon States to meet their disarmament commitments under the nuclear Nonproliferation Treaty.⁵⁰

South Africa's advocacy for nuclear disarmament through its promotion of the TPNW is indicative of a fundamental change in the relevance of the NPT as the cornerstone of the global non-proliferation and disarmament regime. While South African officials continue to uphold the NPT's centrality on issues concerning non-proliferation and peaceful uses, the country strongly supports the TPNW as the primary forum within which nuclear disarmament can be pursued. However, South African support for the TPNW is hinged upon the understanding that the treaty would not infringe on their NPT Article IV rights. At the TPNW's negotiating conference in 2017, South African Ambassador Jerry Matjila stated that:

in our view, a prohibition treaty should not impose new obligations on state parties that go beyond their obligations under the NPT...In addition, nothing in the new instrument should impose any restrictions on the inalienable right of states to nuclear energy for peaceful purposes.⁵¹

However, South Africa went on to demonstrate the importance it attached to the TPNW when then President Jacob Zuma signed the treaty at a high-level ceremony in September 2017.⁵² South Africa became the 22nd state to ratify the TPNW in 2019 and vocally supported the entry into force of the treaty at the 2021 session of the UN General Assembly, calling the treaty "one of the most important developments towards nuclear disarmament."⁵³

South African officials have consistently facilitated the universalisation of the TPNW in Africa. Following the First Meeting of States Parties to the TPNW, South Africa was nominated (alongside Malaysia) as co-chairs for the treaty's informal working group on promoting the universalisation of the TPNW.⁵⁴ It has twice co-hosted regional conferences encouraging African states to join the treaty, gathering over 35 state participants in 2018 and 37 states in 2023.⁵⁵ In the emerging nuclear age, South Africa is expected to become an increasingly ambitious supporter of nuclear disarmament through the TPNW, even as it deepens its strategic engagements with non-western alliances such as the NAM, AU and BRICS.

Conclusion: shaping the contours of the global nuclear order

The pathway to security for South African policy elites in the Third Nuclear Age is not through the development of novel weapons or shoring up alliances with a security guarantor, but rather seeking strategic autonomy and challenging the contours of the prevailing global nuclear order. In its role as a champion of nuclear disarmament, a defender of nuclear technology transfer, and a key member of several influential non-Western “blocs,” South African actions will play a significant role in shaping the unfolding global security environment.

South Africa's position at the intersection of nuclear disarmament and nuclear energy has been leveraged in ways designed to revise some contours of nuclear order. But by striving to simultaneously maintain its strategic partnerships with the BRICS, NAM and AU and continuing to support global nuclear disarmament, the inconsistencies of its complex balancing act may become more visible in an emerging nuclear age characterised by increased geopolitical competition.⁵⁶ In the meantime, RSA's commitment to mainstreaming nuclear disarmament through its advocacy for the TPNW and other multilateral treaties continues to have a significant impact on the evolution of global nuclear order norms. RSA represents an overwhelming number of states (mostly from the Global South⁵⁷) engaging with the emerging nuclear order that seek to accelerate the pace of nuclear disarmament while simultaneously encouraging the diffusion of nuclear technologies for developmental purposes.

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4 Indonesia

We cannot let disarmament take a dangerous step backwards... [But] We must bear in mind that the inalienable right of States to develop nuclear technology for peaceful uses should be preserved.

(Deputy Foreign Minister Mr. Tri Tharyat, August 2022)¹

Introduction: from Sukarno's bomb to disarmament activist

Research into nuclear energy in Indonesia began in the 1950s as part of the US-led Atoms for Peace programme, and in the 1960s, under the leadership of President Sukarno, the government briefly explored the possibility of acquiring a nuclear bomb.² However, following the demise of the Sukarno regime, the new Indonesian government moved quickly to place Jakarta at the heart of the emerging nuclear governance architecture, signing the Non-Proliferation Treaty (NPT) in 1970 as a Non-Nuclear Weapon State and being the first member of ASEAN³ to sign the International Atomic Energy Agency's (IAEA) Additional Protocol in 1999. While Indonesia has traditionally sought to support the established global nuclear governance architecture centred on the NPT and the Comprehensive Test Ban Treaty (CTBT), policy elites in Jakarta have become frustrated at the lack of progress towards Chemical, Biological, Radiological and Nuclear disarmament, and Indonesia emerged as a strong supporter of the Treaty of the Prohibition on Nuclear Weapons (TPNW) and an advocate of expanding Nuclear Weapons Free Zones. Indonesian representatives have consistently called for more progress on nuclear disarmament in international forums. At a Conference on Disarmament meeting in February 2023, Foreign Minister Retno Marsudi warned that, "Without decisive concrete action, a nuclear disaster is only a matter of time, and this risk is getting bigger as the major powers rivalry intensifies."⁴

Officials in Jakarta are conscious of the growing challenge to Southeast Asian strategic stability as a result of global great power competition, particularly between the United States and China. This may be a reason for the ongoing modernisation of Indonesian conventional military forces, particularly new diesel-electric submarines, to guard Indonesia's substantial, congested and increasingly

contested waterways and littoral borders. Membership in ASEAN remains essential to Indonesian security policy, as do relations with the United States, China and Russia – although policy elites have been careful to balance the different benefits of these partnerships. One component of these partnerships is to maximise technology transfer as part of the quest for “Net Zero,” including by utilising nuclear technologies, but at the time of writing, no nuclear power plants have been built. That said, alongside many other members of the Non-Aligned Movement (NAM), Indonesian officials are strong supporters of Article IV rights (of the NPT) of members to access the benefits of nuclear technology.

Net Zero and conventional deterrence

The main technological aspect of the Third Nuclear Age for policy elites in Jakarta is how to advance Indonesia’s interest in civilian nuclear technologies. As the fourth most populous country in the world (approximately 280 million people in 2023), and with a population spread across several thousand islands, Indonesia’s energy demands are significant and diverse. Given that the climate agenda is also important in Indonesian domestic politics, nuclear energy is seen by some as a relatively quick fix. However, it is only one component of a larger strategy to use the latest “green” technologies to achieve Net Zero.

Indonesia has operated nuclear research reactors since the 1960s (the TRIGA). As of today, there are three operating nuclear research reactors in the country – one outside Jakarta, one in west Java and one in central Java. These were formerly run by the National Nuclear Energy Agency of Indonesia (BATAN), which is now part of the National Research Innovation Agency.⁵ As part of this infrastructure, BATAN previously had access to highly enriched uranium for a medical research programme – but all HEU was down-blended to LEU in 2016.⁶ While successive governments have explored the possibility of nuclear power generation, Indonesia has not yet built a nuclear power reactor. However, this appears to be changing as the Indonesian government seeks to develop a cleaner energy mix for sustainable development. In May 2022, the government announced that it aims to build nuclear plants capable of producing 35 GW of power by 2060 and that the first new power plant was planned to be on line by 2040. Integrated Nuclear Infrastructure Reviews have been initiated with the IAEA, and the government appears to be carefully putting in place all the necessary regulation and safeguarding infrastructure for a future nuclear capability.

At the time of writing, it is unclear exactly what the Indonesian civil nuclear capability will look like. The Russian state-owned corporation Rostom has reportedly offered to supply Indonesia with “floating power plants”; a United States-Indonesia strategic partnership has been initiated to help develop the nuclear programme – deploying small modular reactors (SMR),⁷ while Jakarta has also established nuclear cooperation deals with South Korea and Australia. According to World Nuclear, Indonesia has “a greater depth of experience and infrastructure in nuclear technology than any other country in southeast Asia.”⁸ However, part

of the reason for the delay in agreeing a nuclear powerplant deal is that there is a powerful anti-nuclear lobby in Indonesia.⁹ Part of the reason for this is the impact of the nuclear disaster at the Fukushima plant in Japan in 2011, especially for a country that is situated in the “Pacific ring of fire” where earthquakes and other seismic events are commonplace. It is also linked to the power of the domestic “coal lobby.”

While Indonesia may not have any obvious or immediate military security concerns, geography is important when thinking about national security policy, and officials are worried about the deterioration of the regional security environment.¹⁰ This is why the Navy currently operates a fleet of diesel-powered submarines to protect the archipelago¹¹ and why the government has embarked on what has become known as the “Minimum Essential Force” plan.¹² Evan Laksmana has described this project as a “retail approach to defence modernization,” which will include purchasing Rafael, F15 and Mirage combat aircraft, UAVs, frigates and several new submarines.¹³ While none of these platforms may quite fit the advanced conventional weaponry category looked at in the Technological Transformers section of this book, the Indonesian military is set to buy the 290 km range Brahmos supersonic cruise missile from India;¹⁴ the 280 km-range Khan SRBM, a multi-layered air defence system; and possibly the Atmaca airship cruise missile from Turkey,¹⁵ and has an ambitious space programme (including previous experience with solid fuel surface-to-air rockets such as the RX family of boosters).¹⁶ This expanding defence expenditure could be seen as a response to Chinese maritime presence in the South China Sea (Indonesia’s Exclusive Economic Zone expands 370 km from its shores), but it is perhaps better understood as a longer term recapitalisation of the conventional military and to the strategic importance of the Southeast Asian region to great power competition.

There is currently little concern about an Indonesian nuclear weapons programme – Jakarta is fully signed up to IAEA monitoring, including the Additional Protocol, the CTBT and most other non-proliferation mechanisms, and is a signatory of the TPNW. But some experts speaking off-the-record have cautioned against assuming this may always be the case if the regional security context worsens markedly in the future.

Balancing strategic partnerships: multi-alignment

Indonesia sits at the heart of a region that is likely to be a major arena of great power competition in the Third Nuclear Age, given its proximity to China and India and many US allies. But as a “middle power,” Indonesian elites have limited agency over shaping the material contours of the global nuclear order. Instead, its foreign policy seeks to balance a series of relationships with different actors in the region, and as researcher and Indonesian diplomat Felicia Yuwono described it, assert “normative” or “symbolic” power on the global nuclear environment.¹⁷ Outside of ASEAN, scholar Huong Le Thu has suggested that rather than non-alignment, Indonesia and many other states across Southeast Asia can perhaps be best thought of as seeking “multi-alignment” – maximising the benefits of a range

of different relationships and partnerships.¹⁸ Or as Evan Laksmana has described it, “pragmatic equidistance.”¹⁹

While there are no immediate (external) security threats to Indonesia, there is a recognition of growing Chinese influence to the north and that the South China Sea is likely to be a major area of United States-Chinese competition in the near future. The Indonesian response is centred on its membership in ASEAN (it was a founder member in 1967) and a series of partnerships with other actors in the region through its “concentric circles.” The Widodo government (2014–2024) also took a leading role in shaping a common ASEAN outlook towards the Indo-Pacific and to the United States-China rivalry in particular.²⁰ However, it is unclear what the election of Prabowo Subianto as president in 2024 will mean for Indonesian foreign policy priorities.²¹

A key component of Indonesian regional security policy is seeking to reinforce the principles of the Southeast Asia Nuclear Weapons Free Zone (SEANWFZ) (which was established in December 1995) that straddles the Southeast Asian region. However, despite pressure from Jakarta, none of the nuclear-armed states have signed the protocol not to use nuclear weapons within the NWFZ (although Chinese officials have signalled an interest in signing²²). Given the strategic location, it is likely that nuclear-armed submarines regularly transit through Indonesian waters, and there is a concern amongst ASEAN members about the possibility of nuclear accidents.

China is increasingly a major economic partner for Indonesia, but the relationship is tinged with a sense of suspicion about Chinese interests in the Southeast Asia region. Indeed, in 2016, there was a fairly high-profile dispute over Indonesia’s exclusive economic zone.²³ At the same time, Indonesia has carried out military drills and exercises with the United States, Australia and Singapore – but these stop short of formal alliances. As part of the “pivot to Asia” – US officials ostensibly hoped that Indonesia would become the “maritime fulcrum” in the region, but Jakarta has been careful not to side too closely with the West. However, Indonesian armed forces participate in the Super Garuda Shield multilateral training exercises with the United States, Australia, France, Japan, Singapore and the United Kingdom.²⁴

Indonesian leaders are more comfortable working with the United States when Washington’s approach towards China is seen as being less confrontational.²⁵ This all feeds in to an overarching interest in managing the growing security pressures in the region and seeking to maintain some sort of stability in Southeast Asia.

Disarmament advocacy

Indonesian leaders’ interest and activism in curbing nuclear risks and proliferation can be traced back to the Non-Aligned Movement’s Bandung conference in 1955, and despite the Sukarno regimes’ brief interest in acquiring a nuclear weapon, Jakarta has been a vocal supporter of nuclear disarmament since the 1970s. The Indonesian government was a major force behind the establishment of the SEANWFZ (known also as the Treaty of Bangkok) agreed in 1995.

However, Indonesian officials have become concerned about the lack of progress by the 5 recognised Nuclear Weapons States in their commitment to disarmament under the NPT. This probably explains the willingness to engage with the TPNW – although Indonesia remains committed to the central bargain at the heart of the NPT, and the official line is that the two are complementary rather than antagonistic. At the same time, a key policy plank for the government is to use ASEAN to strengthen and expand the influence of NWFZs, and the SEANWFZ in particular.²⁶

Officials in Jakarta were particularly concerned about the announcement that Australia would be allowed to build and operate nuclear-powered submarines under the so-called AUKUS agreement between Australia, the United Kingdom and the United States, unveiled in 2019.²⁷ This agreement was seen as not being in the spirit of the NPT, risked setting a dangerous precedent that others may follow and was further evidence of proliferation of “double standards” by the west.²⁸ There was also disappointment that this plan was not discussed as part of the Lombok Treaty agreement between Indonesia and Australia.²⁹ In a submission to the delayed 2022 NPT Review Conference, the Indonesian delegation noted their growing concerns about the use of HEU for nuclear submarine propulsion (in an assumed reference to the AUKUS deal – although this was not directly referenced).³⁰ This appears to feed into a broader concern about the unfair and restrictive nature of the current non-proliferation regime. This is probably why Indonesia has been sceptical about export-control related mechanisms such as the Proliferation Security Initiative and UN Security Council Resolution 1540.³¹

While Indonesia may still not have made a concrete commitment to build nuclear power plants, the government remains strong supporters of the right of all countries to access nuclear energy for peaceful purposes. This is often coordinated through the Non-Aligned Movement. For example, in October 2016, Deputy Permanent Representative to the United Nations, Ambassador Hagniningtyas Krisnamurthi, delivered a statement on behalf of the NAM at the United Nations which made it clear that: “[The NAM] is of the firm belief that non-proliferation policies should not undermine the inalienable right of States to acquire, have access to, import or export nuclear material, equipment and technology for peaceful purposes.”³²

Indonesia has coordinated the NAM working group on disarmament for over 25 years and is seen as a bridge-builder.³³ Indonesia signed the CTBT in 1996, but it was not until 2012 that the Treaty was ratified by the House of Representatives. Indonesia was a strong supporter of the Nuclear Security Summits hosted between 2012 and 2016,³⁴ co-sponsored the UN General Assembly Resolution to “convene in 2017 a United Nations conference to negotiate a legally binding instrument to prohibit nuclear weapons, leading towards their total elimination,”³⁵ and was one of the first 50 signatories of the TPNW in September 2017. Then President Widodo submitted the Treaty to the national legislature for ratification in late 2022.³⁶

More broadly, Indonesian policy elites continue to see real value in maintaining the current nuclear non-proliferation and governance structures and in trying to make them work. In a co-authored op-ed, former Indonesian Foreign Minister

Marty Natalegwa argued that, “The world needs more nuclear arms control, not less, and it needs states to fulfill their legally binding obligations on nuclear non-proliferation and disarmament.”³⁷ In this way, Indonesian engagement with the global nuclear order can be seen as quite traditional.

Conclusion: towards Nutopia

Indonesia is a classic example of a state without nuclear weapons that, nevertheless, sees itself as having an important role in shaping global nuclear debates. Traditionally, Indonesian politicians and officials have been strong supporters of global non-proliferation and disarmament efforts and norms centred on the NPT – and the political elite continues to see these as essential, even if imperfect.³⁸ Indeed, the Indonesian response to concerns about proliferation for non-weapon military uses embodied in the AUKUS agreement was to push for the creation of a new non-proliferation norm. But Indonesia is also representative of a large group of countries – many from the Global South and the NAM – frustrated with the lack of genuine willingness to reduce the risks posed by nuclear weapons and to work in good faith towards nuclear disarmament. However, Indonesian officials have made it clear that they see the NPT and TPNW as complementary and mutually reinforcing, not incompatible.

Indonesia is also a good example of a group of states that sees the potential of using nuclear technology for peaceful and developmental purposes. It seems likely that nuclear energy will play a role in meeting the Net Zero and developmental goals of the Indonesian government over the next few decades, and Jakarta also remains committed to the principle of secure nuclear technology transfer in general. In this way, it is reflective of a number of states from the Global South, and particularly across Southeast Asia and Africa, that seek to explore the possibilities of nuclear technology transfer while bolstering non-proliferation safeguards and the push for disarmament.³⁹ As Indonesian Minister of Foreign Affairs Retno Marsudi explained in a speech at the United Nations in 2023, two things must be done immediately:

First, create a world free of nuclear weapons. Therefore, the total elimination of nuclear weapons must be carried out and must be included in the important global agenda, including through the New Agenda for Peace proposed by the UN Secretary General in strengthening multilateralism and creating peace. Second, ensuring rights to nuclear energy for peaceful purposes. That is why robust collaboration in the application of nuclear technology such as for agriculture, health, and industry. This will contribute greatly to the achievement of SDGs Agenda 2030.⁴⁰

Acknowledgement

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5 Brazil

Nuclear weapons are not a source of security, but an instrument of mass destruction that denies our own humanity and threatens the continuity of life on Earth.

(President Luiz Inacio da Silva, May 2023)¹

Introduction: contesting the global nuclear order

Brazil is an instructive case study when it comes to thinking about the influence and nature of the Third Nuclear Age because the pathway to security for Brasilia in the global nuclear order seems to be different from many of the other states looked at in this book. Specifically, it is neither nuclear technology for weapons development nor concerns about immediate regional security threats that motivate Brazilian policy elites, but rather a desire to secure and benefit from controlling the nuclear fuel cycle, continue the push for nuclear disarmament and maximise Brazilian power and influence. This is undergirded by a feeling among political and military elites in Brazil that the current global nuclear order is “unfair and antiquated,” and perhaps also overly dominated by the United States and the “West.”²

Brazil is a Non-Nuclear Weapons State and an influential actor in the Non-Proliferation Treaty (NPT), and a pioneer and signatory of the Treaty of Tlatelolco (which established a Nuclear Weapon Free Zone in South America in 1967). It has also been active as an observer of the Non-Aligned Movement (NAM) and is a member of the BRICS group. But at the same time, Brazil has an advanced nuclear infrastructure, plans to use fissile material for submarine propulsion and some believe it has aspirations for regional, if not great, power status. Brazil previously had a military nuclear programme and a geopolitical rivalry (not to be confused with an arms race) with Argentina, although whether there was ever a genuine desire to build nuclear weapons is the subject of debate.³ While a crash Brazilian nuclear weapons programme doesn’t seem particularly likely from the current standpoint (there is no obvious or immediate political or security driver), in theory, Brazilian scientists and engineers would be well placed to produce highly enriched uranium needed for a bomb in a fairly short period of time, should this change. The fluid political situation in Brazil in recent years and the election of ideologically

diverse leaders Jair Bolsonaro in 2019 and Luiz Inacio Lula da Silva in 2022 make forecasts about the future difficult.⁴ That said, “nuclear independence” appears to be the overarching theme for Brazil, whatever guise that might take.

Ultimately, the significance of Brazil in the Third Nuclear Age may be three-fold: as an influential non-Western state without nuclear weapons that has signed the Treaty on the Prohibition of Nuclear Weapons (TPNW); as a country looking to utilise the benefits of nuclear technology for both civilian *and* military purposes and push back against established structures of global nuclear governance seen as discriminatory, intrusive or unfair; and lastly, as a pioneer of different routes to nuclear security.

Towards nuclear independence

The most significant nuclear-technological development programme for Brazil is the governments’ interest in building nuclear-powered submarines. This interest is not new and can perhaps be traced as far back as the late 1970s, as policymakers in Brasilia became increasingly disenchanted with the regimes designed to share nuclear technology (especially the NPT),⁵ and particularly to 1982, when the government saw the significant benefits enjoyed by UK (nuclear-powered) submarines in the Falklands/Malvinas War. However, it does make Brazil significantly different from all the other Activists and Protestors looked at in this book – none of whom have any interest in military applications of nuclear technology.

At the time of writing, the Brazilian government is building one nuclear-powered attack submarine (the Alvaro Alberto), under the PROSUB programme, which is scheduled to be completed in 2029 and will possibly be operational by 2032/34.⁶ This may be followed by five more nuclear-powered submarines by the 2040s. These vessels are based on a French submarine hull design but with an indigenously designed reactor and will be built at an expanded Itaguaí naval complex south of Rio de Janeiro. This co-located shipyard and submarine base already services Brazil’s current fleet of diesel-powered submarines (also constructed with French assistance). According to the Brazilian government, the objective of the programme (which also includes a fleet of four new conventional powered submarines) is to “...to increase the national defense structure and ensure Brazilian maritime sovereignty.”⁷ However, the strategic rationale of the nuclear submarine programme is not entirely clear: it could be linked with future “deterrence” requirements – though it isn’t explicit against whom or what; it may be linked with safeguarding the resources of the “Blue Amazon,” or it may simply be about prestige. One official has suggested that the programme is linked to the need to patrol Brazil’s enormous coast line and to mastering nuclear technology.⁸ Either way, if this timeline is achieved, this would make Brazil the first country *without* nuclear weapons to indigenously develop a nuclear reactor to power a submarine (even the US Virginia class SNNs sold to Australia under the AUKUS deal will not be deployed until the 2030s at the earliest).

Brazil’s SSNs will not use Highly Enriched Uranium (HEU) as fuel for the submarine’s reactor (unlike the HEU used in UK and US submarines – and which

will be used in the AUKUS nuclear-powered submarines – including in sealed hulls for the Australian boats).⁹ This will likely mean that Brazilian submarines will have relatively less power and endurance when on patrol than those using HEU as fuel, and possibly a shorter reactor life span. While this means there should be less of a weapons proliferation concern, Brazil will be the only Non-Nuclear Weapon State to control the entire process. The Brazilian statement to the 2022 NPT Review Conference made it clear that “nothing in the NPT or in the Treaty of Tlatelolco precludes the use of nuclear energy for naval propulsion” and that Brazil had submitted a “proposal for special measures to be applied to the nuclear material” to the IAEA.¹⁰ However, even though the Brazilian government has been very transparent about its plans, Brazil has not signed the IAEA’s Additional Protocol (AP), citing concerns about intrusive inspections. Instead, Brazil and Argentina have established their own monitoring system known as ABACC (discussed below). How safeguards are applied to the Brazilian nuclear submarine programme is being closely monitored by many other actors in the international community, notably Iran, who may also seek to develop this capability, as well as the members of AUKUS.¹¹ Like Australia, Brazil is currently negotiating special procedures with the IAEA for a safeguards arrangement for their SSN programme. Centrally important will be the exact points in the fuel cycle and submarine construction at which international inspectors will have oversight (fuel fabrication, loading and unloading the core, etc.).

The submarine programme is part of a broader interest in pursuing advanced nuclear technologies for a range of different civilian applications, particularly energy generation.¹² The Brazilian military (especially the Navy) retains a strong influence in the civilian nuclear programme and leases the Uranium enrichment technology. As of 2022, World Nuclear estimated that nuclear energy accounted for approximately 3% of Brazilian power generation and that Brazil has access to 210,000 tonnes of Uranium. Most enrichment is performed abroad (by Urenco or in the United States), apart from a small plant at the Aramar Experimental Centre near Ipero, which will produce the LEU for Brazil’s submarines.¹³ Brazil currently operates two nuclear power plants (which were built in the 1970s) and is currently in the process of building a third. Nuclear power forms one part of a planned energy mix of renewable sources to meet future climate goals.¹⁴

It is less clear how Brazil sees the significance of non-nuclear strategic weaponry, although there does also appear to be an interest in hypersonic technologies.¹⁵ Brazilian submarines (both nuclear and conventionally powered) will probably be armed with a mixture of torpedoes, missiles and mines. However, at the time of writing, Brazil’s immediate security environment appears to be relatively benign, and advanced weapons programmes may be principally about technology readiness and research.

Great power politics: opportunity and frustration

As of 2024, Brazil stands at a point of both opportunity and frustration in relation to the changing distribution of power at the global level. Brasilia’s opportunity lies

in the propensity for analysts and policymakers around the world to assume that an overall shift to a multipolar distribution of power will include a great power from Latin America and the widespread perception that Brazil is the region's most likely contender.¹⁶ However, a sense of frustration has also set in within Brazilian foreign policy discourse following the slowdown in its economy in recent years, which appears to have derailed the progress towards this goal that many predicted only a few years ago.

By virtue of being one of the state's most closely associated with the concept of a "post-Western" global order created by "emerging" or "rising powers" – not least due to its inclusion in the economist Jim O'Neill's original "BRIC" formulation and its subsequent multilateral manifestation in the 2000s – Brazil has been treated as a great power contender for the last twenty years.¹⁷ Therefore, the idea of the return of great power politics has, for Brasilia, been a path to greater Brazilian power and status. Yet even before the decline in its economic fortunes began to cast doubt on Brazil's international status, Brazil's lack of nuclear weapons meant that if this goal were to be realised without withdrawing from the NPT, Brazil would be a unique pole of power in the new multipolar order. It would be the only contemporary great power without a nuclear arsenal.

In this regard, Brazil is often compared with India, a fellow rising power and member of the BRICS (Brazil, Russia, India, China, South Africa) and IBSA (India, Brazil, South Africa) diplomatic groupings.¹⁸ In the same year, 1998, both states made consequential choices about their nuclear statuses – Brazil opting to sign the Non-proliferation Treaty (NPT) and thereby give up the right to a weapons programme, India opting instead to conduct a series of nuclear tests and announce its nuclear-armed status to the world. Yet in the years since, it is India that has overtaken Brazil in status terms, including on nuclear issues, only serving to highlight their different nuclear paths.

While Brazilian scholars and policymakers alike have held on to the goal of what one author has dubbed the "mirage" of Brazil helping to create a multipolar order, many now openly question Brazil's importance to the "return" of great power politics at the global level.¹⁹ If, as David Mares and Harold Trinkunas argue, the global order is transitioning to a moment in which hard rather than soft power capabilities have greater salience, then Brazil's atypical position on the relationship between nuclear weapons and global status will become even starker.²⁰ In this context, nuclear latency and related techno-military developments, such as the nuclear-powered submarine programme discussed above, are likely to become more important to Brazil's foreign policy.²¹

Brazilian policy elites look favourably on the move towards a more multipolar world, especially if this leads to reform of the major global institutions – including those that manage nuclear challenges. But at the same time, Brazil is determined to remain neutral. Regional and developing world partners – rather than the global major powers, seem to be central to Brazilian geopolitics, with a strong focus on South America and members of the Non-Aligned Movement in Brasilia. This includes the 1986 ZOPACAS agreement with a number of states from Africa, and the NWFZ discussed below.²²

Disarmament and access to nuclear energy

Political elites in Brasilia also seem set to play an important role in shaping the normative aspects of the Third Nuclear Age, especially pushing for nuclear disarmament. Brazil has signed the NPT, is a founder member of the 1967 Treaty of Tlatelolco that established a NWFZ in South America, and has consistently supported the more recent Treaty on the Prohibition of Nuclear Weapons. It was one of the influential states to vote in favour of negotiating a nuclear ban in 2016, and Brazilian representatives actively participated in the 2017 negotiations at the UN. In these negotiations, Brazilian officials leveraged their influence with the NAM to actively shape the treaty text – Brazil independently requested the inclusion of various draft texts that protected states' NPT Article IV rights (to access nuclear technology for peaceful purposes) within the TPNW.²³ Brazil eventually became the very first state to sign the treaty.

At the 2022 Meeting of States Parties to the TPNW, the delegation of Brazil led by Ambassador Flávio Soares Damico issued a statement pledging Brazil's continuing support for the treaty. Ambassador Damico weighed in on the debate concerning the TPNW's potential undermining of the NPT, claiming that the TPNW is "... fully compatible with and complements existing international agreements on nuclear weapons – particularly the NPT, the Comprehensive Test Ban Treaty and the treaties establishing nuclear-weapon-free-zones." He also promised forthcoming ratification, claiming that "its text is currently under consideration of the Brazilian Congress with a view to its ratification."²⁴ In a confidential interview with the authors, a high-level official confirmed that the Brazilian government did not want the TPNW to interfere with the NPT or in any way to polarise states across the global nuclear order.²⁵

However, taking Brazil's continuing support for the TPNW at face value conceals a much more complex relationship that the country has with nuclear disarmament and the normative structures of the global nuclear order more broadly. For one, Brazilian support for the TPNW appears to have stalled (at the time of writing) as its long-awaited ratification is currently facing an "uphill battle" in the National Congress.²⁶ This might be a symptom of Brazil's internalised identity as a fellow rising power (in the company of BRICS states) perpetuating a revisionist worldview that influences its engagement with the nuclear order.

Ever since Brazil's late entry into the NPT, its participation has been characterised by its revisionist non-proliferation agendas, which Brazilian delegations have been able to significantly amplify due to close relationships with influential groupings such as the NAM and membership in the New Agenda Coalition (established in 1998).²⁷ Point 8 of a joint statement issued at the 25th anniversary meeting of the NAC in Brasilia in June 2023 declared:

The NAC highlights that in the current fragile international security environment, all countries, in particular the Nuclear-Weapon States, should reject any normalization of nuclear rhetoric and, in particular, the threat of use of nuclear weapons, which only serves to undermine the disarmament and non-proliferation regime and is against the UN Charter.²⁸

Brazilian officials have repeatedly taken aim at the IAEA's watchdog function in the global non-proliferation regime and have (almost singlehandedly) obstructed the universalisation of the model Additional Protocol (AP) as the standard of the safeguards system.²⁹ Instead of the AP, Brazil opted for the Argentine-Brazilian Agency for Accounting and Control of Nuclear Materials (ABACC) safeguards in 1991, which was then expanded into a Quadripartite Agreement when the IAEA signed on to ABACC. ABACC played a key role in rapprochement with Argentina and reflected the desire by officials to focus on regional security and indigenous means to achieve this.

That said, Brazil's continued "principled" rejection of the AP is increasingly unsettling as it now contemplates the PROSUB programme. In the absence of an AP the IAEA's monitoring functions might be impaired if Brazil were ever to be drawn into a regional military confrontation in the foreseeable future. However, as one Brazilian official speaking off-the-record put it, the idea of ABACC is that "neighbours watch neighbours as a path to trust building."

Lastly, the political elite in Brasilia have been keen to pursue a more activist stance in non-proliferation issues, the best example being the diplomatic negotiations regarding a possible nuclear fuel swap with Iran in 2010.³⁰ According to Matias Spektor, there were concerns in Brasilia that prohibiting Iran (an NPT member state) from the ability to enrich Uranium would set an unacceptable precedent.³¹ At the same time, the Brazilian National Nuclear Commission seeks to promote the peaceful uses of nuclear energy, including with partners in Latin America and Africa.³² Perhaps partly for these reasons, Brazil continues to be an important player in the Nuclear Suppliers Group (NSG). Indeed, Brazilian Ambassador Claudia Vieira Santos was elected President of the NSG in 2023.³³

Conclusion: nuclear fairness and nuclear justice

The pathway to security for Brazil in the Third Nuclear Age seems subtly different to many others looked at in this book. At the centre of the Brazilian approach is a determination to make the country independent when it comes to nuclear energy and avoid reliance on other states and established governance architectures that are often seen as unfair, unjust and skewed against non-developed and non-Western countries. At the same time, there is clearly a desire to protest against the rules and regulations that define the current nuclear order and the established nuclear club. This should not be confused with any great desire to initiate (or restart) a nuclear bomb programme – Article XXIII of the Brazilian Constitution declares that "all nuclear activity within the national territory shall be allowed for peaceful purposes and shall be subject to approval by the National Congress."³⁴ But it does suggest a more engaged role for Brasilia in the Third Nuclear Age when it comes to nuclear energy and global nuclear norms.

Policy elites in Brasilia have been at the forefront of the nuclear disarmament movement at least since the late 1980s, and this seems unlikely to change. But this is seen as being complementary to securing access to nuclear technology for non-weapons applications. The same is true for nuclear proliferation concerns,

whereby elites in Brazil (and Argentina) worry that access to nuclear technology might become hostage to the non-proliferation goals of developed countries.³⁵ As Togzhan Kassenova explains:

A favourable security environment, concerns about access to nuclear technology for development and economic needs, and a sense of injustice about the existing global nuclear order all explain why Brazil and Argentina are less concerned about nuclear proliferation threats than many Western powers.³⁶

Acknowledgement

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Notes

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Summary

The five states that we have labelled as “Activists and Protestors” are reflective of a much bigger group of countries that do not appear to have any (current) desire to build nuclear weapons, are not members of extended nuclear deterrence relationships, but are increasingly worried about the direction of travel in the current nuclear order. While the particular political objectives and methods employed by these states are far from uniform, the Activists and Protestors are united by a frustration with the current global nuclear order, the normalisation of the practice of nuclear deterrence and a growing concern about nuclear use.

For sure, activism and protest are not a new phenomenon in global nuclear politics, but what appears to be changing is the volume and influence of those traditionally seen as outside or on the fringes of the nuclear debate. This has meant that the concerns of the more than three-quarters of states with no interest in acquiring nuclear weapons, the vast majority of which are part of Nuclear Weapons Free Zones and signatories to the CTBT and NPT, are increasingly shaping the debate and putting pressure on those in the “nuclear camp” (especially the Western democracies). This is particularly true of a group of non-Western “middle” or “normative” powers, often seeking to act as “norm entrepreneurs,” and increasingly in allegiance with Western-based NGOs. A major reason for this is that many influential middle powers find themselves directly impacted by the worsening geopolitical situation and the increased concern about nuclear conflict in the Euro-Atlantic, Middle East, South Asia and Asia-Pacific.

Broadly speaking, the Activists and Protestors share two main goals: (i) decrease the risks posed by the continued retention of nuclear weapons and work towards nuclear disarmament; and (ii) ensure a fair and equitable nuclear order that allows (in some cases) for non-weapon uses of nuclear technology. In a way, one could categorise these states as defenders of the nuclear order given that their goals are effectively enshrined in the NPT. Working “in good faith” towards nuclear disarmament and sharing nuclear technologies for peaceful purposes are after all pledges that the 5 nuclear weapons states and their allies have legally signed up to. But while many non-nuclear states feel that they have upheld their part of the bargain by eschewing nuclear weapons and signing up to initiatives designed to prevent proliferation, in return they have seen little genuine desire to disarm and often intrusive and unfair practices to limit nuclear technology diffusion.

There are two main methods being employed by the Activists and Protestors to achieve their various aims: (i) first increasingly coordinated and vocal opposition in global fora, such as the NPT and the UN General Assembly; and (ii) second, in some cases, a much more prominent link with global civil society groups seeking to raise public awareness of nuclear issues. The 120-member Non-Aligned Movement (NAM) is a particularly important mechanism for coordination between non-Western Activists and Protestors, as are the secretariats of various Nuclear Weapons Free Zone treaties and groupings such as the New Agenda Coalition (Brazil, Egypt, Ireland, Mexico, New Zealand and South Africa.)

In terms of achieving these goals, the fact that the nuclear order appears to be becoming more dangerous and the salience of nuclear weapons appears to be increasing rather than decreasing suggests that the Activists and Protestors have been unsuccessful in their particular pathway to security. There really aren't any obvious levers that can be used to force the nuclear-armed states to disarm (especially given that 4 of 9 nuclear-armed states are not members of the NPT). However, the agreement of the Treaty on the Prohibition of Nuclear Weapons shows that progress is possible, and it is clear that a discursive shift is underway in global nuclear politics. While this is having almost no influence in Russia, China, Pakistan, or North Korea, this discursive challenge is influencing public opinion about nuclear weapons in some nuclear-armed and extended nuclear deterrence states, particularly in the West.

There are a number of important differences between members of what we classify as Activists and Protestors. Indeed, the Activist and Protest pathway to security in the Third Nuclear Age is perhaps not as tightly linked and coherent as the other pathways – especially the Technological Transformers and Nuclear Traditionalists. Perhaps the most prominent difference is between those states that seek to ban the use of *all* nuclear technologies (Austria, Ireland, New Zealand, Malta as well as many prominent [Western] NGOs), and those who champion the right to access nuclear technologies for development (Mexico, South Africa, Indonesia, Kazakhstan) and, in some cases, to help meet Net Zero goals, or in the case of Brazil, for a nuclear-powered submarine programme. This does not automatically mean that all those who defend the right to access nuclear technology are determined to build nuclear power plants (or nuclear-powered submarines), but rather that this often reflects a belief that this “right” should not be compromised or be subjected to restrictive practices (as can be seen from Brazilian involvement in attempting to broker a nuclear deal with Iran in 2010). In this way, an interest in nuclear power might be seen as a hedge or part of a programme of technological readiness, or even prestige.

The same is true in terms of alignment and the relationship with the major powers. For some Activists and Protestors, pushing back against a perceived Western-dominated nuclear order is important, while for others, moves towards multipolarity have created the space for more independence, balancing or multi-alignment. Either way, one major development is that Western powers can no longer assume that Activist and Protestor states in the Global South will “fall into line”; and support Western constructions of global nuclear order: one key reason

for this is that relationships with Russia and China have become stronger – not least for nuclear technology transfer.

Geography is important when it comes to understanding the approaches of the Activists and Protestors. Nuclear risks appear far more acute in Europe or Northeast or South Asia than they do in Africa, Southeast Asia or South America. While security dynamics are clearly different across regions, none of the five states looked at in this section have immediate nuclear or conventional challenges that they need to hedge against. This is perhaps why we also see a difference between those embracing gradual conventional military modernisation (Indonesia, Brazil) while others retain a more pacifist/demilitarised/neutral stance (Austria). While not covered in this book, in the Middle East, Egypt stands out as arguably the most prominent Activist and Protestor. Egyptian elites have played a leading role in promoting a WMD-free zone in the Middle East, regularly protest against perceived unfair practices and double standards by the established nuclear powers and have significant nuclear energy ambitions and projects.

Perceptions of injustice are also important to this group. Historical (retributive) injustices such as the human and environmental consequences of having their territory used for nuclear testing motivate some actors (notably the Marshall Islands, Algeria and Kazakhstan) and were a clear driving force behind the Humanitarian Impacts Initiative, while for others, it was perceptions of contemporary (redistributive) injustice caused by very restrictive nuclear technology transfer due to a prevailing non-proliferation narrative and the injustice of not being able to escape the impact of nuclear use by others (Austria). That said, some members of this group already play an active role in nuclear supply chains (Niger, Gambia) and in the Nuclear Suppliers Group (Brazil, Kazakhstan, etc.).

Ultimately, the importance of the Activists and Protestors in the Third Nuclear Age is in holding nuclear-armed states and their allies to account in far more powerful ways than in the past, putting pressure on these states to recognise the security anxieties of those who view nuclear weapons as a primary source of existential risks and developing a credible vision for a world free of nuclear weapons. It is at least conceivable that this pressure makes it more difficult for some states with nuclear weapons or extended nuclear guarantees to continue justifying their deployment and potentially makes non-nuclear pathways to security more likely.

Part II

The hedgers and balancers



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6 The Islamic Republic of Iran

We believe nuclear weapons are used to commit mass destruction. We strongly oppose mass destruction. It violates religion, and it is contradictory to Islam. That includes any type of WMD: atomic, chemical, or any other possible types.

(Supreme Leader Sayyid Ali Khamenei, June, 2023)¹

Introduction: defiance, resistance and asymmetry

Iran's response to what it sees as Western-designed and Western-led global nuclear order has been defined by defiance and resistance. Resistance describes the attitude that Iranian policy elites have adopted when seeking to address the military challenges posed by its often-technologically superior rivals and adversaries. The reconstruction of the Islamic Republic's deterrent has been the priority for decades and has focussed on the quest for alternative strategies that could compensate for structural asymmetries. Defiance, on the other hand, best captures the Iranian policy elites' approach to the structures of global nuclear governance. While portraying the country as a traditionally pro-disarmament advocate and a compliant member of the NPT, the Islamic Republic's leadership keeps pursuing its nuclear hedging strategy, achieving both a grade of deterrence (ambiguity-driven) and a status of non-complete international isolation. In early 2023, Rafael Grossi, the Director-General of the IAEA, declared that he didn't believe that Iran had yet built a nuclear weapon.² However, he also noted that the country had accumulated 70 kilograms of uranium enriched to 60% purity and 1,000 kilograms enriched to 20% purity – “enough nuclear material for several nuclear weapons – not one...”³

As the pressures of the Third Nuclear Age unfold, the Iranian political and military elite finds itself hedging its bets by slowly adjusting its asymmetric responses to technological advancements – enhancing its nuclear hedging strategy and expanding its conventional capabilities. In parallel, the re-emergence of great power competition has given Iran a wider degree of flexibility, which has allowed leaders in Tehran to adopt a more confrontational attitude with the international community over its nuclear ambitions.⁴

Conventional deterrence and nuclear hedging

Since the Islamic Revolution in 1979, Iran's military strategy has been focussed on the construction of deterrence. The traumatic experience of the Iran-Iraq War, the lessons learned from the First and Second Gulf War and the effects of the long-lasting sanctions regimes have exposed Iran's conventional military weakness, particularly vis-à-vis its major adversary, the United States. While the notion of shifting from a First to Second Nuclear Age was far from being a point of debate in Iran, the effects of rapid military technological change reverberated across the Middle East. Over the following three decades, the question of how to capitalise on such lessons and reconstruct the Islamic Republic's military capability became vital.⁵

A long-lasting sense of vulnerability and inferiority prompted the Iranian policy elites to seek alternative deterrence strategies. The increasing use of irregular forces in asymmetric warfare, deployment of long-range ballistic missiles and tactical weapons systems, use of fast attack crafts and swarm boats to harass enemy vessels and development of a sophisticated cyberwarfare capability are all features of the Iranian leadership's gradual response to its unique condition.⁶ The asymmetric strategy conceived by the Iranian military leadership is based on a mix of anti-access and anti-denial (A2/AD) capabilities. Having learned from the US military during the First Gulf War, the Iranian military has focussed on a strategy of "all-domain superiority." Anti-access capabilities include Iran's ballistic and cruise missile programmes and long-range ISR systems such as satellites, drones, radar and cyber capabilities. Anti-denial capabilities include fixed and mobile air-defence systems, artillery and precision rockets, electronic warfare, naval mines, Fast Attack Craft and swarm boats.⁷ These capabilities are arguably at the very heart of Iran's deterrence strategy, which, as of today, is designed to deter two main security threats: a potential US invasion or regime destabilisation involving Israel and – to a lesser extent – a proxy war in the broader Persian Gulf region involving Gulf Cooperation Council (GCC) countries.⁸

The United States is perceived as a historic existential threat, and Iranian policy elites have compensated for the significant conventional military asymmetry by threatening US assets in the Middle East through proxy forces and asymmetric warfare.⁹ The latter is also the strategic response to the threats coming from its Arab neighbours (GCC states¹⁰), conventionally superior and with strong security ties with the United States. Air defence systems are a central component of Iran's deterrent strategy vis-à-vis the United States' operational prioritisation of air superiority. In light of the increasing deployment of air-to-surface anti-radiation missiles to destroy enemy air defences, the Iranian military elites have responded by rendering their systems more mobile, compact and agile. Sevom-e-Khordad is Iran's most advanced indigenously produced air-defence system that employs mid-range, high-altitude, solid-fuel Sayyad-2 missiles. Its utility as an anti-denial capability was demonstrated on 20 June 2019, when Iran's Islamic Revolutionary Guard Corps (IRGC) shot down a United States RQ-4A Global Hawk BAMS-D surveillance drone over the Strait of Hormuz. As Hadi Ajili and Mahsa Rouhi

suggested, “The episode reflects Iran’s confidence that despite obvious asymmetries, its regional power and reach enable it to deter the US military from acting against Iran.”¹¹ As for Israel, of particular significance is Iran’s adaptation to Tel Aviv’s decades-long policy of kinetic counterproliferation, aimed at disrupting the Iranian nuclear and conventional weapons programmes.¹² Indeed, the effects of Israel’s cyberattacks, assassinations, sabotages and air attacks on Iranian military bases and facilities have prompted the Islamic Republic to escalate its nuclear activities,¹³ and double-down on its ambiguity strategy by reducing transparency with the IAEA.¹⁴

Iran’s ballistic and cruise missile programmes are a vital pillar of the country’s deterrent strategy, both materially and psychologically.¹⁵ Today, Iran has the largest and most diverse missile arsenal in the region, thereby providing the country not only with tools for deterrence by punishment but also for deterrence by denial. This relative advantage has contributed to enhancing the country’s A2/AD capabilities by targeting military bases and aircraft carriers in the region and showing off its military prowess by conducting test launches and military exercises. As Frederic Wehrey et al. point out:

Iran seeks to deter aggression against it by using exaggeration, ambiguity, and obfuscation about its ability to exact prohibitive costs from potential aggressors, especially the US and regional allies. Among other things, Iran combines official statements, parades, set-pieces exercises and show of force, and tests of IRBMs to deter adversaries from initiating conflicts.¹⁶

On 6 June 2023, Iranian military elites unveiled the hypersonic Fattah missile, with an effective range of 1400 kilometres and a maximum speed of Mach 14, which, according to Amirali Hajizadeh, the head of Revolutionary Guards Corps aerospace force, “is capable of penetrating all defence shields.”¹⁷ Iran’s state TV further reported that “it can bypass the most advanced anti-ballistic missile systems of the United States and the Zionist regime, including Israel’s Iron Dome.”¹⁸

Over the past decade, the Iranian leadership has developed various domestic electronic-warfare capabilities and increasingly sophisticated cyber capabilities. In line with its broader strategy of deterring and countering adversaries, it has a two-pronged outlook, focussing firstly on the United States and secondly on regional adversaries such as Israel and, to a lesser degree, Saudi Arabia. In April 2024, Iran and Israel engaged for the first time in a direct military exchange. The unprecedented Iranian multi-phased missile and drone strikes against Israel revealed significant information about both capabilities and intention. The Israeli strike to the Iranian consulate in Damascus marked an apparent shift in the Israeli targeting policy, traditionally centred on killing operational commanders. The risk of an Israeli sustained targeting policy focussed on the Iranian military and political leadership, and the actual damage to Iran’s deterrence, strongly questioned Iran’s traditional policy of non-engagement and restraint. However, in order to restore a credible conventional deterrence and signal resolve – domestically, regionally and internationally – Iranian military elites chose a strong response.

Iran's conventional military inferiority and reliance on a variety of means to achieve deterrence have often been associated with an intrinsic impetus to acquire nuclear weapons. However, there is little evidence to justify this causal link or prove the Iranian leadership intends to integrate its deterrence capabilities with nuclear weapons. The logic of nuclear weaponisation, which publicly surfaced in 2003, was part of the same urgent need to reconstruct the country's deterrent after the series of traumatic events that exposed Iran's deep vulnerabilities, particularly vis-à-vis the United States. After almost two decades, and while the Iranian policy elites are advancing its nuclear programme and enrichment level, the cost-benefit calculus of openly acquiring a nuclear deterrent keeps the country away from such an option. In contrast, *nuclear hedging* provides an optimal strategy within Iran's security doctrine. Mastering the nuclear fuel cycle short of weaponisation constitutes a sufficient deterrent without bearing the costs of complete isolation. This logic was clearly expressed by former Iranian President Akbar Hashemi Rafsanjani, "As long as we can enrich uranium and master the [nuclear] fuel cycle, we don't need anything else. Our neighbours will be able to draw the proper conclusions."¹⁹ According to the latest IAEA report (2024), Iran's total enriched uranium stockpile is at 6201.3 kilograms, of which 142.1 kg are enriched up to 60% purity.²⁰

With a history of international isolation going back decades, Iranian policy elites favour a Brazil or Japan model over a North Korea one and look at normalisation more than increasing isolation. Iranian policymakers have consistently fed the ambiguity surrounding its nuclear programme, and its political discourse has changed based on the most favourable and less favourable conditions (such as the JCPOA deadlock). The current impasse in the nuclear talks, the United States' reiterated military threats²¹ and President Joe Biden's trip to the region to discuss a possible "Middle East NATO" with an anti-Iran function are examples. In response, on 17 July 2022, Kamal Kharazi, former Iran Foreign minister and head of the Strategic Council on Foreign Relations, argued,

It is no secret we have the technological ability to build a nuclear bomb, but we have not made a decision in this regard. In a few days we went from 20% to 60% enrichment, we can easily reach 90%.²²

These comments are not simply symbolic but rather aim at strengthening Iran's hedging-oriented deterrent strategy. Doubling down on nuclear hedging and asymmetrical conventional capabilities appear to be the Iranian leadership's response to the pressures of the Third Nuclear Age.

The compass points East

Iran has had hostile relations with the United States since 1979. Iranian leaders have defined Washington as the "Great Satan" and have articulated the US presence in the Middle East as the primary reason for instability and chaos.²³ On the other hand, all US administrations since President Jimmy Carter have seen Iran as a sworn

enemy whose hate is driven by Shia ideology and a desire to export its revolution, destabilise its neighbours and destroy Israel.²⁴ This narrative is strong in Iranian political culture, and the perception of the United States as an all-encompassing enemy has been strengthened since the revolution. The visit by President Biden to the Middle East in 2022 exacerbated this perception. In fact, the intent of the trip was “to push the region toward a new regional order based on Israeli-Arab cooperation against Iran under American guidance.”²⁵ The security architecture – Israel’s alignment with Arab states against Iran envisioned by the US policy elites – is nothing new. The Abraham Accords, brokered during the Presidency of Donald Trump in 2020, formalised and externalised such a relationship with some Arab states of the Persian Gulf. However, the Saudi leadership has shown reticence in welcoming Biden’s proposal and is willing to keep a dialogue open with the Islamic Republic.

On the nuclear file, the US leadership has tended to adopt a negative perception of Iran’s nuclear programme, whose origin, paradoxically, lies in the US support given to the Shah to build a civil nuclear research programme beginning in the late 1950s. Since the revolution of 1979, Washington has systematically accused the Iranian elites of seeking to acquire a nuclear weapon, while the latter categorically deny such accusations, claiming that the nature of their nuclear programme is exclusively peaceful. In light of this enduring animosity, both sides have employed various means to counter the other: numerous economic and diplomatic sanctions but also military threats à la “all options are on the table.” Such threatening rhetoric is further reinforced by the presence of several US military bases in Iran’s neighbourhood.

Despite not being a newcomer to the region, since the launch of the Belt and Road Initiative in 2013, China has quickly enhanced its presence in the Persian Gulf, progressively increasing its ties with the Islamic Republic. Notwithstanding the ostensible incompatibility between a communist country and an Islamic theocracy, the PRC and the IRI have built a complex, often incoherent relationship. Today,

the relationship is defined by a dominant and seemingly inescapable structural element: China is a great power that has assumed the role of the principal, if not the sole, challenger of US global primacy; Iran is a middle power that competes for regional hegemony. In short, the two countries form “an archetypical Great Power–Middle Power relationship”.²⁶

Iranian elites have attempted to exploit the changing global distribution of power and the dissatisfaction towards the Western-led international system that the two countries have in common to gain the political and economic support of a seemingly like-minded great power.

Two main intervening factors exacerbate the resulting power asymmetry. First, the Chinese leadership is engaged in great power competition with the United States. Historically, the PRC’s policy elites have prioritised its relations with the United States over those with Iran, which is unlikely to change in the foreseeable

future. At the same time, they are building a strong but carefully balanced regional presence in the Middle East, whereby Iran is a key actor but certainly does not occupy a special seat above the others. Consequently, Iran's problematic behaviour in the region and its rivalries with Saudi Arabia and the United Arab Emirates (UAE), China's two other key partners in the Persian Gulf, negatively influence Chinese leaders' willingness to intensify their relationship with Tehran.

Contrary to the dominant Western understanding that the strategic environment of the past is under threat, the Iranian policy elites do not perceive a renewed challenge from Russia. In fact, the war in Ukraine in 2022 has created opportunities for Iran, such as the finalisation of a long-term strategic cooperation agreement that has been on the table for years. According to Abdolrasool Divsallar, "this has Russia and Iran relationship in a process that if continues can find a strategic character."²⁷ Iranian drones, specifically, have been at the core of the growing Russia-Iran military partnership.²⁸ We will see the implementation of some deals that might boost trade and economic cooperation between the countries and people-to-people connections. Transactional interests dominate the relationship and might be easily diverted by any significant development between Iran and the West, such as the JCPOA.

Iran and nuclear governance: critical pragmatism

Iranian policy elites' position vis-à-vis the normative frameworks governing nuclear proliferation is inherently pragmatic. To understand it, one must first comprehend the country's "resistance identity" and the deep-seated sense of injustice that permeates it. The Iranian leaders' revolutionary discourse hinges on a constructed dichotomy between the "non-Islamic West" together with the Western cultural institutions and political practices (oppressor) and the anti-imperialist, anti-establishment Islamic Republic (oppressed).²⁹ Accordingly, since the 1979 revolution, Iranian policy elites have contested the prevailing international order as Western-designed and Western-led and have aimed at shifting the existing pattern of structures through defiance and resistance. As noted by Ayatollah Ali Khamenei: "They [the west] impose their interests under the name of 'international law' and their dominating and illegal statements under the name of the 'international community' to nations."³⁰ Over time, Iranian leaders' particular type of revisionism has shaped and defined the country's position toward the non-proliferation and disarmament regimes.

On the one hand, the country's policymakers have continuously denounced the failure of the Nuclear Weapons States to take substantial steps toward the second pillar of the Non-Proliferation Treaty (NPT): disarmament. The leadership's position also retains a strategic objective alongside the more ideational constitutive element. The anti-imperialist, anti-colonialist narrative has found a natural audience and support system in the Non-Aligned Movement (NAM). Within it, Iranian policy elites have sought to champion the disarmament cause – a role traditionally played by Egypt by portraying itself as a trailblazer and standard-bearer of the Weapons of Mass Destruction Free Zone (WMDFZ) in the region. As a

consequence, they have been able to benefit from the NAM's vast influence in the realm of non-proliferation and disarmament. During its period as Chair of the NAM (2012–2015), Iranian diplomats emphasised its narrative on the injustice of the international order, the biases of international law and its supporting institutions and the failure of Nuclear Weapons States to meet their obligation in initiating negotiations on nuclear disarmament.³¹ In parallel, Iranian policymakers have often defined the IAEA as a Western-manipulated institution designed to promote the interests of the West. In this context, the discourse around the country's nuclear programme is that it is merely for peaceful purposes, not because of western imposition but because Islamic law prevents it from having a military dimension. On the MEWMDFZ, Iran's official stance is that:

The Islamic Republic of Iran considers the use of chemical and nuclear weapons and the like a great and unforgivable sin. We have proposed the slogan of a 'Middle East free of nuclear weapons', and we stand by it. This does not mean giving up on the right to use peaceful nuclear energy and nuclear fuel production. The peaceful use of this energy, according to international law, is the right of all countries.³²

On the other hand, Iran's nuclear programme has become a national symbol of resistance against the much-criticised international system. Since the first allegations of Iran's clandestine proliferation activities,³³ the debate around the nuclear programme has been defined by accusations. The IAEA Board of Governors has denounced the IRI's violation of its NPT obligations – its breaches of Article III³⁴ and potentially Article II³⁵ of the NPT – Iran, on the other hand, has accused the UN Security Council (UNSC) of being a biased institution and the Security Council Resolutions to be an illegal instrument.³⁶ The ability to communicate to the domestic and international audiences that the country has overcome the obstacles set by the West and the conspiracies designed to stop its right to enrich has become a key endeavour for the IRI. Hence, while the Iranian leadership has limited its programme several times to seek sanctions relief (as in the case of the JCPOA), dismantling the enrichment component has consistently remained out of the question (described as the "redline" during the Geneva talks³⁷). Over time, Iran's right to domestic enrichment has been framed as a key achievement by Iranian policy elites, a symbol of the country's persistence and resistance to foreign forces.

On the TPNW, despite having participated in the negotiations, supported the adoption of the Treaty, and consistently voted in favour of the subsequent UN General Assembly resolutions, Iran has not signed the Treaty. In the First Committee of the UN General Assembly in October 2022, the representative of the Islamic Republic of Iran argued,

The adoption of the TPNW was a right step in the right direction. It complements the NPT. However, the TPNW should also be complemented by the urgent commencement of negotiations and conclusion of a comprehensive convention

on nuclear weapons, leading to the total elimination of nuclear weapons in a verifiable and irreversible manner.³⁸

This juxtaposition captures the essence of the Iranian position vis-à-vis the non-proliferation regime and the Non-Proliferation Treaty: a pragmatic criticism. Although it strongly criticises the non-proliferation regime and the NPT, Iranian policy elites keep reiterating the country's compliance with it. During the last NPT Review Conference, the Iranian Permanent Representative to the UN reiterated four central points: "the blatant non-compliance of nuclear-weapon States with their legal obligations under Article VI of the Treaty," "the application of double standards in enforcing non-proliferation provisions," "the Islamic Republic of Iran's support for the establishment of a nuclear-weapon-free zone in the Middle East" and lastly on the JCPOA, that "the Islamic Republic of Iran acted responsibly and with strategic patience and maximum resistance preserved the agreement."³⁹ The pragmatism of such a position is further emphasised by the Iranian leadership's apparent unwillingness to leave the NPT and become a fully fledged nuclear-armed state. Nonetheless, Iranian policymakers threatened to withdraw from the NPT several times. On 20 January 2020, Foreign Minister Javad Zarif said, "If the Europeans continue their improper behaviour or send Iran's file to the Security Council, we will withdraw from the NPT."⁴⁰ Previously, in April 2019, after the United States tightened sanctions on Iran, Zarif told state media: "The Islamic Republic's choices are numerous, and the country's authorities are considering them...and leaving NPT is one of them."⁴¹ Iran's pragmatic criticism can therefore be understood as part of its broader hedging and balancing strategy.

Conclusion: nuclear hedging and asymmetry

The notion of nuclear ages has not had much traction in countries such as Iran, and the Islamic Republic will not play a determinant role in shaping the Third Nuclear Age. However, the pressures and challenges of the unfolding global nuclear order will undoubtedly impact the IRI. It is possible that the technological innovation by strategic adversaries, such as the United States, Israel, or the GCC countries, will push Iranian security elites towards a constant adaptation and adjustment of its deterrent – both conventional and unconventional – to compensate for any possible asymmetrical shock. As of today, Iranian policymakers feel quite confident about the deterrent value of the country's capabilities and will probably keep this direction: nuclear hedging and an asymmetric strategy based on A2/AD capabilities.

As for the re-emergence of great power politics, Iranian leaders have extensively tried to "turn East" and establish a stable partnership with China in order to evade international isolationism and dampen the effects of the decade-long sanctions regime. If, on the one hand, China has allowed Iran to hedge its bets for a while, the failure to restore the JCPOA and to lift US secondary sanctions continues to severely impair the partnership's potential. The 7th National Development Plan (2023–2027), published in May 2023, clearly sums up Iran's polarised vision

of the changing global order: an axis of resistance made of the Islamic Republic itself together with regional partners and emerging powers against a disruptive and threatening US-led “world.”⁴² Nonetheless, the election of reformer Masoud Pezeshkian might mark a slight shift in Iranian foreign policy, potentially normalising relations with the West and distancing from Russia: “My administration will pursue an opportunity-driven policy by creating balance in relations with all countries, consistent with our national interests,” he emphasised in his inaugural speech.⁴³

The Ukraine war and the AUKUS announcement, the slow erosion of the non-proliferation and arms control infrastructure, as well as conventional and non-conventional modernisation plans, all have affected Iran. According to Abdolrasool Divsallar,

the war in Ukraine was picked up by Iranian analysts as a warning not to enter arms control agreements with the West. Entering an international agreement and negotiating your deterrent in exchange for security guarantees is seen as a very fragile balance, especially in the absence of mutual trust.⁴⁴

Indeed, Iranian leaders’ unwillingness to give up the enrichment programme is seen as an insurance policy,⁴⁵ which primarily aims to secure the regime’s stability.

This narrative might dangerously intertwine with any future attempt at restoring the JCPOA or any other arms control agreement. In an interview, Divsallar went on to claim that “should the talks permanently fail, it will be portrayed as a failed attempt to join an international deal. Then, engaging the Iranians with any other non-proliferation deal will be a non-starter.”⁴⁶

Notes

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- 3 CNN World, “Iran’s amassed enough material for ‘several nuclear weapons,’ says IAEA chief.”
- 4 Interview with Raz Zimmt.
- 5 Interview with Abdolrasool Divsallar.
- 6 International Institute for Strategic Studies (IISS), *The Military Balance, 2018* (London: Routledge, 2018).
- 7 See John Gordon IV & John Matsumura, *The Army’s role in overcoming Anti-Access and Area Denial Challenges* (Santa Monica, CA: RAND Corporation, 2013), pp. 1–35.
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- 15 As Michael Elleman and Mark Fitzpatrick have pointed out, "the need for missiles is also embedded in the national psyche, from the days in the mid-1980s when acquiring and firing back Scud missiles was the only way to retaliate against Iraqi missile strikes on Iranian cities." See Michael Elleman & Mark Fitzpatrick, "No, Iran does not have an ICBM programme," *IISS Analysis* (5 March 2018), www.iiss.org/blogs/analysis/2018/03/iran-does-not-have-icbm.
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46 Interview with Abdolrasool Divsallar.

7 Germany

As long as nuclear weapons exist, maintaining credible nuclear deterrence is essential for NATO and for European security. Germany will continue to do its part in nuclear sharing and will constantly provide the dual-capable aircraft this requires.

(German National Security Strategy, June 2023)¹

Introduction: German policy as a balancing act in the TNA

When it comes to responding to the pressures of the emerging, new or Third Nuclear Age, Germany is a complex case. On the one hand, policymakers in Berlin continue to commit to nuclear deterrence through membership in the NATO alliance and benefit from its nuclear “umbrella,” host US nuclear bombs at Büchel airbase in western Germany as part of the NATO nuclear-sharing agreement, will procure a new generation of F35 aircraft to deliver these nuclear weapons and, in 2024, announced that it will host US medium-range missiles able to hit Russia. On the other hand, Germany is a Non-Nuclear Weapon State under the Non-proliferation Treaty (NPT), previously agreed to phase out nuclear power for energy generation, and in 2021 elected a government with nuclear disarmament sentiments that chose to “observe” the first two meetings of the Treaty on the Prohibition of Nuclear Weapons (TPNW). German officials have also, until very recently, seen themselves as a bridge between Europe and Russia and a strong supporter of arms control and risk reduction measures in the Euro-Atlantic space – especially since the end of the Cold War in 1991. This all contributes to what has been termed the “Zeitenwende” or “watershed moment” for German nuclear politics.²

Given the strategic shock provided by the Russian invasion of Ukraine in 2022 and fears of a return of Russian nuclear weapons targeted at European capital cities, from the outside it appears that the German political elite are uncertain about how best to achieve nuclear security in this new environment. The response therefore appears to be one of hedging and balancing: strengthen NATO, accept the role of (the United States, United Kingdom and French) nuclear and strategic non-nuclear weapons in Euro-Atlantic deterrence and security, while at the same time seeking to provide a link with non-nuclear armed states and groups. In this way, Germany

can be seen as an archetypal “Hedger and Balancer” that seeks restraint and continuity in the global nuclear order. As Federal Foreign Minister Annalena Baerbock put in a speech accompanying the launch of the National Security Strategy process in March 2022, “We must understand disarmament and arms control as being complementary to deterrence and defence.”³

Dual-capable aircraft renewal and Russia

German decisions about technological procurement and change appear to be bound closely to decisions taken by NATO. NATO deterrence posture remains undergirded by nuclear weapons and nuclear deterrence, but also slowly appears to be incorporating various strategic non-nuclear weapons into its posture too.⁴ Germany plays a specific role in NATO deterrence strategy, both through its membership in the nuclear planning group and as one of the five states in Europe that host US B61 nuclear gravity bombs. These “tactical” nuclear weapons⁵ are owned by the United States but will be made available to allied air forces at a time of war under a policy of nuclear sharing that dates back to the 1960s. The principle military function of these weapons was originally to halt a Soviet conventional attack across the Iron Curtain, but some would suggest that after the Cold War their main function became chiefly political (as a symbol of alliance commitments).⁶ However, analyst Julia Berghofer has suggested that in the Third Nuclear Age this might be changing in favour of a renewed military value – especially in light of the Russian invasion of Ukraine in 2022.⁷ In theory, there could be a scenario where German pilots deliver a nuclear weapon to a “tactical” military target, most likely in mainland Europe (notwithstanding the difficulties of NATO and the German government agreeing to do this). Although, as Oliver Meier suggests, it is not clear how much thinking the German government has done in the event that deterrence fails.⁸

One of the most symbolic Third Nuclear Age decisions facing Germany has therefore been whether to replace the current fleet of Tornado aircraft that are designated to deliver these nuclear weapons. Belgium, the Netherlands and Italy have all taken decisions to acquire a new generation of dual-capable aircraft (DCA) that can deliver the US B61 nuclear gravity bomb – specifically the US F35. Germany hosts 20 or fewer B61 bombs at Büchel air base, and retains a fleet of Tornado DCA to deliver them. But these aircraft are reaching the end of their service lives. There was a view that the new German coalition government elected in Autumn 2021 might decide either not to replace the existing DCA (thus effectively withdrawing from the NATO nuclear mission) or at least buy a less suitable aircraft for the role.⁹ But the coalition agreement made it clear that the Government would replace the DCAs – even before the strategic shock provided by the Russian invasion of Ukraine.¹⁰ Accordingly, in March 2022, the German government officially agreed to buy the F35 to replace the Tornados by 2030.¹¹ This commitment notwithstanding, some commentators have suggested that for the deterrence/warfighting mission to remain credible (e.g., against advanced air defences), Germany should consider a different method of nuclear delivery, such as an air-launched stand-off weapon or a submarine-launched cruise missile.¹²

Engagement with the idea of strategic non-nuclear weaponry has been slower in Berlin than in other parts of Europe,¹³ but the decision taken at the 2024 NATO Summit to (re)deploy US medium-range ground-launched missiles in Germany marks a significant first step.¹⁴ Under this plan, US Tomahawk cruise missiles, SM6 ballistic missiles and the Long-Range Hypersonic Weapon of the US Army's Multi-Domain Task Force will be deployed on German soil in 2026. These missiles have ranges varying between 1500 and 3000 km, meaning they can strike targets inside Russia.¹⁵ Germany has also invested in conventional precision strike capabilities that appear to be designed for tactical missions against high-value conventional military targets. Most notable is the Taurus KEPD 350 air-launched cruise missile (ALCM) acquired during the 2000s and, more recently, several AGM-158 JASSM cruise missiles purchased from the United States. On the sidelines of the 2024 NATO summit, German officials also agreed to be part of the European Long-Range Strike Approach (with France, Italy and Poland) to develop missiles with ranges beyond 500 km.¹⁶

The Russian invasion of Ukraine in 2022, and before that, the end of the Intermediate Range Nuclear Forces Treaty (in 2018), has also driven interest in Germany acquiring a ballistic missile defence capability. Specifically, the concern is that the current NATO BMD system based around the US Aegis and Standard Missile architecture is designed to address threats from the south (Iran) rather than the east (Russia). Germany is concerned about threats emanating from Kaliningrad – where Russia has deployed Iskander ballistic¹⁷ and Kinzhal hypersonic missiles capable of reaching Berlin.¹⁸ The result is interest in buying the Israeli Arrow BMD system¹⁹ (although according to one senior German expert, the wisdom behind this idea is unclear) and German leadership of the Sky Shield initiative that began in late 2022.²⁰

Germany has begun preparing its navy for ballistic missile defence missions and also joined the European TWISTER project to build space-based sensors to track hypersonic weapons.²¹ However, there is evidence to suggest that these developments are inherently political and driven in part by domestic industrial factors (and so-called “pork barrel politics”) as much as strategic threat-based planning.²²

Harmonising geopolitical interests

There are four key components to the geopolitics of the Third Nuclear Age for Germany: first, the German political and military elite remain committed to a policy of nuclear deterrence against Russia through membership in NATO; second, historically, Germany has been among the states most reliant within NATO on Russian energy; third, the United States remains the central guarantor of German security, but there are concerns that this link may be weakening; and lastly, the majority of German policymakers have a different view of France as a global nuclear actor to their French counterparts and on the idea of a “Eurodeterrent.” All of this is unfolding in what one German expert has termed “Cold War 2.0” for Berlin.²³

German elites continue to see national security as best served by membership in NATO and ongoing engagement with multilateral organisations. The NATO

Strategic Concept released in 2022 makes it clear that Russia and China are viewed as major challenges to Euro-Atlantic security and that the threats facing the alliance are global and interconnected.²⁴ The Strategic Concept also reiterates that

As long as nuclear weapons exist, NATO will remain a nuclear alliance. NATO's goal is a safer world for all; we seek to create the security environment for a world without nuclear weapons.²⁵

Mainstream German politicians and officials publicly accept the role of nuclear weapons in alliance deterrence strategy. Although it was somewhat surprising that the Social Democrats, Free Democrats and Greens all agreed to support the continuation of nuclear sharing as part of their coalition document of December 2021 (before the Russian invasion of Ukraine). The Christian Democrats, which had been in power for almost two decades (and previously led by Angela Merkel), had always been a strong supporter of the NATO nuclear deterrence mission. While in 2020 a public opinion poll found that 66% of Germans supported abandoning nuclear deterrence,²⁶ this has shifted since the start of the Ukraine war, and there is no strong disarmament constituency in contemporary federal German politics.²⁷

Germany is a key member of the NATO nuclear alliance, but it has traditionally sought to develop good relations with Russia too. A key component of this is the Nord Stream 2 pipeline and the energy reliance that Germany has on Russia; it is estimated that in 2022, 25% of German energy needs were dependent on Russia.²⁸ This made Germany potentially vulnerable to Russian coercion and can explain the reluctance in Germany's approach to how NATO should respond to the invasion of Ukraine in 2022. Unsurprisingly, the Scholz government has been at pains to stress the importance of energy diversification and moving away from relying upon any one supplier, but this will take time.²⁹

Germany remains heavily reliant on a continued US commitment to European security, but officials became concerned about the Trump administration's (2017–2021) “transactional approach” to extended deterrence partnerships,³⁰ and what a Trump second term might mean for European security. The centre ground of German politics is characterised by a strong desire to ensure the vitality and functioning of the Atlantic Alliance while at the same time seeking to balance the relationships with the United States and the European Union. That said, there is no strong push to “Europeanise” the German response to nuclear challenges in the Third Nuclear Age. Indeed, while Germany may be increasingly keen to diversify its security strategy, policy elites remain sceptical of the idea of a “Eurodeterrent” as has been revised by French President Emmanuel Macron.³¹ As Oliver Meier puts it, “for France, nuclear weapons remain symbols of independence and a national security asset, while Germans see these weapons mainly as a liability.”³² However, the idea of a European nuclear weapon has returned to the political debate given the fear that the European security complex could deteriorate further and both the United States and France become unreliable partners³³ (marking a noticeable shift from pre-Ukraine war).³⁴

Arms control, disarmament and the TPNW

Irrespective of the emerging challenges of the Third Nuclear Age, the German political establishment remains (at least rhetorically) a supporter of nuclear arms control,³⁵ a major driver of confidence-building measures across the Euro-Atlantic space, and believes in the sanctity of the NPT.³⁶ The Russian invasion of Ukraine does, however, appear to be something of a watershed moment and seems likely to usher in a new period of more vocal and staunch support for NATO and the role of nuclear deterrence, and for greater expenditure on defence. Germany is also one of the four key members of the NATO “Quad” and enjoys special access to nuclear consultations with the nuclear-armed United States, United Kingdom and France.³⁷

Federal Government officials are increasingly concerned about the gradual unravelling of the agreements and structures that were perceived as central to peace and security in Europe during the First and Second Nuclear Ages, namely the ABM Treaty, the Treaty on Conventional Armed Forces in Europe, the Intermediate Range Nuclear Forces Treaty and the Open Skies Treaty. While in the past, Berlin may have felt a “responsibility to take the lead on efforts to strengthen mutual restraint between the West and Russia – or at least to support them energetically,”³⁸ today there is no practical German approach to arms control. For example, proposals to negotiate a European INF treaty have been rejected by German lawmakers, largely due to concerns that a European successor agreement could create rifts within the transatlantic community.³⁹ Moreover, German officials played a major role in the discussions with Iran regarding its nuclear programme, but there is a feeling of fatigue and a broader concern about a lack of willing partners when it comes to developing new arms control agreements.⁴⁰ Unlike in other parts of Europe, Germany doesn’t like to take the lead when it comes to arms control.⁴¹

The German Federal Government remains committed to a world without nuclear weapons,⁴² but has not signed the TPNW, as doing so would severely complicate its role in NATO. And in a speech in late 2022, Foreign Minister Annalena Baerbock made it clear that “NATO’s nuclear deterrence must remain credible” and that disarmament “cannot be done by making unilateral demands of our western partners within the alliance.”⁴³ However, in 2022, a German delegation participated as an observer at the First Meeting of the States party to the TPNW (Germany and Norway were the only nuclear alliance states to do so). A major reason for this was a concern about the growing fissure between NPT supporters and disarmament activists, and especially as a way of making the nuclear sharing agreement more digestible to the green constituency. As Oliver Meier puts it:

For Berlin, it is thus particularly important to prevent a looming fragmentation of the nuclear order. To achieve this goal, Germany has to be willing to sit at the table with all sides. Berlin must be able to speak with its nuclear allies in NATO as well as with disarmament advocates and TPNW supporters.⁴⁴

According to one NATO official interviewed off-the-record, this decision by Berlin is being closely monitored by officials in other NATO capitals. But experts

suggest that there was never any serious desire for Germany to engage further with the TPNW. Moreover, the disarmament movement is not as strong in Germany as it once was, and much like other European populations, the lack of engagement in nuclear issues in general is low.⁴⁵

In 2011, following the Fukushima nuclear accident in Japan, the German government announced the intention to phase out nuclear power by 2022 (nuclear power had contributed about 25% to the German national energy mix up until the early 2010s).⁴⁶ While Chancellor Scholz briefly extended the life of Germany's three remaining nuclear power stations following the Russian invasion of Ukraine and the subsequent European energy crisis, all reactors were taken off line in April 2023.⁴⁷ The result is that Germany continues to rely on fossil fuels for electricity generation at the same time as other states in other parts of the world turn to – or turn back to – nuclear power for “clean” energy. This also marked the end of a long period of nuclear latency.⁴⁸

Conclusion: hedging and balancing

The Atlantic alliance and nuclear deterrence through NATO remain absolutely fundamental to German security policy, and the German government has announced that the Bundeswehr will acquire a new fleet of F35 aircraft to deliver US tactical nuclear weapons as part of this deterrence mission, as well as hosting US medium-range missiles able to hit Russia. While German officials and policymakers in Berlin continue to publicly support the goal of multilateral nuclear disarmament, and delegations were sent to observe both Meetings of State Parties of the TPNW, this was as much about domestic politics and a desire to reach out to all stakeholders in the global nuclear order rather than a tentative foray into signing the treaty. This suggests that the German political elite are effectively hedging their bets as the global security environment unfolds in the Third Nuclear Age, although post-Ukraine invasion Germany may begin to play a more prominent role in the Euro-Atlantic security order. Indeed, the Scholz government has already pledged 100 billion Euros to “defence,” although at the time of writing it is unclear exactly what this will be spent on (or what strategic goals it will be shaped by...).⁴⁹

The German political and military elite are trying to balance a number of different military, political and normative pressures as the Third Nuclear Age unfolds. But membership in a strong and militarily capable NATO, undergirded with United States, United Kingdom and indirectly French nuclear weapons, is at the heart of this strategy. This sentiment was captured by Foreign Minister Annalena Baerbock in August 2022 when she said that, “Now is the time to defend what the generation before us has built. Now is the time to stand strong for our peaceful international order.”⁵⁰ Berlin is keen to advance new mechanisms of arms control, risk reduction and stability; at the same time, German policymakers are keenly aware of the growing fractures within the international nuclear order but seem to view orthodoxy, assimilation and dialogue rather than new disarmament initiatives as the best way to maintain global nuclear peace. Or as Ulrich Kühn put it in 2024, “Right now, deterrence rules; arms control comes second.”⁵¹

Acknowledgement

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8 India

India is unequivocal in its commitment to universal, non-discriminatory and verifiable nuclear disarmament. ... [But] As a responsible nuclear weapons State, India has a policy of maintaining a credible minimum deterrence based on a No First Use posture and non-use of nuclear weapons against non-nuclear weapon states.

(Statement to the First Committee of the UN General Assembly, October 2021)¹

Introduction: “nuclear sui generis”²

India provides a fascinating case study for understanding the impact and implications of a move into a Third Nuclear Age. Officials in New Delhi appear to be following a classic hedging strategy: continuing to modernise and slowly expand the nuclear arsenal and delivery platforms, developing a range of non-nuclear weaponry with potential strategic applications, while at the same time seeking to balance relations with the three major powers – China, Russia and the United States – and slowly establishing itself as a *de facto* (and “responsible”) member of the nuclear order from its position outside the Non-Proliferation Treaty (NPT). Genuine nuclear security concerns continue to underpin Indian nuclear deterrence thinking, but this varies between the challenges posed by the direct military threat in the west from Pakistan and the more status-based challenge posed in the east from China. While nuclear weapons remain an important component of meeting and deterring these challenges, there are no obvious signs that political and military elites are contemplating a rapid expansion of the nuclear force. Military developments such as a multi-layered missile defence system, a nuclear-powered submarine programme and investment in hypersonic missile technologies, all have a role in Indian security planning. But these moves might also be explained in part by wanting to match the developments of the major players and assure the “great power status” that ostensibly comes with having such technologies. There is also a strong sense of not wanting to be left out of future arms control discussions or be hampered by them, as happened with the 1968 NPT.

The pathway to security for India is neither centred on nuclear weapons nor underpinned by a strong desire to use technology to transform its current security

environment, but rather by a hedging strategy that seeks to slowly manoeuvre New Delhi into a more militarily and geopolitically secure and advantageous position. At the same time, the Indian government is committed to working towards nuclear disarmament and continues to play an important role in non-Western groups, such as the BRICS and the Non-Aligned Movement. This approach has been described by one former Indian official as “nuclear *sui generis*” – the context facing Indian policymakers and the Indian response is quite unlike that of other states looked at in this book.

Modernised nuclear forces and the quest for advanced technology

Official information on India’s nuclear capabilities and nuclear doctrine is difficult to access, owing to the high level of secrecy that surrounds the programme, but there is evidence that India is pursuing a hedging strategy.³ This approach consists of the continuous modernisation of its nuclear programme and a growing interest in the development of “emerging technologies.”

It is estimated that as of 2022, India possesses around 160 nuclear warheads and has produced enough weapon-grade plutonium to produce between 138 and 213 more.⁴ New Delhi is also working on expanding its nuclear triad. In 2016, 36 nuclear-capable Rafale fighter aircraft were purchased from France. The new jets will have longer-range weapons and more advanced sensors than the current IS/IB Jaguar and Mirage 2000H aircraft.⁵ The land-based component relies on the short-range Prithvi II (350 km) and Agni I (700 km), the medium-range Agni II (2,000 km) and the intermediate-range Agni III (3,500 km) ballistic missiles.⁶ Since 2012, the Defence Research and Development Organisation (DRDO) has been working on the Agni V, a nuclear-capable ICBM with a range of over 5,000 km that could reach Beijing and Shanghai.⁷ In March 2024, India successfully tested the Agni-5 with Multiple Independently Targetable Re-Entry Vehicle technology. According to some analysts, the launch of the missile represents India’s response to China’s deployment of MIRV on its DF-5 ICBM.⁸ The maritime leg of the triad includes India’s first nuclear-powered ballistic missile submarine, the INS Arihant, which successfully completed its first deterrence patrol in 2018. According to Indian Prime Minister Narendra Modi, this event contributed to the enhancement of India’s security needs and to maintain peace and stability in the region.⁹ India has also operated the nuclear-capable BrahMos supersonic cruise missile, which can be launched from submarines, ships, aircraft, or land platforms, since the early 2000s.¹⁰ Given the dual-use nature of the missile, some experts have pointed out that India could use the BrahMos to strengthen nuclear deterrence.¹¹

Indian officials are interested in hypersonic missile technology. Externally, this involves joint development of the BrahMos II hypersonic missile in partnership with Russia.¹² Indigenously, the DRDO has tested the Hypersonic Technology Demonstrator Vehicle in 2019, 2020 and 2023.¹³ There are few publicly available details about India’s hypersonic programme, but it appears to be linked with perceived requirements for deterring China.¹⁴ It may also be driven by a desire not to fall victim to a future technology denial regime inflicted by the major powers.¹⁵

The Indian government has embarked on the development of a two-tiered missile defence system to protect New Delhi and Mumbai from ballistic missile attacks. The system consists of the Prithvi Air Defence (higher tier) and the Advanced Air Defence (lower tier).¹⁶ In December 2021, Defence Minister Rajnath Singh claimed that “Ballistic missile defence systems are getting more and more robust” and that “as the time is changing, our defence requirements are changing accordingly,”¹⁷ but the specific plans for the programme were left opaque. The main drivers of Indian BMD appear to be China and Pakistan’s expansion of their nuclear programme, concerns about the launch of missiles against India and the security challenges deriving from the presence of non-state actors in the region.¹⁸ At the time of writing, experts suggest that India may have some rudimentary BMD capability, but it is difficult to make a more precise assessment because the Indian government is reluctant to share information.¹⁹

India has also focussed on developing different space technologies. In March 2019, India conducted an anti-satellite missile test, *Mission Shakti*. The Indian government made it clear that the “new capability we have developed is not directed against anyone,”²⁰ but the test may have been aimed at sending a demonstration of India’s space capabilities to China that conducted an ASAT test in 2007.²¹ This event pushed India to reassess its space policy and to acquire these technologies.²² Prestige has also been indicated as an important factor to explain India’s interest in ASAT, seen as a way to consolidate its great power aspirations and to demonstrate its modernity.²³ The official goal of the test has never been disclosed, but the Indian Prime Minister stressed that Mission Shakti represented an important step in enhancing India’s security and economic development and technological progress.²⁴

The election of Narendra Modi (in 2014) triggered a lively debate on India’s nuclear posture and the expectation that, as stated in the Bharatiya Janata Party election manifesto, he was going to make changes to India’s NFU. In spite of these concerns, India’s policy has remained unchanged.²⁵ Officially, India is committed to “build[ing] and maintain[ing] a credible minimum deterrent” and adhering to a policy of No First Use (NFU). This means that India retains the right to use nuclear weapons “in retaliation against a nuclear attack on Indian territory or on Indian forces anywhere” or “in the event of a major attack against...by biological or chemical weapons.” India’s doctrine also states that “nuclear retaliation to a first strike will be massive and designed to inflict unacceptable damage.”²⁶

Christopher Clary and Vipin Narang have suggested that India may be moving towards a counterforce capability against Pakistan.²⁷ They claim that there is evidence that India is moving away from NFU and investing in a series of technologies, such as more accurate and longer-range missiles, MIRVs and BMD, that could enable India to destroy and neuter Pakistan’s nuclear force. Others have suggested that there is no definitive evidence that India has assumed a counterforce posture.²⁸ Rajesh Rajagopalan claims that India does not possess the nuclear capabilities that would be necessary to conduct a counterforce first-strike attack against Pakistan and to deter China.²⁹ Moreover, there is no official statement from the government announcing this shift towards counterforce. During the first patrol of the INS

Arihant, Prime Minister Modi reiterated India's commitment to NFU and minimum deterrence.³⁰ According to Manpreet Sethi, the importance of this announcement should not be overlooked because the prime minister is head of the Political Council of India's Nuclear Command Authority.³¹

Great power aspirations and great power competition

It would be impossible to fully understand India's response to the Third Nuclear Age without taking into consideration how the country is balancing its relations with the great powers, the United States, China and Russia, and dealing with the complexities of the current international system. There is a strong desire among the elite in New Delhi for India to become a great power and to join the small group of countries that possess advanced nuclear and non-nuclear technologies. For example, following a BMD test in early 2017, the Indian Defence Minister declared that "India [had] crossed an important milestone" and that "It has entered an exclusive club of four nations (the United States, Russia, China and Israel)."³² A similar comment was posted by Prime Minister Modi after the March 2019 ASAT test when he tweeted, "India [was] only the fourth country to acquire such a specialised & modern capability," stressing that "the entire effort was indigenous."³³ The Union Defence Minister Rajnath Singh stated that the Indian government was committed to the modernisation of its technologies and that this goal was going to be achieved indigenously.³⁴ He added that "Those technologies which we have already developed are already ours, but along with that we should also acquire those technologies which today are only with a handful of countries."³⁵ These remarks show the tight link existing between India's commitment to improving its nuclear and strategic forces, its efforts to develop the same technological capabilities possessed by the United States, China and Russia, and its aspiration to be recognised as an important international player.

While the competition between great powers is intensifying in the new nuclear age, the Indian elite appear reluctant to take sides. Following the end of the Cold War, India abandoned its policy of non-alignment, replacing it with an approach based on the principle of "strategic autonomy."³⁶ Under this approach, Indian officials are seeking to preserve India's independence and freedom of action while maintaining friendly ties with the major powers.³⁷

As global strategic stability deteriorated with the 2022 Ukraine war, India has shown little willingness to side with the United States/West or Russia, but rather to keep the relationships distinct.³⁸ This is because India sees both Russia and the United States as valuable partners.³⁹ India and Russia entered into a strategic partnership in 2000, but their friendly relationship dates back to the Cold War period. Although the economic dimension of the relationship is underdeveloped, defence cooperation between India and Russia remains strong.⁴⁰ According to a study published by SIPRI, India was the top recipient of Russia's military hardware between 2012–2016 and 2017–2021.⁴¹ It has purchased missiles, submarines, frigates, tanks and helicopters from Russia.⁴² India's neutrality is also driven by its concern that this may push Russia to strengthen its relationship with China and get

closer to Pakistan. According to Ashley Tellis, “Both China and Pakistan desire closer ties with Russia than India feels comfortable with. Consequently, New Delhi aims to minimize Moscow’s proximity to both of its rivals.”⁴³

India has also been able to establish friendly ties with the United States. In 2004, the United States and India launched the “Next Step in Strategic Partnership” that “expand[ed] bilateral cooperation in the areas of civilian nuclear activities, civilian space programmes, and high-technology trade, and expanding dialogue on missile defense.”⁴⁴ Since then, the strategic partnership between the United States and India has continued to develop and has led to a series of agreements, such as the Logistics Exchange Memorandum of Understanding, Communications Compatibility and Security Agreement, Industrial Security Annex, Basic Exchange and Cooperation Agreement and Defence Technology Trade Initiative. In 2016, President Obama declared India a “Major Defense Partner” of the United States.⁴⁵ This recognition was designed “to elevate defense trade and technology sharing with India to a level commensurate with that of our closest allies and partners” and to “ensure strong defense trade and technology cooperation.”⁴⁶ In the last few years, the United States-India strategic partnership has continued to blossom. In 2023, in a Joint Statement, President Biden and Prime Minister Modi reiterated their reciprocal commitment to deepen the bilateral relationship and stressed that “technology will play the defining role in deepening our partnership.”⁴⁷ The two leaders also expressed their intention to work on the defence industrial cooperation between the two countries.⁴⁸

India is also a member of the Quadrilateral Security Dialogue, a strategic forum whose goal is to promote cooperation among the United States, Australia, Japan and India to maintain a free, open and inclusive Indo-Pacific and to deal with common regional challenges.⁴⁹ Since 2017, India has shown a strong interest in engaging with the other members and in playing an active role in the Quad, described by Modi as “a force for good.”⁵⁰ Some analysts and scholars have pointed out that the group represents an attempt to counter China’s rise in the Indo-Pacific,⁵¹ but Indian officials have been reluctant to explicitly admit it.⁵²

Since 2002, the United States and India have conducted a series of military exercises to expand their military-to-military relations, strengthen maritime cooperation and increase interoperability.⁵³ The growing level of engagement between the two countries in the defence and strategic fields suggests that they have been able to overcome their reciprocal mistrust and divergences. However, Washington and New Delhi’s interests and priorities do not always converge. According to Sumit Ganguly and M. Chris Mason, the United States has overestimated its influence on India and has not fully understood. They suggest that India’s hesitations to further develop the strategic partnership are driven by a reluctance to enter an exclusive relationship with the United States, which could be incompatible with its commitment to avoid alliances, reduce its freedom of action and could create an unbalanced partnership owing to the differences in terms of power, status and resources existing between the two countries.⁵⁴

The evolution of the relationship between the United States and China and the intensification of their rivalry are important factors in shaping India’s response

to the Third Nuclear Age. The United States and India share common concerns about China, but they have different views on how to deal with this challenge. The United States sees India as a counterweight against China and a crucial partner to protect US influence and interests in the Indo-Pacific region.⁵⁵ For India, clashes (such as that at Doklam in 2017) and China's expansion of its nuclear forces have contributed to strengthening the feeling that Beijing poses a serious threat to India's security.⁵⁶ These concerns have pushed Indian officials to adopt an "evasive balancing" approach.⁵⁷ This strategy involves enhancing the strategic cooperation with the United States and other countries concerned about the rise of China while trying to persuade the Chinese leaders that these initiatives are not directed against Beijing.⁵⁸

The complex relationship with the non-proliferation regime

At the start of the Third Nuclear Age, India's relationship with the non-proliferation regime remains fraught with complexities and challenges. These complexities are exacerbated by the tension between India's growing appetite for nuclear and emerging technologies, its strong desire to be part of the (nuclear) great power club and the inability of the global non-proliferation regime to accommodate India's security interests and aspirations.

In the last two decades, perceptions about India as a nuclear power have undergone a significant transformation. The United States-India civil nuclear deal in 2006 and the waiver from the Nuclear Suppliers Group in 2008 helped to inculcate an increasing recognition that even though it is not a member of the Non-Proliferation Treaty, India was a "responsible" nuclear actor that has complied with the principles of the treaty.⁵⁹ For instance, Foreign Secretary Shri Shyam Saran declared that India has always behaved in accordance with the provisions that NPT member states have to comply with.⁶⁰ A similar point was also made by External Affairs Minister Jaswant Singh in 2000 when he stated that even though New Delhi has not signed the treaty, its behaviour and policy have always been in agreement with the obligations of the NPT.⁶¹

Normative and ethical considerations of how to achieve a world free of nuclear weapons are significant to understand the evolution of India's attitude towards the non-proliferation regime in the new nuclear age. New Delhi has historically been a strong advocate of nuclear disarmament and has supported many initiatives targeted at promoting a world free of nuclear weapons (such as the Action Plan for a World Free of Nuclear Weapons presented by Prime Minister Rajiv Gandhi to the UN General Assembly in 1988).⁶² India's commitment to this goal has been reiterated in several statements released by eminent Indian policymakers. For example, in a statement before the Indian Parliament (in 2000), Jaswant Singh claimed that India's dedication to achieve nuclear disarmament has remained unwavering.⁶³ Similar remarks were also made by India's Foreign Secretary (in 2023) who stressed that "India believes that the goal of nuclear disarmament can be achieved through a step-by-step process, underwritten by a universal commitment and an agreed multilateral framework that is global and non-discriminatory."⁶⁴ However,

this seems to be impossible to obtain at the moment, given the inflexibility and the structure of the NPT.

Despite its strong support to nuclear disarmament and non-proliferation, India's opposition to international treaties, such as the NPT and the CTBT, has remained unchanged. New Delhi's position stems from the failure of these agreements to accommodate India's national security interests.⁶⁵ These considerations are useful to explain the decision of the Indian government to take part in the Treaty on the Prohibition of Nuclear Weapons (TPNW). After the TPNW entered into force in January 2021, the Indian Ministry of External Affairs published a press release stating that New Delhi did not support, and was not bound by, the treaty. Moreover, it made it clear that the creation of a nuclear weapon free world "can be achieved only through a step-by-step process underwritten by a universal commitment and an agreed global and non-discriminatory multilateral framework."⁶⁶ This is partly because none of the other nuclear-armed states have recognised the treaty, and it would be detrimental to India's security, given its difficult relationship with China and Pakistan.⁶⁷

Conclusion: nuclear pragmatism

The Indian response to the pressures, challenges and opportunities of the Third Nuclear Age is complex, but ultimately pragmatic. This multifaceted approach by New Delhi of nuclear and technological hedging, strategic balancing and gradual assimilation into the nuclear order reflects not just external pressures from a changing system but also internal and bureaucratic pressures from different constituencies within the Indian political system. The centrality of acquiring great power status, however this might be defined, and being seen as a "responsible nuclear actor" is also very important.

India may not currently be part of the trilateral great power nuclear club that will probably have the greatest say in defining what the Third Nuclear Age will look like, but the decisions taken by New Delhi in terms of weapons procurement, doctrinal evolution, great power relationship balancing, its membership of BRICS and its links with the Non-Aligned Movement and the Global South and its growing role within global nuclear governance discussions potentially make India the lynchpin around which the Third Nuclear Age will unfold.

India exhibits a range of characteristics which could potentially fall under any of the other categories examined in this book: nuclear weapons are important, albeit for political as well as military reasons; advanced strategic non-nuclear capabilities are being developed for conventional deterrence and possibly warfighting reasons; and India remains an outsider and sometimes a protestor against the established nuclear order. This is perhaps why India is best described as a hedger and balancer – seeking to navigate the new nuclear complexity in its *sui generis* way.

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9 The United Kingdom

A minimum, credible, independent nuclear deterrent, based on a continuous at sea posture and assigned to the defence of NATO, remains essential as the ultimate guarantee to our security, and that of our allies.

(UK Defence Command Paper, March 2021)¹

Despite a decision to increase the maximum number of warheads that might be held in the nuclear stockpile in 2021, the United Kingdom does not appear to be placing more emphasis on nuclear weapons, like the Nuclear Traditionalists. Neither is the UK commitment or direction of travel when it comes to strategic non-nuclear weapons development comparable with the Technological Transformers. And notwithstanding a long-running commitment to disarmament, like the Activists and Protestors, nuclear deterrence remains important to the security thinking of UK political and military elites. This all makes the United Kingdom a classic Hedger and Balancer: unwilling or unable to shift thinking and practice markedly as a new nuclear age unfolds; wedded to protecting the nuclear status quo based on arms control, restraint and established institutions; doubling down on key alliances, especially those with the United States and NATO, and slowly developing advanced conventional weapons. The UK approach to the Third Nuclear Age is therefore characterised by continuity rather than change, but also by growing concerns about the challenges posed by technological innovation by adversaries, the implications of a move towards multipolarity and the possible instability stemming from the breakdown of normative frameworks.

The United Kingdom is in the process of building a fleet of four new “Dreadnought-class” nuclear-powered submarines and a new nuclear warhead that will provide the ability to deliver nuclear weapons well into the second half of this century. While UK officials have begun to speak of a “new era” and a more “contested and volatile world,” it could be argued that this is very much a nuclear force structure designed for the exigencies of the Cold War and the First Nuclear Age, and that didn’t alter very much during the Second Nuclear Age.² As a result, it appears that the overriding response to a Third Nuclear Age by the UK government will be pragmatic hedging – slow, gradual engagement with technological,

geopolitical and normative challenges and a desire to maintain the status quo rather than seek change. Indeed, according to one former Ministry of Defence official, the United Kingdom has restricted ability to make any changes to its current position, given tight coupling to US programme decisions, the limited capacity of the United Kingdom's nuclear complex, and the timescales – and cost – to do new things.³ At the time of writing, the Labour Party government elected in July 2024 has committed themselves to maintaining “the nuclear deterrent.”

In early 2021, the UK government released the findings of a major review of national security policy: *Global Britain in a Competitive Age: Integrated Review of Security, Security, Development and Foreign Policy*⁴ (IR21), shortly followed by the *Defence in a Competitive Age Command Paper* (DCP21).⁵ Driven by the perception of substantial changes in the security environment – namely the Ukraine war and the growing challenge posed by China – an *Integrated Review Refresh*⁶ (IR23) and a new *Defence Command Paper* (DCP23)⁷ were released in 2023. While these documents noted the significance of technological change, they reiterated that a submarine-based retaliatory nuclear capability remained the central mechanism for strategic deterrence. At the same time, these reports outlined that a central approach to this new era would be doubling down on key alliances, continuing to support measures of risk reduction and arms control and working towards incremental multilateral nuclear disarmament.

Technological innovation and the UK deterrent

The United Kingdom operates a posture of “minimum credible nuclear deterrence” based on a fleet of four nuclear-powered submarines (SSBNs), each armed with “Trident” Submarine Launched Ballistic Missiles (SLBMs) carrying multiple independently targetable nuclear warheads. Since 1969, one of these submarines has always been on patrol, hidden underwater (probably in the North Atlantic Ocean), ready to respond to a nuclear or other existential attack against the United Kingdom. As of 2021, the government no longer makes public how many missiles or warheads are deployed on these submarines, but previously the submarine on patrol carried no more than 40 warheads, each with a “scalable” yield up to approximately 100 kt. In 2021, it was announced that the UK stockpile would rise from approximately 225 warheads up to “no more 260 nuclear warheads” by the middle of the decade.⁸ In addition to undergirding UK deterrence policy, UK nuclear weapons are also assigned to the defence of NATO.

Technological shifts are a major challenge for the United Kingdom in the Third Nuclear Age. There is a growing concern that the development of sophisticated nuclear and especially non-nuclear weapons capabilities presents a major challenge to the United Kingdom, its allies and its interests. As DCP21 put it:

Our historic technological advantage is being increasingly challenged by targeted investment in capabilities designed to counter our strengths and challenge strategic stability, such as hypersonic missiles to defeat missile defences, and nuclear-powered cruise missiles.⁹

The challenge is not just to the sanctity and surety of the UK nuclear capability but also to the ability to deter and respond to conventional aggression in the Euro-Atlantic and potentially further afield.

The biggest concern arising from a more technologically challenging environment for UK military officials is the potential for direct threats to the UK nuclear deterrent that might mean that it cannot function in the way that is intended to, or at best, confidence in the invulnerability and security of the SSBN-Trident system is undermined. The historical record shows that UK deterrence planning has traditionally been linked with the “Moscow Criterion” (that is, being able to credibly threaten to destroy a major city) and causing “unacceptable damage” to an adversary, and perhaps even more obliquely with mitigating “future uncertainty.”¹⁰ At least in theory, the challenge to this system and thinking could emerge in several different ways: first, through a breakthrough in Russian or another state’s Anti-Submarine Warfare capabilities that makes finding and tracking UK submarines less difficult¹¹; second, Computer Network Operations or “cyberattacks” that are used to steal design secrets, access and compromise the submarine’s various operating systems or somehow target sailors and operators; or third, as a result of advances in integrated air and missile defence systems that could undermine confidence that UK warheads can reach their targets.¹² These challenges are perhaps more acute for the United Kingdom than the other nuclear-armed states because the United Kingdom relies on just one nuclear delivery system.

The United Kingdom doesn’t have an explicit strategic non-nuclear weapons development programme, like the Technological Transformers looked at in this book. However, the MoD has expressed an interest in developing hypersonic weapons,¹³ principally as a technology-readiness programme rather than one driven by a specific strategic need, and is working to explore the latest military technologies through the AUKUS partnership with the United States and Australia. Likewise, the United Kingdom is working with Japan and Italy to develop a sixth-generation stealth fighter under the Global Combat Air Programme. The United Kingdom’s interest in missile defence is principally related to the maritime domain (the Sea Viper/Aster system on Type 45 destroyers for example¹⁴), early warning and tracking radar and battlefield defences with NATO allies and other partners, rather than the protection of the British Isles.¹⁵

But the United Kingdom does operate a fleet of Trafalgar and Astute-class nuclear-powered submarines,¹⁶ armed with highly accurate non-nuclear Tomahawk Land Attack Missiles, purchased from the United States. The United Kingdom has approximately 65 block IV Tomahawk missiles, which can be deployed aboard surface ships or submarines. Each missile has a range of in excess of 1000 miles and is accurate to approximately 5 metres. In 2022, the UK government announced that the Tomahawk missile would be upgraded, allowing for greater range, enhanced target selection and reduced vulnerability to air and missile defences.¹⁷ The United Kingdom also operates the highly accurate conventionally armed Storm Shadow air-launched cruise missile (used to great effect in Ukraine), which has an operational range of up to 350 miles.¹⁸ Lastly, the United Kingdom has begun work on the next generation of nuclear-powered conventionally armed submarines

(SSN-AUKUS – in partnership with the United States and Australia) that are planned for deployment in the late 2040s. These submarines will be fitted with Vertical Launch Tubes that will allow greater interoperability with different types of missiles.¹⁹

Great power deterrence and the importance of alliances

The great power challenges of the Third Nuclear Age were brought starkly into contrast for the UK government following Russia's invasion of Ukraine in February 2022.²⁰ While the invasion itself was not initially a direct challenge to UK national security, it appeared to mark the end of a prolonged period where Russia wasn't really considered a major strategic competitor in the Euro-Atlantic region or an immediate nuclear threat to the United Kingdom. Subsequent Russian threats against the United Kingdom and NATO have only served to make this more tangible – including a rather bizarre nuclear threat by a Russian TV presenter in May 2022.²¹ In a July 2002 speech, UK National Security Advisor Sir Stephen Lovegrove described this as part of “a much broader contest unfolding over the successor to the post-Cold War international order.”²² In early 2023, the IR Refresh noted the “transition into a multipolar, fragmented and contested world has happened more quickly and definitively than anticipated.”²³

There are a number of implications that arise from the Russian invasion of Ukraine and the gradual resurgence of Russia as a major nuclear player over the past decade. First, the United Kingdom has to think seriously about the requirements of deterring Russia, both in the nuclear conventional realms. Russian ASW and BMD (and arguably CNO) now play a much bigger role in shaping decisions about the UK nuclear capability than they have for several decades and whether the UK nuclear force continues to represent a credible deterrent.²⁴ Second, Russian actions have put renewed focus on the importance of *conventional* deterrence for the United Kingdom (and NATO) and the need for both a credible conventional *and* nuclear deterrent capability (and the industrial base and skilled workforce to sustain this).²⁵ This is also likely the reason behind the possible deployment of US B61 gravity bombs, which can be delivered by US F35 aircraft, to RAF Lakenheath in eastern England.²⁶

The United Kingdom is also slowly realising that it may have to think about deterring two major nuclear-armed powers at the same time (Russia and China). While the assumption is that this challenge can be met through burden-sharing across key UK alliances, there is also a worry that should the United States become involved in a conflict in the Asia-Pacific, it may not be able to contribute the same conventional deterrent effect in Europe. This potentially places the United Kingdom and the other European members of NATO in a difficult position. At the same time, while successive UK governments were keen to see China as a partner rather than a competitor or adversary over the past two decades in the Asia-Pacific, this has been replaced by a recognition that China represents a major challenge to the western “rules-based” international order in the Third Nuclear Age. This could have been one of the factors influencing the nuclear warhead cap increase and has

led some to suggest that the United Kingdom should possibly build more than the 4 SSBNs it currently operates or even consider redeployment of other nuclear delivery systems.

The need to balance a rising China has been cited as a likely reason behind the decision to sign the trilateral Australia-UK-US (AUKUS) security pact in September 2021.²⁷ The headline aspect of the agreement is to supply Australia with conventionally armed nuclear-powered submarines (making it the only non-nuclear armed state to have this capability²⁸), but it also includes plans to cooperate on a number of other advanced military technology areas (notably hypersonic weapons and AI). However, while for the United States, the AUKUS agreement seems to be designed directly to balance and perhaps deter China, according to a senior government official speaking off-the-record, for the United Kingdom, it is primarily about technology sharing. It is probably also about shoring up the UK submarine-building base.

The United Kingdom is not one of the nuclear great powers and will not be a major influence in determining the shape of the Third Nuclear Age, and this means that its alliance with the United States and membership in NATO are likely to become even more important. The relationship with the United States remains fundamental: while the United Kingdom builds its own submarines and nuclear warheads – both are believed to be contingent on technology exchange with the United States²⁹ – the United Kingdom leases its Trident ballistic missiles from a common pool built and maintained by the United States, and purchases US-made Tomahawk cruise missiles for long-range conventional land attacks. The United Kingdom also hosts a key radar for the US ballistic missile defence system (at Fylingdales Moor in the North of England), but does not have the ability to intercept long-range ballistic missiles aimed at the UK mainland.³⁰

The UK nuclear deterrence mission is shifting back towards prioritising the challenges posed by major powers (Russia and China) and away from “rogue states” and terrorists. However, the SSBN-Trident system is inherently designed to be able to destroy a counter-value target as part of a policy of deterrence by *punishment*. While this is not to say that the Trident missile and “Holbrook” warhead (and its replacement, “Astraea”) could not be used in a *counterforce* or even a sub-strategic role in certain circumstances – perhaps against a “rogue” or minor nuclear-armed state – it would be difficult for the current system to play both a tactical *and* a strategic role in a future conflict against a nuclear competitor because a tactical/sub-strategic use would potentially undermine its strategic value (by giving away the submarine’s position).³¹

There is of course also the possibility that a future nuclear challenge to the United Kingdom (and NATO) comes from a non-great power, or at least not Russia or China, and that different capabilities might be required for different types of both nuclear and non-nuclear strategic deterrence missions. This could include: the ability to conduct rapid *non-nuclear* long-range strikes against missiles being readied for firing; deploying a limited defensive capability to intercept a small and relatively unsophisticated launch from a non-great power adversary; or building capabilities for strategic non-nuclear weapons and strategic non-nuclear deterrence in general.

Nuclear restraint: the NPT and stability

The United Kingdom has traditionally seen itself as a leader in normative disarmament and verification efforts,³² operating a policy of “minimum nuclear deterrence” and making significant cuts to its nuclear stockpile since the Cold War. It probably also still has the smallest nuclear arsenal among the P5, and officials often refer to it as a “responsible nuclear weapon state.”³³ But the pressures of the Third Nuclear Age seem likely to make nuclear weapons more important for the United Kingdom rather than less, and this is evidenced in the decisions to push ahead with a fleet of new nuclear-powered submarines to carry nuclear-armed missiles, to lobby the United States about supporting the development of a new UK nuclear warhead and to increase the warhead stockpile ceiling and end transparency about the number of nuclear weapons that the United Kingdom operationally deploys. As one UK official put it in off-the-record discussion, “we remain committed to minimum credible nuclear deterrence, but minimum has grown a bit.”

The political debate about nuclear weapons in the United Kingdom is arguably the most contested of all the nuclear-armed states, and this is reflected to some extent in the positions of the major political parties at Westminster. While the political mainstream broadly supports the continuation of an independent deterrent at the same time as working towards *multilateral* disarmament, the Scottish National Party, Plaid Cymru and the Green Party and some members of the Conservative Party, Labour Party and Liberal Democrats favour *unilateral* UK disarmament, and a recent former leader of the Labour Party was a leading figure in the UK Campaign for Nuclear Disarmament. Nuclear disarmament played a prominent role in UK politics in the 1980s, and it is conceivable that it could do so again in the future.

As one of the legally recognised Nuclear Weapons States under the Non-Proliferation Treaty (NPT), the United Kingdom continues to see the NPT as the cornerstone of global nuclear security and disarmament efforts.³⁴ Like other European allies, UK officials regret the loss of the Intermediate-range Nuclear Forces (INF) and Conventional Forces Europe (CFE) treaties, as well as the Open Skies and Vienna Document agreements, and are keen to rebuild this security architecture in Europe.³⁵ The current focus appears to be on “integrated arms control,” extending previous initiatives across “interlinked and overlapping categories of proliferation,” as well as “strategic risk reduction.”³⁶ A good example of this is the United Kingdom’s involvement in the JCPOA (Joint Comprehensive Plan of Action) with Iran and the decision taken in 2023 to maintain missile and nuclear restrictions on Iran.³⁷ Another example is the decision taken in October 2022 not to develop direct ascent anti-satellite weapons.³⁸

UK officials expressed interest (albeit not publicly) in attending the Humanitarian Impacts conferences but were very clear that the United Kingdom would not sign the 2017 Treaty on the Prohibition of Nuclear Weapons (TPNW) because the UK government does not believe that “this treaty will bring us closer to a world without nuclear weapons,”³⁹ and “[does] not address the obstacles that must be overcome to achieve lasting global disarmament.”⁴⁰ However, UK officials have put themselves in a difficult position when it comes to global non-proliferation norms and

particularly the NPT review process given the decision to effectively increase or expand its nuclear stockpile and deployed nuclear weapons (or at least the perception that this is the case) and because of the possible ramifications of supplying Australia with nuclear-powered submarines under the AUKUS agreement. While provision of nuclear-powered submarines to other states is not formally prohibited under the NPT, the fear is that this sets a worrying precedent for unmonitored technology transfer that others might follow.⁴¹

This could be problematic for the United Kingdom, because arguably the most important factor for Westminster in the unfolding Third Nuclear Age will be whether a return to arms control and restraint is possible. The United Kingdom is not in a position to compete with Russia and China in a nuclear or strategic non-nuclear military technology arms race and is heavily dependent on the United States and its role in NATO. As the 2023 IR Refresh put it, "...burden sharing with our allies and partners is a vital element of an integrated approach to deterrence and defence."⁴² Indeed, the current UK deterrence posture only really makes sense in a world where strategic stability is based on the deterrent value of minimum nuclear forces used for retaliation and where key UK alliances are solid. "Renewing strategic stability for a new era" is therefore at the heart of UK policy.⁴³

Conclusion: business as usual?

The decisions taken by the United Kingdom will not play a major role in shaping the Third Nuclear Age (or, as one senior government official put it in a private meeting, "a new geopolitical age where the role of nuclear weapons may shift"). But the United Kingdom will be impacted by strategic shifts in the unfolding global nuclear order. There are a number of different aspects to this, but above all, technological innovation by strategic competitors will pose unsettling questions about the credibility of UK conventional and nuclear deterrence capabilities. UK planners will have to think seriously about whether a commitment to both the Euro-Atlantic and Indo-Pacific theatres of operations is feasible, and, in turn, this will have implications for the commitment to future global non-proliferation efforts.

The United Kingdom retains a sophisticated conventional military capability, including platforms such as nuclear-powered submarines and long-range, highly accurate cruise missiles that might be thought of as strategic non-nuclear weapons. But the key difference with the Technological Transformers is that the role and size of these forces remain largely unchanged from the Second Nuclear Age and, if anything, have reduced. It is possible that the United Kingdom could move towards a greater reliance on advanced conventional weaponry for Euro-Atlantic deterrence requirements in the future, but this would involve a significant political commitment to increase defence spending. Even with the overt Russian threat and the pressures of supplying Ukraine with weapons, the current political climate suggests that this is unlikely.

As a result, and notwithstanding a gradual recognition that the pressures and challenges posed by the global nuclear order are changing, the United Kingdom appears wedded to continuing a decades-long approach to nuclear deterrence in

the Third Nuclear Age, one characterised largely by hedging and balancing. This approach places a small and constrained – albeit very sophisticated – retaliatory nuclear deterrent capability at the heart of strategic policy. With the next generation of SSBNs due to become operational sometime in the next decade, this suggests that UK policy is unlikely to change. Whether this is by choice or necessity is debatable; it is unclear the extent to which current UK decisions have been curtailed by past choices that have limited any ability to change and by a perpetually decreasing funding envelope.

Notes

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10 The People's Republic of China

We will strengthen Party building across the board in the people's armed forces to ensure that they always obey the Party's command. ... We will establish a strong system of strategic deterrence, increase the proportion of new-domain forces with new combat capabilities, speed up the development of unmanned, intelligent combat capabilities, and promote coordinated development and application of the network information system. We will improve the command system for joint operations and enhance our systems and capacity for reconnaissance and early warning.

(President Xi Jinping, October 2022)¹

The “rise” of the People's Republic of China (PRC) is central to the new security politics of the Third Nuclear Age. However, while the material power of the PRC *has* undoubtedly expanded in the past 20 years, it would be a mistake to assume this has automatically led to a totally new paradigm for Chinese nuclear politics. Although secrecy makes it impossible to be certain, PRC security elites have consistently understood nuclear weapons to provide both a measure of deterrent power and a level of international standing.² At the same time, fears that minimum deterrence could be overturned by technological change have also been present since the 1960s. In the 21st century, what is different about the PRC's responses to changing geopolitics, technology and norms is that the government finds itself with overwhelmingly more resources to throw at technological “fixes.”

Perhaps now more than at any other time in the PRC's history, Chinese leaders are attempting to chart a route to nuclear security through a strategy of hedging, albeit one predominantly based on technological capability. Most prominent are the nuclear- and non-nuclear-armed ballistic missiles, along with more esoteric delivery systems such as hypersonic glide vehicles. Behind the eye-catching build-up of missiles lie a whole host of supporting technologies. China can increasingly boast of an intelligence, surveillance and reconnaissance infrastructure that can deliver precision strikes against targets throughout East Asia. Furthermore, its hit-to-kill technologies have a proven anti-satellite capability and a presumed degree of effectiveness against ballistic missile threats. However, this high level of activity in the military-technology realm totally eclipses the limited efforts the PRC has put into shaping the global nuclear order. This is especially the case on bilateral

negotiations with the United States, a deteriorating relationship that is arguably central to the Third Nuclear Age.

Chinese leaders have continued to publicly emphasise their long-standing policy of a “defensive” nuclear strategy, including a doctrine of No First Use (NFU)³ – importantly also emphasised in the confidential-marked doctrinal document *The Science of Second Artillery Campaigns/Operations*.⁴ An important clarification on the “defensive” quality of China’s nuclear strategy is the PRC’s official designation of Taiwan’s government as illegitimate separatists. According to their logic, renunciation of use of force internationally is a totally separate notion to the “internal affairs of whether the [Chinese] government should resolve the Taiwan issue by peaceful means or by force.”⁵ Nevertheless, Beijing has consistently laid the rhetorical groundwork for the use of force against Taiwan to be “defensive” as far as intra-elite and domestic audiences are concerned.⁶ The role of nuclear weapons in this hypothetical scenario is an open question.

As official Chinese discourse has described it, “Nuclear capability is the strategic cornerstone to safeguarding national sovereignty and security.”⁷ As of 2023, the nuclear capability in question is primarily land-based ballistic missiles, with around 142 intercontinental-range supplemented by 240 medium- and intermediate-range weapons.⁸ Additionally, the PRC has six nuclear-armed ballistic missile submarines and bomber aircraft with “a nuclear mission.”⁹ The PRC’s leaders also appear to be creating technological options to diversify their nuclear forces in the future.

The menace of BMD, responses and the conventional picture

Hedging against future “nuclear blackmail” has been one of the rationales of the Chinese nuclear arsenal since the beginning.¹⁰ Official Chinese sources represent this issue less as a concern in-and-of-itself, but rather with nuclear threats being a potential feature of future regional wars.¹¹ Xi Jinping has also explicitly linked China’s nuclear weapons to maintaining its great power status.¹² The PRC does not explicitly name the intended counterparts to be deterred. The Ministry of National Defense has published provocatively titled Op-Eds from elsewhere in the state media ecosystem, such as “US the greatest nuclear threat to international community,” yet this is still short of an explicit declaration that the United States is the target of China’s nuclear deterrent.¹³ However, analysts have typically felt confident using historical analysis (China’s past involves several violent border clashes), reading the not-so-subtle subtext of Chinese official discourse and producing inferences from weapons’ ranges.¹⁴ For example, China’s medium- and intermediate-range ballistic missiles are suited to a “regional” deterrence role that encompasses the capability to strike India, Russia and US allies and military forces in the Asia-Pacific. China has a comparably vast array of delivery vehicles for conventional and/or nuclear payloads that enable “regional” strikes. Yet, as Phillip Saunders and David Logan point out, there is no evidence that the PRC has pursued tactical nuclear weapons, and even conventional “regional” range forces seem to have been assigned an implicitly “strategic” role.¹⁵ Chinese procurement decisions

and doctrine seem to foresee using strategic non-nuclear weapons to tackle targets that might alternatively be tempting nuclear targets – infrastructure such as ports and military bases. For the PRC, advanced conventional weapons fulfil roles that decision-makers in other circumstances (such as NATO war planners in the Cold War) have viewed as requiring nuclear warheads.

Questions of the character of Chinese nuclear posture, doctrine and strategy are central to English-language debates about the PRC's nuclear weapons. However, due to secrecy, there are no easy answers.¹⁶ During the 1969 crisis with the USSR, Chinese sources indicate that the leadership improvised a response – strongly implying that there was no pre-prepared doctrine, and a *de facto* posture set without top-down planning.¹⁷ What doctrinal information does exist in public is drawn from the PRC's repeated declarations of No First Use, Defence White Papers¹⁸ and military educational materials (most notably the *Science of Second Artillery Campaigns*).¹⁹ The methodological controversy for divining Chinese nuclear doctrine and strategy from these sources is the extent to which they represent real practices, processes and intentions among Chinese security elites. Complicating this assessment process for outsiders is that many of the core documents analysts tend to use now predate the hundreds of new Chinese ICBM silos and also organisational changes (primarily the reorganisation of the 2nd Artillery Corps into the PLARF). Even the most capable analysts of China's nuclear politics are careful to delineate what is knowable and unknowable on the topic.²⁰ For example, the potentially highly impactful politics among the elements constituting the Central Military Commission are effectively beyond the reach for academic and open-source analysts.²¹

The more recent build-up of strategic launch vehicles is likely linked to long-standing Chinese fears about developments in ballistic missile defence (BMD) technology.²² China has provided no official justification for the missiles, and spokespeople have been reluctant to engage journalists on the topic at all.²³ Using technology to hedge against developments in BMD goes back to at least the 1960s,²⁴ and Chinese officials privately complained to the United States about Ronald Reagan's "Star Wars" plan in the 1980s.²⁵ Fu Cong, then Director-General of the Department of Arms Control of the MFA, blamed US development of BMD for the deteriorating nuclear security environment in 2019, around two years before the new silo construction was noticed by Western analysts.²⁶ With a more favourable amount of resources to throw at the "problem" of adversary BMD, what has been a continuity in Chinese strategic policymaking and thinking is now being addressed with significant technological procurement. New technological projects do not inevitably mean that Chinese strategy has changed. Instead, there is a strong case to be made that, despite the dramatic changes in force structure and content, Chinese nuclear strategy has rarely changed since the decision to develop a nuclear weapons capability was taken. M. Taylor Fravel argues that Chinese nuclear strategy has not changed much since the 1960s, with the few publicly known statements about nuclear weapons from Jiang Zemin, Hu Jintao and Xi Jinping all remaining compatible with the old position of assured retaliation.²⁷ PLA doctrine has flowed from this strategy: activities are centred around providing

a retaliatory strike in the event nuclear weapons are used against China.²⁸ The validity and trustworthiness of China's famous "No First Use" pledge are the most important complicating factors to questions of Chinese nuclear strategy in practice. Citing participants at Track 1.5 dialogues, Christopher Twomey argues that conventional US long-range precision strikes on Chinese nuclear forces might lead to Chinese nuclear counterattacks that nevertheless would not be seen as "first use" by Chinese leaders.²⁹ The several hundred new ICBM sites have only stoked American fears that China might move to a launch-on-warning posture, moving in essence from a definition of adversary "first use" of nuclear detonations on Chinese soil to some kind of tactical warning (e.g., detection of missile launches) or perhaps even strategic warning (a much more fuzzy concept).³⁰

China has been reliant on land-based missiles for nuclear retaliatory capability. However, there are growing signs that this is changing. China's sea-based nuclear weapons are deployed on a growing number of submarines, and there is evidence of qualitative improvements as new classes are rolled out. The first patrol of the 2nd generation of SSBN may have been conducted in 2015.³¹ Before this, China's SSBN and SLBM capabilities were simply insufficient to be of practical use. While it is unclear how many will eventually be built, China could end up with a larger fleet of SSBNs than the United Kingdom and France or even the United States and Russia as it builds its third-generation 094-class SSBN.³² According to Tong Zhou's analysis, Chinese SLBMs now constitute a plurality (48%) of launchers that are able to hit the continental United States.³³ China's SLBM developments are therefore of similar importance to the new ground-based ICBM fields. The shortcomings of these systems, then, coupled with the geographical position of China, are critical to understanding the PRC in the Third Nuclear Age. With comparatively noisy submarines and a lack of "safe" ocean to patrol in, Chinese SSBNs are unlikely to be as secure a second-strike capability as the United States, Russia, France or the United Kingdom. While "transparent oceans" discourse has repeatedly been an unfulfilled part of nuclear strategy debates for decades, in the case of the PRC there is a real possibility that US ASW capabilities would make Chinese SSBNs vulnerable, and therefore collectively have a destabilising United States-China dynamic.³⁴

"Escalation control" is a point of controversy in expert analyses of Chinese nuclear strategy. Chinese sources emphasise how raising the alert status of nuclear forces would be done in public, with multiple communication methods, to try and signal resolve to cause the adversary to back down.³⁵ Christopher Twomey infers that doctrinal discussions of holding back nuclear weapons as a "reserve" even after an initial exchange are good evidence that the doctrinal materials assume that nuclear escalation (and even war) are controllable to a significant degree.³⁶ Tong Zhao speculated that the 2021 reveal of a potential Fractional Orbital Bombardment System (FOBS) was a programme specifically aimed at functioning as an "escalation management" capability.³⁷ That is because a FOBS could reliably penetrate US BMD with only a single launcher. This would have the advantage of providing a demonstration-type attack against the United States (including the continental United States) without launching large numbers of ICBMs that could be mistaken

for an all-out attack. If Zhao's inference is correct, it is further evidence of a techno-optimism among the Chinese nuclear elite – assuming that a technological fix exists for controlling escalation (when escalation is inherently uncontrollable). On the other hand, Fiona Cunningham and M. Taylor Fravel make the case that China's doctrine and force structure are strong evidence that China's strategic community is "confident" about China managing to avoid nuclear escalation with the United States yet unable to control escalation once a nuclear weapon is used.³⁸ The existence of multiple plausible arguments on the question of how the PRC has institutionalised ideas of escalation into technological choices is perhaps evidence once again of the hedged, multifaceted landscape of Chinese nuclear politics.

The end of "leaning" and a future Chinese-led order?

The major shift in broader PRC foreign policy is the end of some form of strategic leaning. In the First Nuclear Age, the PRC gained strategic advantages by aligning itself, albeit not totally, with the USSR and later, the United States. The greater power base of the PRC means that in the 21st century, Chinese leaders have not needed to "lean" towards the United States, Russia or any other great power. This has led some US observers to predict (and fear) an emerging Chinese-led world order complete with rival multilateral institutions and a rejection of a rules-based approach.³⁹ Whether abstract notions of Chinese grand strategy mean much in practice remains to be seen. It must not be forgotten that Chinese leaders have pressing domestic and regional issues to address, notwithstanding particular visions of successful "Long Games." Regardless, the end of Chinese leaning towards the United States and growing power has resulted in an intensifying United States-China rivalry. This rivalry is at the core of the so-called "return of Great Power Competition" officially recognised by the Trump administration. The Biden administration's China policy has essentially taken the same tone and approach. China, for its part, has adopted a toxic "Wolf Warrior" diplomacy, including promising "shotguns" for its enemies. Whereas the 1980s, 1990s and 2000s saw China and the United States engaging in a mixture of cooperation and competition,⁴⁰ at the beginning of the Third Nuclear Age, it is competition that best characterises the United States-China relationship.⁴¹

United States-China relations have been a strong influence on Asia-Pacific security politics since the establishment of the People's Republic in 1949. In the 21st century, the trend is for this bilateral relationship to have an even greater role in shaping regional security than in the past. The US foreign policy elite is increasingly accepting of the idea of an anti-China coalition of sorts in the Indo-Pacific. The rebranding of the region to include India is indicative of this US policy initiative – to create a network of partners, including India, that can cooperate without signing formal alliance treaties in every instance. While the initial idea of a "Quad" in 2007 fizzled out, its 2019 form seems to be adding depth to the arrangement between India, Japan, Australia and the United States.⁴² With lethal clashes between India and China in 2020 in the Ladakh border area, the PRC seems to increasingly be facing multiple great power competitors in the form of India in addition to the perennial presence of the United States. However, the Quad should not be mistaken

for a full alignment of India *against* China,⁴³ making the character of competition rather different to the sort identified by US elites in their articulation of a “return of Great Power competition.” Nevertheless, there are developments in the region that could straightforwardly play into existing fears held by the Chinese elite that they are surrounded by a US-led, anti-China coalition. The US-UK deal with Australia to provide nuclear-powered attack submarines (AUKUS) was greeted with dismay and criticism in Beijing.⁴⁴ Chinese state media, later reposted on the official public website of the Ministry of National Defense, represented the international community as “seriously concerned” and called the transfer of nuclear materials “illegal.”⁴⁵

China’s own alliances and partners are incredibly limited compared to the number of US partners and allies. The PRC’s only treaty ally is North Korea (DPRK), often described by analysts as more of a “liability” than a benefit to China’s standing and security.⁴⁶ Nevertheless, the continued existence of the DPRK under the Kim regime, especially in light of its nuclear arsenal, creates a constant strategic concern for the United States and its allies in the region. China also has a limited partnership with Pakistan (falling short of a defensive treaty alliance),⁴⁷ that raised the spectre of nuclear weapons when it notably resulted in the appearance of a Chinese attack submarine in Karachi in 2017 – to the consternation of New Delhi.⁴⁸

China’s relationship with Russia is drastically different from the Cold War. China has maintained an ability to strike Russia with nuclear weapons since the 1960s – a deterrence priority perhaps even higher than versus the United States in light of the nuclear-inflected 1969 crisis with the USSR. The PRC cooperates with Russia and makes public displays of partnership between the two countries. A recent prominent example has been the use of Chinese state power to counter NATO narratives about Russia’s invasion of Ukraine. However, there is no sign that this will develop into a more formal alliance. In the early Cold War, the PRC was heavily reliant on the USSR for technological capacity – that is far from the case now.

The PRC as a “normal” great power?

China’s engagement with the norms and institutions relating to nuclear weapons has the important continuity of an undercurrent of *realpolitik*. What has changed in the past few decades is the addition of more Chinese power, across the board, to advance the PRC’s interests in global norms and institutions of nuclear politics. Before the first Chinese nuclear test, the PRC was pushing for Nuclear-Free Zones (including in Asia) and floated the idea of a summit to discuss abolition.⁴⁹ As Jeffrey Lewis argues, however, these initiatives were not promoted solely for lofty ideological or ethical goals but rather part of a diplomatic strategy to offset criticism against China’s refusal to sign up to the Limited Test Ban Treaty.⁵⁰ Scholar and US official, Nancy Gallagher, ascribes China’s reluctance to engage in arms control as being derived from the heavily US-led character of “global nuclear order” going back to the 1950s.⁵¹ While this is certainly the case, Nicola Leveringhaus makes the important observation that, during and after the Cold War, China successfully shaped nuclear order despite largely being an outsider.⁵² In the 21st century, the

PRC simultaneously calls for multilateral constraints and dialogues on strategic weapons, including nuclear weapons, while defining itself a “special” status that leaves it mostly unconstrained by existing norms and institutions. This does not make the PRC unique in world politics. Rather, it is evidence of how the PRC’s greater power in the international arena allows it to act like a “normal” great power – choosing when and where China observes or quietly ignores normative and institutional constraints.

China is a recognised Nuclear Weapon State under the NPT but reaffirmed the commitment to total nuclear disarmament in its accession document in 1992.⁵³ Additionally, while not ratifying the Comprehensive Test Ban Treaty (CTBT), the Chinese leadership has allowed CTBT seismic monitoring stations to be operated in China.⁵⁴ Adopting the CTBT involved significant costs for China, curtailing a testing programme that would have closed the gap between China and other nuclear-armed states, showing how committed the PRC was ultimately to the multilateral regime the CTBT sought to create.⁵⁵ The CTBT engagement was a high point of PRC engagement with global nuclear order that is unlikely to be repeated in the next few decades. There is compelling evidence that Chinese decision makers feel no need to engage further with the norms and institutions surrounding nuclear weapons. The official lines on developments such as the hundreds of new ICBM silos or the FOBS test have been straightforward denial.⁵⁶ Additionally, Tong Zhou assesses that “the Chinese view that verification activity tends to provide an asymmetric advantage to the stronger party at the cost of the weaker party contributes to China’s concern about verification posing a threat to its security interests.”⁵⁷ With no appetite to even acknowledge the weapons technology developments that are in public view and a perception that verification is itself a source of *insecurity*, it is no surprise that PRC elites do not view treaties, agreements and norms as useful routes to nuclear security. This accounts for the vast gap between the idealistic language (dating from the 1960s and still reaffirmed in official discourse) of total nuclear disarmament versus a major arms build-up absent of any serious diplomatic efforts. Following this trend, China’s engagement with the TPNW has amounted to little more than social media posts.⁵⁸

Conclusion

China’s military and economic rise had been remarkably untinged with major nuclear weapons developments until the late 2010s. With a seemingly sudden build-up of delivery vehicles capable of nuclear missions, Western China watchers have pointed to a major shift in Chinese elites’ thinking about nuclear politics. Yet it is far from clear that the PRC is pursuing a single coherent strategy. Available evidence points more towards China continuing its hedging strategy in relation to nuclear politics. This is especially in terms of delivery vehicle technology, albeit coupled with a more vivid threat perception of the United States. The question of “how much is enough?” has seemingly shifted enough to win more resources than ever before for the PLA’s nuclear forces. Alongside delivery vehicles, the Chinese military has procured new supporting technologies, such as sensors, missile defence

and counterspace capabilities, that widen the possibilities for Chinese decision-makers burdened with responding in hypothetical future crises and wars.

Great power competition and political wrangling are at the heart of the PRC's need to hedge. The relationship with the United States continues to deteriorate, and Russia's precipitous position presents its own unanswerable questions. As India grows more powerful, regional primacy cannot be taken for granted (although it is possible that this contingency is currently less important in strategic debates among Chinese security experts).⁵⁹ The leaders of the Communist Party have only pursued a hedging strategy in regard to technology; however, the support for the Ministry of Foreign Affairs' multilateral initiatives is in reality fairly limited in comparison to the resources and diplomatic bandwidth put towards Xi Jinping's favoured focuses on Taiwan, great power bilateral relationships and economic initiatives (Belt and Road being emblematic). China's official rhetoric criticising AUKUS, for example, ultimately drew on long-standing discourses of non-proliferation rather than a new, distinctively Chinese vision of nuclear multilateralism. The result is that China punches far below its weight in the multipolar, institutional arenas of the global nuclear order – at least in terms of driving change. Instead, Chinese state power is a preeminent contributor to the maintenance of stasis in the institutionalisation of the global nuclear order.

With so many possible paths forward, in terms of policy and technology, China's security elites have so far made their response “wait and see.” With tight secrecy around the plans and ideational horizon of the inner Party elite, any future plans currently fomenting are beyond the reach of outsiders to that elite. There can be no confident predictions about where the PRC will move next simply because the hedging approach has been so successful in presenting different paths forward, at least technologically speaking. Given the PRC's importance for international politics in the 21st century, this uncertainty around its path to nuclear security as far as *other* actors are concerned is itself a major force in shaping nuclear order.

Notes

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Summary

The five case studies that comprise the “Hedgers and Balancers” in this book are united more by what they aren’t doing than by what they are: neither Iran, Germany, India, the United Kingdom or China appear to be fully committed to either nuclear disarmament, transformation through non-nuclear technology, or see a bolstered nuclear weapons capability as the central pathway to security. That is not to say that these dynamics are not important to their respective national policies and outlooks, but that they are not the overwhelmingly dominant response to the challenges of the Third Nuclear Age. Instead, this group is characterised by a reluctance, uncertainty or a wait-and-see approach to forging a particular path, often the result of seeking to balance a number of different foreign and domestic policy objectives as they slowly engage with new technological, geopolitical and normative pressures. One could also therefore think of this group as “nuclear pragmatists.”

The Hedgers and Balancers are impacted by the actions of states in all of the other pathway groupings. For example, at least some of the Chinese nuclear and non-nuclear military build-up can be explained by fears about the combination of a sophisticated nuclear and massive conventional capability of the United States and the Technological Transformation approach being adopted by US regional allies in Asia. The United Kingdom and other members of NATO (especially Norway and Germany) have been impacted by the reinvigorated push for disarmament from the Activists and Protestors, perhaps more so than other nuclear-armed or extended deterrence states elsewhere in the world, as well as by uncertainty about the US commitment to their security. At the same time, Russian actions, particularly the invasion of Ukraine, nuclear sabre rattling and the announcement of new nuclear delivery systems and enhanced missile defence systems, have been linked with an increase in the UK nuclear stockpile ceiling and a hardening of German support for NATO. While Indian elites continue to try to balance immediate deterrence requirements presented by an expanding Pakistani nuclear arsenal with a historical link with the many of the states that comprise the Activists and Protestors in the non-aligned world. Interestingly, at the time of writing, there is little appetite among the Indian policy elite to match a future Chinese nuclear expansion.

Hedging and balancing can take many forms: Iran is hedging by moving gradually closer to a latent position whereby it could build nuclear weapons fairly quickly if it chose to; Germany is hedging by doubling down on the extended (nuclear and non-nuclear) deterrence guarantee through NATO and by investing more in its military

and hosting US weapons; the UK is hedging by making small changes to its nuclear posture, investing in a next generation of nuclear delivery systems and advanced conventional weapons and working to strengthen key alliances; India is hedging by slowly modernising its nuclear forces and at the same time investing in a variety of advanced strategic technologies; while China is hedging by investing in both nuclear and non-nuclear forces across the board. Other hedgers could include Saudi Arabia as its interest in both nuclear and conventional technology continues, and Finland and Sweden following their decision to join NATO.

In different ways, nuclear weapons remain important to each of these five countries looked at in this section, but significantly, they do not appear to be the central factor when it comes to security in the Third Nuclear Age. The United Kingdom and India remain committed to a “minimum” nuclear deterrent, being seen as “responsible nuclear states,” and to the pursuit of arms control and restraint, and neither appear to have aspirations (or in the United Kingdom’s case the ability) to significantly enhance or expand their nuclear forces. While there is a perception that both Iran and China could move quickly to “break-out” and expand nuclear capabilities, both states appear more focused on conventional force modernisation, especially the development of regional-range missiles. Unlike some of the Nuclear Traditionalists, none of these states appear to see a “tactical” role for nuclear weapons in warfare and on the battlefield.

Some of these states also exhibit characteristics of Technological Transformation; the United Kingdom, India and China all have an interest in strategic conventional platforms, such as nuclear-powered submarines, “hypersonic weapons” and military applications of artificial intelligence, for example, but haven’t made this a major strategic objective. India and China are pursuing limited ballistic missile defence programmes, but these don’t currently appear to have a strategic role against large-scale nuclear attack (the same is true for NATO). Iran is investing in advanced asymmetric military capabilities such as drones, missiles and A2AD systems to deter aggression from the United States and/or Israel. What this suggests is that developing conventional military technology is clearly important for each of these states but is not the dominant approach towards the security challenges of the Third Nuclear Age. Likewise, each of these states continues to have public commitments and, in some cases, initiatives ostensibly designed to support nuclear disarmament. However, none of these states is pursuing disarmament in the manner of the Activists and Protestors or has any interest in signing the TPNW.

Each of the Hedgers and Balancers signifies a slightly different implication for nuclear politics in the Third Nuclear Age. The Iranian approach could reiterate the perceived benefits to moving towards a position whereby nuclear weapons could be built but choosing not to do so – in this way, Iranian hedging may show the benefits of “virtual” nuclear arsenals for others. The UK and German approaches show how Western middle powers are increasingly having to react rather than shape the contours of the Third Nuclear Age, and to great power politics, and have relatively little agency and room for manoeuvre. India and China are both examples of how the actions and intentions of aspiring great powers will shape the Third Nuclear Age, but perhaps in ways that are not yet clear.



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Part III

The technological transformers



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11 Japan

Given a situation in which the security environment around Japan is growing increasingly severe at an unprecedented pace, Japan needs to dramatically reinforce its defense capabilities...in order to secure technological superiority, Japan has decided to significantly increase investment in potentially game-changing technologies, and has increased R&D expenditure to a record high.

(Ministry of Defense, 2022)¹

Introduction: a unique moral and political position

Japan's modern history has been profoundly shaped by the nuclear age. It holds a unique moral and political position in the nuclear order as the only victim of a nuclear attack yet has also sheltered under the nuclear umbrella of that same belligerent in the decades since. The central role of the collective memory of the Hiroshima and Nagasaki attacks in Japanese public discourse has never solely been about reconciling with history. As Kiichi Fujiwara has argued, the onset of the United States-Soviet confrontation and nuclear arms race of the post-war era meant that anxiety over future nuclear use has been at the heart of Japan's approach to the nuclear age from its outset. For the Japanese, "memories of the past war were combined with fear of yet another one: the rallying cry was not just about remembering Hiroshima but also about avoiding another nuclear holocaust in the future."²

Japan's approach to minimising the risks of either another nuclear attack or nuclear blackmail has primarily been to look for, and rely on, an extended nuclear deterrence guarantee from its treaty ally, the United States. However, for many decades, and still today, this has also been combined with a deliberate effort to maintain a degree of nuclear latency. More recently, as part of the largest modernisation effort of its military forces in a generation, Tokyo has sought to position Japan as a key player in the development of a number of Strategic Non-Nuclear Weapons including long-range, precision-guided missiles, integrated air and missile defences, and some, albeit limited, anti-submarine and anti-satellite capabilities.

Given Japan's history and geographic location, it is perhaps unsurprising that nuclear issues have had a higher saliency in public debates in Japan, even during

the post-Cold War period, than in most non-nuclear armed states. Japanese officials are keenly aware of the changing contours of the global nuclear order, and Japan is one of the few countries in which officials even speak publicly of the world entering a Third Nuclear Age.³ The view from Tokyo of this new nuclear age is a decidedly pessimistic one. According to the Director of Defense Policy Research at the Ministry of Defence's research arm, Sugio Takahashi this will be an era in which "the limited use of nuclear weapons becomes a reality."⁴ Beyond concerns over the growing likelihood of nuclear use, policymakers in Tokyo are also profoundly concerned about Chinese advances in military technologies (including Artificial Intelligence capabilities, hypersonic missiles and anti-satellite weaponry) and the potential for such advances to diminish the advantages that Japan enjoys in the Northeast Asian military balance. Tokyo now assesses its immediate security environment as being "as severe and complex as it has ever been since the end of World War II" and an important driver of this is the increase in nuclear warheads and missiles "in the vicinity of Japan."⁵

This combination of the unusually prominent role that nuclear issues play in Japanese foreign and security policies with the broadly pessimistic view of the future nuclear order leads Japan to somewhat of a middle-ground approach to the Third Nuclear Age. On the one hand, Tokyo is looking to make sure that it is not left behind as more states seek to acquire or develop Strategic Non-Nuclear Weapons or their supporting programmes. On the other, Japan still places a high premium on the extended nuclear deterrence guarantee provided by the United States and has responded to the return of great power competition in Japan's own immediate region by doubling down on its existing alliance arrangements while simultaneously building up links with other US allies. Tokyo's approach to the US extended deterrence guarantee is now one of active cultivation and development rather than simply relying on this existing alliance structure. As Kimiaki Kawai has put it, "Japan's security policy has shifted from the mere stage of reliance to the stage of engaging with the United States in extended nuclear deterrence."⁶ This leads Japan into a position marginally closer to what we are terming Technological Transformation rather than a Hedging and Balancing approach in navigating the new nuclear order.

Technology and conventional military modernisation

Military modernisation has been a central pillar of Japan's larger "normalisation" in defence policy terms, a process that has been underway since the turn of the century.⁷ This has built on pre-existing trends but has accelerated greatly in the last thirty years. A slow but steady remilitarisation of Japan took place over the course of the Cold War with the assistance of alliance cooperation from the United States. However, in what became known as the Second Nuclear Age, Tokyo demonstrated a greater propensity to respond to regional threats such as North Korea's development of nuclear weapons with attempts to improve Japan's own capacity to defend its population. From upgrading Japan's satellite capabilities to collaboration with the United States on missile defence to improving both its surface missile and

anti-submarine capabilities for operation in the Yellow and East China Seas, Japan has sought qualitative improvements in its military stocks to counter perceived threats from North Korea and China in particular.⁸

While the US extended nuclear deterrence guarantee is still described in Japanese official documents and public statements as “the cornerstone of Japan’s national security policy,”⁹ Japan is slowly shifting towards a more balanced approach to facing nuclear threats that combines a greater role for the Japanese Self Defense Force (SDF) and therefore also a larger role for non-nuclear forces. The greater emphasis on equipping the Japanese Self Defense Force with high-end military technology to bolster Tokyo’s ability to deter nuclear blackmail and even nuclear attack is one of the hallmarks of contemporary Japanese defence policy. In part, this is about responding to the speed at which North Korea has been able to develop and test an intercontinental range ballistic missile capable of carrying a nuclear warhead, which, in principle, could undermine the reliability of the US extended deterrence guarantee.¹⁰

Given the proliferation of ballistic missiles in Northeast Asia, Japan has prioritised missile defence capabilities in its military acquisitions and domestic technological development for almost twenty years. Japan’s own system has been in development since 2004. It includes US-made Aegis-equipped ship-based systems (deploying SM-3 interceptors) and PAC-3 systems on land.¹¹ Both are connected and coordinated through the Japan Aerospace Defense Ground Environment system. The latest defence guidance documents have emphasised the growing need for an integrated and robust defensive system due to Japan’s immediate neighbourhood witnessing “dramatic advances in missile-related technologies, including hypersonic weapons, and practical skills for missile operations, such as saturation attack.”¹²

Officials and analysts in Japan alike worry about the ability of adversaries to overwhelm and undermine the Japanese missile defence system through the use of fast but manoeuvrable missiles.¹³ Therefore, increasingly, the SDF is looking to supplement this defensive system with greater offensive counterforce capabilities, such as air-to-surface standoff missiles as well as surface and ship-launched missiles.¹⁴ As the recent National Defense Strategy puts it, “Looking ahead, however, if Japan continues to rely solely upon ballistic missile defenses, it will become increasingly difficult to fully address missile threats with the existing missile defense network alone. For this reason, Japan needs counterstrike capabilities...”¹⁵ In the immediate term, the lack of domestic industry means that these need to be acquired from overseas sellers. The Ministry of Defense announced at the end of 2022 that within ten years it plans to supplement these capabilities with both hypersonic glide vehicles and guided hypersonic missiles. While the Japan Aerospace Exploration Agency has been working on various hypersonic missile prototypes (including scramjet engine technology), it is likely that Tokyo will look to acquire an off-the-shelf hypersonic missile in the future, probably from the United States. While far from a mainstream media issue, privately some Japanese analysts worry, however, that such capabilities, given their ability to target an adversary’s nuclear forces or command and control, may make Japan a nuclear target during a war or militarised crisis.¹⁶

Beyond specific capabilities with particular operational roles, Japan is also focused on more nascent or “emerging” technologies and software in the defence postures of adversaries and whether Japan will have the ability to keep up with breakthroughs in research and development. This primarily translates into a concern over Chinese technological breakthroughs, but there is also some focus on others, including Russia, given the presence of the Russian Pacific Fleet of nuclear-armed submarines based in Vilyuchinsk on the Kamchatka Peninsula.¹⁷ Of particular concern to Tokyo are states with the ability to spend “large amounts of R&D funds to develop and research weapons that utilize potentially game-changing, cutting-edge technologies such as AI (artificial intelligence), and are working on their early operationalization.”¹⁸

This concern about losing ground to China on the technological front also extends to competition in high-end domains in which Beijing can capitalise on what Tokyo refers to as China’s “civil-military fusion,” particularly in AI and satellite reconnaissance. Analysts have pointed to Japan’s desire to “shadow and match China’s expanding military power” and characterised this aspect of the two states’ relationship as falling into a “quiet arms-race dynamic” for well over a decade now.¹⁹ Others argue that Japan need not keep pace exactly with China’s defence spending. It is simply that it must be able to spend enough, and on the right technologies, to be able to deter both China and North Korea in potential future crises, and it is the problem of dual and simultaneous deterrence that presents a growing challenge.²⁰

While Tokyo has placed emphasis on qualitative technological advances rather than mass production, at some point when translating this into military advantages, it requires a degree of scale that Japan simply does not have on anywhere near the same level as China. Japan’s “peace constitution” and the legacies of enforced demilitarisation under the post-war US-led occupation meant that, as one account puts it, the country “cannot be said to have possessed anything akin to a fully-fledged military-industrial complex in the post-war period.”²¹ Japanese officials now admit in publicly released defence documents that “Japan’s defense industry and technology infrastructure are under severe pressure.” This is due to rising unit costs of “increasingly sophisticated technology” producing a decline in procurement volume from domestic companies.²² In addition, there are concerns both inside and outside of government about Japan’s prospects in a new advanced conventional or even “emerging technologies” arms race. A difficult balancing act is being struck between not falling behind in technological terms while also trying to avoid fuelling this burgeoning arms race.²³ This helps to explain the degree to which Japan continues to hedge by emphasising the nuclear-armed alliance with the United States as well as maintaining a relatively high degree of nuclear latency itself (discussed further below).

A deteriorating security environment

The overarching framework for Japan’s approach to the Third Nuclear Age is Tokyo’s assessment that the return of great power politics is producing a more

hostile security environment for Japan.²⁴ Recent Japanese defence documents have emphasised the idea that “Strategic competition between states is intensifying in the context of the changing global balance of power.”²⁵ While this overarching framework emphasises the return of great power competition at the global level, it is in Japan’s immediate regional neighbourhood of the Asia-Pacific (and perhaps most acutely in Northeast Asia) that Tokyo sees real danger. In 2018, then Prime Minister Shinzo Abe stated that “It is not an exaggeration to say that the security environment surrounding Japan is at its severest since World War Two.”²⁶ In March 2023, Prime Minister Kishida characterised the global order more broadly as being at an historical “turning point” in which “the balance of power is shifting dramatically” and competition and conflict are facilitated by a “lack of a guiding perspective that is acceptable to all about what the international order should be.”²⁷

Among the foreign policy and defence community in Japan, increasing attention is being paid to the flashpoints in the region that hold the possibility of conventional war and the escalation, in the worst scenarios, to the use of nuclear weapons. High on the list of flashpoints garnering attention is a new crisis between the United States and China over Taiwan.²⁸ In particular, the matching mainland Chinese and Taiwanese claims over the Diaoyu/Senkaku Islands (disputed by Japan) in the East China Sea mean that in a Taiwan crisis, Japan will be almost automatically involved.²⁹

Yet the Japanese government faces serious constraints in its ability to respond to a worsened regional and global security environment on its own terms. Japan’s annual defence budget has remained around a quarter of the size of China’s, at just under US\$50 billion in recent years.³⁰ While the Kishida government announced a small increase (by roughly US\$2 billion) at the end of 2022 as part of its new defence strategy, the stark imbalance remains. In terms of its percentage share of the overall Japanese budget, it has actually decreased over time.³¹ This has led Japan to a greater reliance than ever on the US alliance in the face of concerns over China’s rise and the ongoing tensions in the Sino-Japanese relationship. While traditional concerns over both abandonment and entrapment in Tokyo’s view of the United States-Japan alliance prevail, today concerns focus more on abandonment by Washington and therefore on ways of deepening the relationship to make such abandonment harder for Washington.³²

It is in this aspect of Japan’s approach to the new nuclear order that we see the greatest degree of traditionalism. In general, Japan’s approach to the changing distribution of power in general, and in Asia in particular, has been to look for ways of preserving the status quo.³³ In Asia, this means reversing, or at the very least limiting, the transition from the existing military imbalance (favouring the United States over all others) towards balance (between the United States and China).

In nuclear policy terms, this has led to a degree of unease in recent years over the greater emphasis on SNNW over nuclear weapons in the US defence posture (particularly during the Obama administration) as well as the possibility of the United States adopting a No-First-Use (NFU) posture.³⁴ The latter issue has led to Japanese media speculation about the role of Tokyo’s concerns in influencing the Obama administration’s eventual decision not to adopt a No First Use nuclear

posture.³⁵ This impression was reinforced by then Foreign Minister Toshimitsu Motegi, who, when asked about this when the story broke in Japan in April 2021, said that “it would be difficult to rely on the concept of no first use and fully protect Japan’s security.”³⁶

Japanese policy elites’ unease at any lessening of the role of nuclear weapons in the overall US defence posture does not, however, translate into an opposition to the growing role played by SNNW in Washington’s posture in general. As long as the latter is increased in addition to, rather than at the expense of, nuclear forces, Tokyo sees much to collaborate on with its alliance partner. Japan’s missile defence capabilities, for example, are well integrated into, and interoperable with, US capabilities.³⁷ The two have collaborated on missile defence research since the mid-1980s and have more recently significantly increased this collaboration to include joint missile defence exercises. The closeness of this collaboration has led to a high degree of Japanese reliance on US support for the operation of its own missile defence system. This includes relying on early warning data and missile tracking data received from two US-owned X-band radars operated by US personnel from Japanese territory.³⁸

As well as working to consolidate the US alliance, the Japanese government has focused on two other strategies to counter China’s rise. The first, despite budgetary constraints, is to bolster the Japanese SDF’s own capabilities and ability to operate autonomously. The second is to build links between the hitherto largely unconnected “spokes” of the US alliance system in Asia. The latter has resulted in the championing of new partnerships such as The Quad (formerly known as the Quadrilateral Security Dialogue) with Australia, India and the United States. Japanese officials have also spoken positively about the possibility of collaborating with groupings like the Australia-United Kingdom-United States pact (AUKUS). Tokyo has also placed a far greater emphasis than in the past on deepening bilateral relationships with US allies (e.g., Australia) or at least partners of the United States (India, Singapore, etc.), including on intelligence cooperation and even defence technology transfers.³⁹

Arms control, disarmament and nuclear order

Concerns over Japan’s maintenance of a relatively high level of nuclear latency have existed for a very long time. As Mark Fitzpatrick puts it, “For much of the past half century, Japan has been considered to be a likely candidate for nuclear proliferation. It has both the means and the motive to do so.”⁴⁰ Most still agree that Japan’s decision to remain a member in good standing of the Non-Proliferation Treaty (NPT) is almost exclusively reliant on the level of confidence in Tokyo in the US extended deterrence guarantee. However, Japan remains the only NPT non-nuclear weapons state in possession of full-scale nuclear fuel cycle facilities and it maintains the 10th largest stockpile of plutonium in the world, making it the largest stockpile of any Non-Nuclear Weapons State (NNWS).

On arms control and disarmament, Tokyo’s long-held view is that cooperative relations between the nuclear-armed great powers are what make arms control and

disarmament possible. In this view, non-proliferation is effectively a separate exercise, and it is here that, as a NNWS, Tokyo has greater agency.⁴¹ Yet, largely driven by its unique experience with the use of nuclear weapons in war, Japan has at various points in the past sought to leverage the legacies of the bombings of Hiroshima and Nagasaki to play a role of moral leadership on disarmament diplomacy. This has largely focused on sponsoring Track II and 1.5 initiatives such as the Tokyo Forum for Nuclear Non-Proliferation and Disarmament, the International Commission on Nuclear Non-proliferation and Disarmament (co-sponsored with Australia), and more recently, the Group of Eminent Persons for Substantive Advancement of Nuclear Disarmament.

However, specifically in relation to the Treaty on the Prohibition of Nuclear Weapons (TPNW), Japan's approach has departed somewhat from its overall pragmatist position. So far, Tokyo has faced the Third Nuclear Age with a greater degree of consistency in its advocacy for existing mechanisms such as the NPT rather than embracing the potential for the more radical steps towards disarmament found in the TPNW. In this regard, its position is closer to those of the "traditionalist" camp identified elsewhere in this book.

In 2017, Japan joined other recipients of a US extended nuclear deterrence guarantee in boycotting the Ban Treaty negotiations, and it has subsequently voted against the annual UN General Assembly resolutions welcoming the treaty. This position led the then Prime Minister Shinzo Abe to avoid meeting with a delegation of the International Campaign to Abolish Nuclear Weapons (ICAN) to Japan in early 2018 following the awarding of the Nobel Peace Prize to the campaign for its efforts in bringing the treaty into existence the previous year.⁴² Like others, Tokyo has expressed concerns about divisions between states over disarmament, and officials talk openly of Tokyo's preference for "maintaining and strengthening" the NPT instead of putting time and effort into processes associated with the TPNW.⁴³

Unlike other recipients of US extended deterrence guarantees, Australia and Germany, Japan chose not to send an official delegation to attend as an observer at the first meeting of states parties to the TPNW in Vienna in June 2022 nor subsequent meetings. Of the NNWS who opted not to attend, Japan's absence was most conspicuous. The Kishida government resisted pressure to attend from the *Hibakusha* (survivors of the atomic bombings of Hiroshima and Nagasaki), the mayors of both Hiroshima and Nagasaki, Japanese civil society groups and even members of the ruling coalition partner the Komeito political party, all of whom sent delegates. Prime Minister Fumio Kishida's own electorate includes the City of Hiroshima, and he has been careful to describe the treaty as "an important treaty that can serve an exit as we seek to realize a world without nuclear weapons" even while stating his preference for more "realistic efforts" in the immediate term.⁴⁴

While there is still an aspiration within Japan's Ministry of Foreign Affairs for Japan to play a leadership role on nuclear risk reduction and disarmament advocacy – even also on the part of Kishida himself – this is unlikely to involve a meaningfully different position on the TPNW in the immediate future.⁴⁵ Instead, Tokyo

will look for high-profile ways of reminding the world of its unique status in the Third Nuclear Age via initiatives such as the Hiroshima G7 summit statement on a “Vision for Nuclear Disarmament” of May 2023.⁴⁶ This leadership role will likely remain somewhat hamstrung by Japan’s Janus-faced position of leading disarmament advocate and world’s only victim of the use of a nuclear weapon in war while also sheltering under the US nuclear umbrella.⁴⁷

Conclusion: a Janus-faced nuclear position?

Japan then occupies the most starkly Janus-faced position in the global nuclear order of the NNWS, who receive US extended nuclear deterrence guarantees by virtue of being vehemently anti-nuclear due to its history, while maintaining a significant nuclear hedge and supporter of continued US nuclear possession. Tokyo holds a fundamentally conservative view of both the nuclear order (e.g., emphasising the NPT over the TPNW) and, in many regards, is most focused on preserving the status quo in the global order, more broadly in its preference for US primacy over a balance of power created by the rise of China and others.

But Japanese elites are also driven by a conviction that major changes in the global distribution of power are underway and that these changes will have important implications for the Third Nuclear Age. In particular, the dominant concern in Tokyo is that rising powers, particularly China, are set to advance beyond Japan and its allies technologically. For this reason, Japan is hedging its bets between continuing to rely on the US extended nuclear deterrence guarantee as its ultimate defence against nuclear threats while also considerably upgrading the SDF’s technological capacity to both deter by punishment and deter by denial using strategic non-nuclear capabilities. Ultimately, Tokyo is unable to realise its own defence technology aspirations due to budgetary constraints and is therefore opting to reemphasise its alliance with the United States and even embed itself in alliances and partnerships even further throughout the region. For Japanese elites, while they reserve the right to hedge against the future possibility of having to stand alone in the nuclear order by maintaining a degree of nuclear latency, for now the decision stands to face the Third Nuclear Age firmly anchored to others.

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12 Australia

we live in a time of profound geopolitical uncertainty, both in our region and around the world...This will be the single biggest leap in our defence capability in our history. Yet AUKUS is about much more than nuclear submarines, or even technological inter-operability. AUKUS is about the future.

(Prime Minister Anthony Albanese, February 2023)¹

Introduction: between disarmament and extended deterrence

Australia is responding to the shift towards a Third Nuclear Age with a mix of continuity and change. Canberra is doubling down on its existing defence posture of conventional deterrence backed by the extended nuclear deterrence offered by its formal ally, the United States. The military technology sharing component of this relationship has never been more important to Australia, and this has been bolstered by the Australia-United Kingdom-United States (AUKUS) pact.

However, Australia is also embracing a new role in the nuclear order, adopting a controversial position on proliferation safeguards by aiming to be one of the first non-nuclear armed states to acquire nuclear-powered submarines.² In addition to this, Canberra is now placing a much greater emphasis on building some degree (however limited) of technological autonomy in the military domain, spurred on by concerns over the return of competition, and even future conflict, between nuclear-armed great powers in Australia's own region. In particular, Australia is looking to acquire conventionally armed long-range missiles capable of, among other things, adding to the deterrent effect of the American nuclear guarantee in a crisis. In the short term, this will require buying missiles from elsewhere – over 200 Tomahawk cruise missiles are the initial focus – but over the medium to long term, Australia is investing billions of dollars of its defence budget in establishing a domestic base for the production and maintenance of its missile capabilities. The 2023 Defence Strategic Review's recommendation of appointing a senior figure to lead what it calls the Guided Weapons and Explosive Ordnance (GWEO) Enterprise “whose singular role is to direct strategy, capability development, acquisition and domestic production across all of Defence's GWEO needs” is the first, but important, step

in this process.³ In early 2024, the Albanese government announced an intention to begin manufacturing Guided Multiple Launch Rocket System (GMLRS) missiles in Australia from 2025, following the signing of a \$37.4 million deal with Lockheed Martin.⁴

Australia has a long and complex relationship with nuclear weapons.⁵ A prominent Australian scientist, Sir Mark Oliphant, played a crucial role in the very early stages of the British and American nuclear weapons programmes and Australia would go on to host British nuclear tests in the 1950s and 60s. The 1950s to the early 1970s saw serious debates about whether Canberra should develop its own nuclear capability, and as one of the largest exporters of uranium, Australia maintains a degree of nuclear latency.⁶ Australia also “shelters” under the US nuclear umbrella as part of its formal alliance with Washington and operates the Joint Defence Facility Pine Gap near Alice Springs, which contributes to the US missile defence system.

Paradoxically, Australia has also played high-profile roles in the global discussion on nuclear arms control and disarmament. This has included playing a critical role in the negotiation of the Comprehensive Test Ban Treaty, hosting the Canberra Commission in 1995–1996⁷ and co-convening the International Commission on Nuclear Non-proliferation and Disarmament (ICNND) from 2008 to 2010.⁸ Yet not all governments in Canberra have embraced this role, and under successive conservative governments, Australia joined its ally, the United States, and other fellow “umbrella states” in boycotting the 2017 negotiations for the Treaty on the Prohibition of Nuclear Weapons (TPNW) and did not formally recognise the Australian origin of the International Campaign to Abolish Nuclear Weapons (ICAN) when it won the Nobel Peace Prize that year.⁹ While a change in government to the more left-leaning Labor Party in 2022 has softened this position somewhat (discussed further below), Australia remains firmly wedded to an incrementalist, “step-by-step” approach to disarmament and is committed to seeking an extended nuclear deterrence guarantee from the United States for the foreseeable future.

In recent years, as debate about the changing distribution of power in Asia has increased, the idea of Australia developing its own nuclear weapons capability has re-emerged once more.¹⁰ In September 2021, this discussion took a new turn as Australia, the United Kingdom and the United States announced their intention to cooperate to make Australia either the first or second (depending on the timing of Brazil’s programme) non-nuclear weapons state to operate nuclear-powered submarines and thereby exploit the much discussed “naval loophole” in the NPT as part of the AUKUS agreement.¹¹ In so doing, and in order to reassure its neighbours in particular that Canberra has no intention of reversing its commitment to remaining as a non-nuclear weapons state under the NPT, Australia has recently doubled down on its public assurances that it “does not and will not seek nuclear weapons.”¹² The difficult balancing act of deterrence and reassurance – a hallmark of the First Nuclear Age – is now central to Australian defence and foreign policy. As Prime Minister Albanese put it when addressing Australia’s neighbours at the 2023 *Shangri La Dialogue* in Singapore,

Our Government's investments in new capability and technology and personnel are – unapologetically – about our national defence and our national sovereignty. But they are also an investment in regional stability, strengthening our capacity to contribute to the collective security of the Indo-Pacific.¹³

Seeking a technological edge in the Third Nuclear Age

Across questions of global and regional stability, military modernisation and build-ups, and even the prospects of nuclear use, the view from Canberra has grown decidedly pessimistic in recent years. Central to this assessment is the sense that Australia and its allies have decidedly lost their former advantage in the regional military balance. In no area is this more pronounced than in the revolution in the availability and effectiveness of contemporary missile capabilities. As the 2023 Defence Strategic Review put it,

The rise of the 'missile age' in modern warfare, crystallised by the proliferation of long-range precision strike weapons, has radically reduced Australia's geographic benefits, the comfort of distance and our qualitative regional capability edge.¹⁴

As a state with a treaty alliance with a nuclear-armed state, what is often described as Australia's "nuclear dilemma" – on the one hand, an arms control and disarmament activist, while on the other, a recipient of an extended nuclear deterrence guarantee – officials in Canberra have long settled for dependence in Australia's defence posture.¹⁵ Signed in 1951, the ANZUS Treaty has been a central pillar of Australian defence policy ever since.¹⁶

Both the 2016 Defence White Paper and its 2020 Strategic Update document were clear on Canberra's view of the continued centrality of the US extended deterrence guarantee to Australia's defence posture. As the authors of the 2016 White Paper put it:

Australia's security is underpinned by the ANZUS Treaty, United States extended deterrence and access to advanced United States technology and information. Only the nuclear and conventional military capabilities of the United States can offer effective deterrence against the possibility of nuclear threats against Australia.¹⁷

Yet interestingly, while the 2016 White Paper went on to discuss the important role of US forces being projected into Australia's immediate neighbourhood for the future of a "rules-based order," the 2020 update document, while re-stating Canberra's reliance on US extended deterrence, instead stressed a greater need for a degree of self-reliance. Here the authors stated "the Government's intent that Australia take greater responsibility for our own security. It is therefore essential that the ADF grow its self-reliant ability to deliver deterrent effects."¹⁸

Despite being a largely settled issue since 1973 when Australia ratified the NPT, the question of whether Australia should develop its own nuclear weapons

capability has returned to public debate. The context for this return to a previously almost “unthinkable” question is a widespread perception of a worsening strategic outlook in Australia’s immediate region (discussed further below). As one author has put it, “The emergence of an era in which stability in Asia is no longer guaranteed prompts a question that until recently may have seemed far-fetched: does Australia need to acquire nuclear weapons?”¹⁹ There is no sense in this public discussion that a decision to reverse Australia’s mid-1970s decision to abandon any plans for a sovereign nuclear weapons programme is imminent. One intervention estimated that, depending on levels of international cooperation that Australia might be afforded, a robust nuclear arsenal suitable to Australia’s needs could take decades to build and cost as much as 10–15 billion Australian dollars per year.²⁰ Instead, this relatively distant prospect is couched in terms of the need to look decades ahead to what may be a radically different strategic environment, particularly in Asia. Importantly, this discussion has not been driven by university campus debates or the statements of rebel backbench members of parliament, but instead by public interventions on the topic by no less than three former Deputy Secretaries of the Defence Department.²¹

While paying some rhetorical commitment to sovereign defence capabilities in terms of advanced conventional weaponry, Australia has placed great emphasis on partnerships with others. The most high-profile aspect of this so far has been the September 2021 announcement of the AUKUS pact focused specifically on military technology cooperation. The first, most significant and controversial area for collaboration under this new partnership is on nuclear-propelled submarines.²²

The AUKUS submarine plan, if successful, would make Australia one of the first Non-Nuclear Weapons States (NNWS) under the NPT to operate nuclear-powered submarines. Both domestically and internationally, the implications of this decision were somewhat overshadowed by the diplomatic fallout relating to the fact that it required Australia to renege on the existing agreement with France to build Australia’s next fleet of submarines.²³ The more important implications for the global non-proliferation regime are discussed further below. The partnership’s “optimal pathway” plan in which Australia will buy three *Virginia* class submarines from the United States by the 2030s and build five new SSN-AUKUS vessels by the 2040s is widely considered an optimistic one that is unlikely to result in any Australian SSN deployments before the late 2030s and perhaps not even well into the 2040s. Given the likely capability gap that this will create in the meantime, the fact that governments of both conservative and progressive stripes are fully committed to the plan is illustrative of the importance currently placed on high-end technologies in Canberra’s approach to its perceived defence needs at present.²⁴

While receiving less attention both domestically and internationally, the AUKUS partnership also has important implications for areas such as research on quantum computing, artificial intelligence and hypersonic missile technology.²⁵ Australia’s Defence Science and Technology Group has been collaborating with the US Air Force’s Research Laboratory on the Hypersonic International Flight Research

Experimentation (HIFiRE) programme for a number of years. However, in April 2022, the three AUKUS partners announced a trilateral project aimed at further developing both hypersonic missiles and defences against such missiles. Public commentary now discusses this collaboration on hypersonic missiles as being both part of Australia's ability to maintain a "competitive edge"²⁶ but also "just the start if Australia is to secure its sovereignty."²⁷

Finally, Australia's connection with the US ballistic missile defence (BMD) system is decades old given the hosting of a number of joint military facilities that have operated as satellite ground stations, formerly at Nurrungar in South Australia and still today via the relay ground station located at the Pine Gap facility in the Northern Territory.²⁸ Later, more formal cooperation got under way with Australia's Defence Science and Technology Organisation and their American counterparts from the mid-1990s, resulting in a Framework Memorandum of Understanding on BMD cooperation in 2004 and the later establishment of a bilateral working group. The latter takes Australia beyond simply playing a geographic role in the satellite network that underpins the US BMD system – once described as a "suitable piece of real estate"²⁹ – but instead towards focusing on what Australia's 2016 Defence White Paper describes as "more detailed understanding of options to protect our forces which are deployed in the region from ballistic missile attack."³⁰

Each of these areas of conventional technological focus, from the anti-submarine warfare missions that the new fleet of nuclear-powered submarines is likely to take on, to the targets that hypersonic missiles are uniquely suited to, to the role of layered missile defence systems, all have important implications for nuclear stability. Each is a key technology that analysts focusing on strategic non-nuclear weapons and their potential impact on nuclear force postures are concerned with. Nevertheless, there is little sense in Australian official discourse or media coverage that Australia is preparing its defence forces for missions that have any relation to nuclear counterforce attacks. Instead, these weapons capabilities are generally viewed as contributing to, rather than detracting from, levels of stability in Australia's immediate geographic region by helping to maintain the imbalance of military power in favour of the United States and its allies in the face of a rising China.

Multipolarity and the return of great power politics

Australia's assessment of the return of great power politics in general tends to be most commonly focused on how this manifests in the Asian region. Since at least the release of the Defence White Paper in 2016, it has been clear that the official view in Canberra is one of concern about the regional security environment in Asia. This concern has a number of important characteristics. The first is that there is a clear expectation that the return of great power politics in Australia's immediate region will not only be decidedly competitive but also that it will have a clear military, perhaps even nuclear, dimension. The second is that, while almost always expressed in terms of a general concern over a "deterioration" in the Asian security

environment, Australian policymakers perceive the primary driver of this as being China's growing military capabilities.³¹ The third is that these two assessments are matched by a concomitant unease about the future of US power in the region and Washington's willingness to project force to balance Chinese military power when doing so may incur costs in the future.

The response to this assessment of the rebalancing of military power in Asia away from uncontested US hegemony in Canberra has revolved around attempts to keep Washington engaged in Asia in any way possible. This has included a mix of reemphasising the centrality of Australia's treaty alliance with the United States, direct exhortations to Washington on Asia's importance to the United States' own security and the development of new groupings and arrangements that further embed the US defence establishment in the region. The latter includes both The Quad (formerly known as the Quadrilateral Security Dialogue) and the aforementioned AUKUS partnership.

Not only has Canberra's general foreign policy direction become increasingly framed around a perception of a more dangerous immediate neighbourhood that can only be addressed by the maintenance of US power projection there, but Australia's bilateral relationship with China has, since 2020, been characterised by a high degree of volatility.³² This has provided further grist to mill for voices in Canberra that depict the Asian security environment as becoming less favourable to Australia.

It is the perception of a more complex and dangerous security environment for Australia that has led to the renewal of public discussion of a potential future nuclear weapons option discussed above. As Hugh White, one of, if not the, most influential voices in this debate put it:

For many years it has been obvious that Australia has been much more secure without nuclear weapons. But the same big strategic shifts in Asia that require us to rethink our conventional defence forces also challenge the way we have thought about the nuclear option. It is no longer so clear that nuclear weapons would never make sense for Australia in the future.³³

For White, the return of great power competition in Australia's own geographic region does not mean that a state like Australia must abandon its previous position and acquire nuclear weapons (nor did he advocate that Australia should do so). But instead, "the question is one we will not be able to avoid over the decades to come."³⁴

The technological developments discussed above in relation to the AUKUS pact too are a direct product of the perception (shared with the other two AUKUS partners) of what is usually described as a more "contested" military environment in Asia created by China's military rise. For example, the early AUKUS collaborative work on AI-related platforms is focused on "accelerating adoption, and improving the resilience of, autonomous and AI-enabled systems in contested environments."³⁵

Norms and governance: traditionalism with a twist

Australia's current approach to the global governance of nuclear weapons is underpinned by a similarly pessimistic sense of change in the global nuclear order but, at least on the surface, a less radical response to this change. According to the latest annual report of its Safeguards and Non-Proliferation Office (ASNO), officials view non-proliferation challenges as escalating at the global level.³⁶ This, according to ASNO, highlights the importance of existing arrangements and the need to respond with "continued engagement in work towards the ultimate goal of eliminating chemical and nuclear weapons."

This sense that despite the increasing pressures that the non-proliferation regime in particular is coming under, the best course of action is to protect what already exists rather than to engage in regime shifting or developing new arrangements can be seen across two important areas. The first is Australia's choice to join the Nuclear Weapons States and other states that receive extended deterrence guarantees in prioritising the NPT over the Treaty on the Prohibition of Nuclear Weapons (TPNW). This position had until very recently involved opposing the TPNW outright, but this stance has recently softened somewhat. The second manifestation of Australia's fundamentally status quo approach to existing arms control regimes is the emphasis placed on the integrity of the NPT in official statements justifying the decision to acquire nuclear-powered submarines.

In relation to the former, as noted, Australia's position has mirrored that of other US allies. It voted against beginning negotiations for the treaty in 2016 and then boycotted the negotiations at the UN General Assembly in 2017. Like other "nuclear umbrella" states, Australia publicly opposed the treaty by pitting it in opposition to the NPT. Even after the treaty's civil society architects, International Campaign to Abolish Nuclear Weapons, which had been launched in Melbourne in 2007, was awarded the Nobel Peace Prize in 2017, the Australian government chose not to officially congratulate its Australian founders.

The election of the Labor government of Anthony Albanese in 2022 opened the door to a greater degree of engagement with the diplomacy of the TPNW. Albanese made a pre-election pledge to have Australia one day sign the treaty.³⁷ While the caveats added to this pledge make it unlikely that this will happen in the foreseeable future, the shift from total opposition of the previous government to in-principle (albeit heavily caveated) support has led already to more direct diplomatic engagement. Australia sent a Labor Party backbench MP as an observer to the first meeting of the states party to the treaty in June 2022. In the lead up to this, 55 former Australian Ambassadors and High Commissioners published an open letter to the Prime Minister recommending Australia sign and ratify the treaty, arguing that doing so would still be compatible with Australia's alliance commitments.³⁸ Whether this engagement can now produce anything more concrete than signalling a general openness to the spirit of the treaty remains an open question.

In relation to the NPT, Australia has, for the first time since ratifying the treaty almost half a century ago, found itself at odds with the spirit of the treaty.³⁹

Australia is now hoping to be the first state to exploit the loophole in paragraph 14 of the IAEA's safeguards agreement document (INFCIRC/153) used as the basis of the safeguards arrangements with NPT signatories in order to acquire nuclear-powered submarines. Given the very long-standing concerns over what the use of this legal loophole within the NPT might mean in terms of complicating the task of non-proliferation (by placing more fissile material in the possession of more states worldwide), the AUKUS plan has attracted both state and non-state criticism.⁴⁰ Both advocates and critics were quick to point out the proliferation consequences when the AUKUS partners first announced the plan, with one proponent dubbing this the opening of an era of "conditional proliferation."⁴¹

Australian diplomacy in the lead up to, and during, the 2022 NPT Review Conference therefore aimed to assure fellow signatories of Australia's peaceful intentions and non-proliferation credentials.⁴² Public statements went beyond claiming that the submarine programme would not undermine the NPT and instead attempted to make the case that by working closely with the IAEA on a safeguards arrangement for the submarines' fissile material, Australia could even strengthen the existing non-proliferation regime.

Conclusion: from hedger to conventional war fighter?

Historically, Australia would probably be classified as a Hedger and Balancer within the global nuclear order, prioritising the defence and extended deterrence relationship with the United States, maintaining a limited but modern military capability and at the same time taking the lead on issues of arms control and disarmament. But this appears to be shifting, and while Australia may not be building up its military capacity in the same way as Taiwan or South Korea, it is clear that Australian policymakers recognise the need for a bolstered conventional capability and deterrent to meet a much-changed regional security context. Importantly, Australia's approach emphasises a number of SNNW, which means that whether Australian officials intend for this or not, Australia, for the first time in its history, may yet play a crucial role in a nuclear crisis in the Third Nuclear Age.⁴³ This does not mean that the US extended nuclear deterrence guarantee has become less important to Canberra's calculations, but rather that the cauldron of competition unfolding in the Asia-Pacific region, and especially the military challenge posed by China, requires a greater Australian engagement with planning for and deterring conventional aggression and war.

A key part of the Australian plan to achieve this is through greater cooperation with key allies through the AUKUS agreement, and particularly the agreement for Australia to operate nuclear-powered submarines. But this newfound commitment to Australian security does not come cost-free. First, it compounds an already worsening relationship with China by putting Australia even more firmly into the US/Western camp and as an adversary of China. Second, it creates problems for the Australian government in global non-proliferation forums and with allies across Southeast Asia worried about the maintenance of nuclear norms.⁴⁴ In this way, the government in Canberra appears to have made up its mind that security in the Third

Nuclear Age will be found through a stronger relationship with the US and Western allies and by utilising the latest technologies to build a more capable conventional military force.

Notes

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13 Israel

We will never sign the [Fissile Materials Cutoff] Treaty, so do not delude yourselves, no pressure will help. We will not sign the treaty because we will not commit suicide.
(Benjamin Netanyahu, unknown date)¹

Introduction: technological and geopolitical adaption

Israel became a nuclear-armed state in the late 1960s, during the First Nuclear Age, and continues to maintain its long-standing nuclear monopoly in the Middle East today. While contested, Israeli nuclear policy has been one of nuclear ambiguity or opacity (*Amimut* in Hebrew), under which Israel neither confirms nor denies possessing nuclear capabilities.² However, expert assessments suggest that the size of the nuclear arsenal is between 200–300³ and 90–115⁴ warheads. These are deployed on a nuclear triad consisting of land-based Jericho missiles, Dolphin-class submarines reportedly equipped with a sea-launched variant of the “Popeye Turbo” cruise missiles and nuclear-capable aircraft (F-16I and F-15I).⁵

While nuclear weapons and nuclear deterrence have been fundamental components of Israel’s national identity for more than fifty years, their perceived utility has gradually shifted with changes in the strategic and operational environment. The country’s strong emphasis on achieving and maintaining an edge in new types of strategic *non-nuclear* weaponry has to be seen in this light. Different threats demand different responses, and Israeli policy and military elites see the pathways to security in the Third Nuclear Age through new, evermore effective non-nuclear weaponry. As highlighted by Director of Israeli Missile Defense Organisation, Moshe Patel, Israel’s acquisition philosophy hinges on four elements: responsiveness, interoperability, cost efficiency and maximum performance.⁶

Despite being an (undeclared) nuclear-armed state, Israeli policymakers consider the potential of its own nuclear weapons of secondary importance to the immediate threats that the country faces domestically and regionally, against which a nuclear arsenal appears to have limited utility. Accordingly, Israel’s nuclear weapons and nuclear deterrence seem to be substantially path-dependent, inefficient for current

security threats, and therefore of cosmetic relevance in the national security policy of Israeli policymakers.

Israel's approaches to technological and normative shifts have been generally linear and consistent, but military officials have been cautiously adjusting to China's "rise" and carefully triangulating between the United States and China. Israel's technological edge is both an internal and external asset that has increasingly attracted China's attention, giving Tel Aviv a more significant role within the great power competition for technological superiority. Nonetheless, the relationship with Washington's remains fundamental to Israel's "survival."⁷

Quality over quantity: a technological constant

Over the last decade, Israel's security doctrine⁸ – defensive strategically but offensive operationally – has undergone major changes. Today's "offensively executed defensive strategy"⁹ exhibits a strong preference for mobile manoeuvre warfare, pre-emption¹⁰ and inflexible defence. This set of tactical defensive measures, tendentially based on advanced military technology, has become the primary deterrent to Israel's regional adversaries.

At the heart of such transformation are a regional security complex in flux, changes in the nature of military threats and ground-breaking innovations in military technology. Limited military campaigns and conventional warfighting have replaced full-scale wars, and strategic threats have replaced existential threats. The implications of this transformation for Israel's security strategy have been significant. As for sub-conventional threats, or "rocket-based terror armies"¹¹ as the newest Operational Concept for Victory defines them, Israel's response has primarily and increasingly focussed on *conventional* defensive systems that could be used to deter such actors through "denial."¹² Israel's active defences include five separate mortar, rocket and missile defence systems: Iron Dome for short-range rockets, Magic Wand (also referred to as David's Sling) for intermediate-range rockets, Arrow 2 for shorter-range ballistic missiles and Arrow 3 for long-range ones. A fifth defensive system, Iron Beam, against mortar fire, is now under development.¹³

Yet the Israeli military and political elite are still increasingly reliant on deterrence by punishment, such as with precision stand-off conventional firepower, or escalation dominance as evidenced in the Gaza war. According to many sources, Israel does not yet appear to have an effective offensive response to the rocket threats posed by Hamas and even more so by Hezbollah, and thus has preferred to rely increasingly on active defence.¹⁴ Notably, deterrence in Israeli thinking has always aimed at lengthening the lulls between rounds rather than at preventing hostilities. At the 2023 Herzlihya Conference, various Israeli officials hinted at a gradual erosion of deterrence, particularly noticeable against Hezbollah. The 7 October events, together with Iran's massive missile-and-drone attack in April 2024, and the continued strikes by Hezbollah on Israel's northern border and by Yemen's Houthis, have further spotlighted the fallacy/precariousness of Israel's deterrence. Iran's attack marked the first direct confrontation between the countries,

as well as the first state-sponsored attack on Israel's soil in over three decades. If, on the one side, Israel's active defences have reaffirmed their effectiveness in significantly limiting the material and human damage, on the other, Israel's deterrence "has been shattered" as journalist Ben Caspit wrote in *Ma'ariv* newspaper.¹⁵ The scenario of a convergence of multiple escalations – ever more tangible after the Gaza war – has become the primary focus, according to the same officials.¹⁶

As for Iran, perceived as a multi-layered strategic threat, Israeli military elites have adopted an equally multi-layered strategy known as the "Octopus Doctrine."¹⁷ Instead of exclusively targeting Iran's nuclear and non-nuclear activities, and the individuals associated with them, tendentially in third countries, such as Syria, the Octopus Doctrine aims at expanding the scope and scale of such attacks, mostly on Iranian territory. One of the primary objectives of this strategy is disrupting Iran's nuclear programme, deemed as a long-term strategic security threat. Israel's kinetic counterproliferation operations (part of its broader Begin Doctrine¹⁸) have so far included assassinations of scientific and military personnel, sabotage, surgical strikes and cyber operations. Indeed, Israel has been investing significantly in cyber and AI offensive capabilities, which constitute one of the major battlegrounds of the decades-long confrontation between the two countries. In light of Iran's advancing nuclear programme and the current impasse of the JCPOA, the Israeli leadership has felt the need to focus more on Iran's broader military strategy. The mobilisation of regional resources, particularly in the Persian Gulf, in an anti-Iran function is a prime example. For Israeli policy and military elites, the potential of integrating Israeli, Arab and US military assets into defence projects – BMDs, maritime security and intelligence – would be considerable in enhancing a deterrent vis-à-vis Iran.

Overall, Israeli leaders' ability to exploit the potential of technology in order to restore its conventional deterrence and enhance the country's national security sits at the heart of its transformationalist attitude. Israel's response to the Third Nuclear Age seems set to follow the same approach. While nuclear deterrence remains a vital element within Israel's military doctrine, prioritising strategic non-nuclear weaponry seems to be the country's chosen pathway to security.

Israel's great power-balancing act

Israel's fundamental pillars of strategic autonomy and self-reliance notwithstanding, the pursuit of alliances with great powers has been considered vital in order to secure diplomatic, military and economic support. From the late 1960s onwards, the United States gradually emerged as Israel's great power partner in what is still known as an "unwritten alliance."¹⁹ Today, Israel enjoys official status as a "non-NATO" ally, with extensive access to US advanced military technology, enormous amounts of military assistance (currently set at \$38 billion, according to the 2019–2028 MOU) and multi-layered integration in joint training exercises, intelligence exchanges and military-to-military activities. In a recent interview with the Israeli newspaper *Yedioth Ahronoth*, Ze'ev Snir, the former head of Israel's Atomic Energy Committee, repeatedly emphasised that "without American support, Israel

will struggle to survive.”²⁰ Israel’s Air and Missile Defence programme was and still is an illustrative example of the degree of cooperation between the two defence establishments. The United States financed 80% of the Arrow programme under the 1985 Memorandum of Understanding, and today, it is still closely integrated with and highly dependent upon the United States.

While Israel has widely benefitted from the deepening of this relationship, the political-strategic benefits that the United States has accrued are more limited. During the Cold War, Israel might have been a valuable strategic asset for the United States, particularly in intelligence exchange regarding the Soviet military influence in the region. However, today, the costs of unconditional political backing and lavish military aid do not seem to match the benefits, mainly resulting from the sharing of critical technologies and sensitive information. According to various sources, the US Congress’ high support of the two countries’ defence cooperation ensures a double objective: securing Israel’s QME²¹ and exploiting Israeli technological advances by reclaiming technological rights and the possibility of entering co-production agreements.²² For example, in August 2020, the US company Raytheon and Israeli-based Rafael formed a joint venture to start building the Iron Dome in the United States.

Just as Israel’s ability to produce maximum military innovation has been determinant in cementing old partnerships, likewise, it has increasingly crystallised as a strong pull factor in forming new partnerships. The innovation-oriented relationship with China is the most obvious case. Since the establishment of formal diplomatic relations in 1992, Israel’s positioning in the United States-China competition has been about finding the appropriate balance between securing its historical relationship with the United States and cautiously exploiting the economic benefits of trading with China. Indeed, as Wang Yu has suggested, “Israel-China relations are exemplary of a mutually beneficent bilateral relationship of the type that China pursues with most countries in the world.”²³ In other words, a win-win situation. If, on the one hand, Israel’s leading global position of its high-tech industry has been highly attractive in the eyes of China, Chinese capital-intensive investments have offered Israeli companies a unique opportunity for market expansion. Over 28 years, bilateral trade alone has increased from a bit more than \$50 million in 1992 to over \$17.54 billion in 2020.²⁴ According to data from the Institute of National Security Studies,

China has boosted its average yearly investment in Israel from 2002, with the annual investment growing from US\$20 million to more than US\$200 million. [...] China’s investments and M&As in Israel were overwhelmingly directed to the technology sector (449 deals with a reported value of roughly \$9.14 billion up to 2019).²⁵

The economic complementarity between the two countries has created an enormous potential for further cooperation, leading to the establishment of the China-Israel Comprehensive Innovative Partnership in 2017.²⁶ Interestingly, Ehud Eiran argues that “China behaves with Israel as it was a Third World country by building

infrastructure, and as it was a First World country by extensively investing in a variety of high-tech fields.”²⁷

So far, the Chinese-Israeli marriage of interests has been highly dependent on the state of Sino-US relations and the boundaries set by the United States on sensitive areas. In the past, US interference emerged starkly with regard to China’s interest in Israeli defence technology. In 2000, the United States stopped Israel from selling four advanced Phalcon early warning aircraft to China, citing US components used in the system.²⁸ Similarly, when Israel decided to upgrade the Harpy UAVs it had sold to the PRC in the 1990s, the United States retaliated by downgrading Israeli participation in the F35 programme.²⁹ In the aftermath of this story, Yitzhak Shichor, a leading scholar of Sino-Israeli relations, stated that in the Sino-Israeli-United States triangle, “Washington represents the independent variable whose uncompromising policy toward China is being systematically consolidated.”³⁰

Overall, Israel’s attitude within this triangulation is defined by: an absolute and unquestionable tie with the United States, which provides Israel with two existential elements – the pledge to secure its QME and a loyal backing within the UN Security Council – and, in parallel, a pragmatic and flexible partnership with China, a source of alluring economic opportunities. As Ehud Eiran stated, “no one in Israel is thinking about it in the context of great power competition or a balancing act against China. It is merely about capitalising on an opportunity.”³¹

Similarly, although on a smaller scale, Israel’s relations with India have been equally characterised by a utilitarian approach. A strong mutual interest in advanced defence systems, together with Israel’s qualitative edge, is a key element within the growing Indian-Israeli relations. The signing of the “India-Israel Vision on Defence Cooperation,” aimed at enhancing defence technology cooperation, is a case in point.³² In April 2022, Israel Aerospace Industries (IAI) publicly announced the completion of missile defence systems tests in collaboration with India’s Defence Research and Development Organisation (DRDO).³³

Russian-Israeli relations have a long and tortuous history. For decades, the Soviet Union was, for all practical purposes, an enemy, providing the Arab countries with vast quantities of weaponry and economic assistance, virtually unconditional diplomatic support and strategic backing. From 1991 onwards, when formal relations were restored, the two countries have enjoyed closer ties diplomatically, economically and politically. The Russia-Israel relationship witnessed a strategic paradox after 2015: Russia intervened militarily in Syria, supporting the regime and rebuilding the Syrian air-defence systems, while at the same time establishing a coordinating mechanism with the IDF that effectively de-conflicted the two air forces and de facto legitimised Israel’s strikes on the same allies Russia was supporting.³⁴ Indeed, *realpolitik* is what best captures the essence of contemporary Russian-Israeli relations. Cultural and historical ties remain strong, and cooperation on shared strategic issues remains contingent and limited. However, Russia’s involvement in the Iranian nuclear and missile programmes,³⁵ broader military assistance to regional adversaries (Syria, Iran), and, most recently, the invasion of Ukraine reflects a fundamental divide between the two countries.

An inflexible resistance to nuclear governance

Resistance, in absolute terms, best defines Israel's approach toward the normative regime governing nuclear proliferation. By late 1966, as the Non-proliferation Treaty (NPT) was nearing agreement, Israel was covertly finalising the R&D phase for its first nuclear explosive device.³⁶ Israel's emergence as a nuclear-armed state was characterised by "full technological vigour but with a great deal of political ambivalence."³⁷ Indeed, while the non-proliferation regime was being built, Israel's nuclear weapons programme emerged as its first exception. In 1969, Prime Minister Golda Meir reached a tacit agreement with US President Richard Nixon, according to which Israel would be exempted from the US non-proliferation policies as long as it refrained from explicitly referring to its nuclear capability, did not declare possession of these weapons and did not test them.³⁸ Despite various events that catalysed the attention to the reality of Israel's military nuclear programme – such as the Vanunu declarations and the Vela incident – the Nixon-Meir pact still holds.

For over five decades, Israel has consistently resisted US and international demands to sign the NPT and declare or abandon its nuclear programme.³⁹ Since 1998, the Arab states have annually requested that Israel's nuclear capabilities be placed on the General Conference agenda for debate. The adoption of the resolution ("Israel Nuclear Capabilities") was constantly blocked by the Western European and Other States Group (WEOG) until September 2009, when the IAEA GC adopted it with a slight majority, "calling upon Israel to accede to the NPT and place all its nuclear facilities under comprehensive IAEA safeguards."⁴⁰

Alongside resistance, Israel's relationship with the non-proliferation regime has been, from time to time, characterised by conflict. The first time the IAEA singled out Israel was in 1981, following the Israeli preventive strike against an Iraqi reactor under construction at Tuwaitha. Again, in 2007, Israel conducted another kinetic counterproliferation operation against the al-Kibar reactor in Syria. Similarly, Israel has maintained a confrontational approach vis-à-vis the diplomatic process concerning the Iranian nuclear programme, formally known as the Joint Comprehensive Plan of Action (JCPOA). Israel's hostility towards the JCPOA translated into a series of efforts – led by the pro-Israel lobby and the AIPAC in the US Congress – to derail the Deal considered by the Israeli leadership as a "stunning historic mistake."⁴¹

Israel's resistance still holds today. Israel is one of four nuclear-armed states (alongside India, Pakistan and North Korea) outside the NPT. The official Israeli position is that "Israel maintains a policy of responsibility and restraint in the nuclear domain consonant with the underlying goals and principles of the non-proliferation regime."⁴² Israeli policymakers value the NPT and recognise its contribution to the non-proliferation regime. At the same time, they also find the NPT insufficient to fully address the deliberate advancement of clandestine military nuclear programmes by states with little or no regard for international legal obligations they have undertaken.⁴³

The IAEA applies safeguards in Israel under an INFCIRC/66-type safeguards agreement, implemented at the Soreq Nuclear Research Centre, this includes a uranium storage facility and a heavy water and material storage facility. Contrarily, the Israeli Negev Nuclear Research Centre (known as Dimona) is not under IAEA safeguards. Israel has not concluded an Additional Protocol to its safeguard's agreement. Israel has also not signed the Biological Weapons Convention despite US pressure to do so during the first Bush and Clinton administrations.⁴⁴ It has instead signed but not ratified the Chemical Weapons Convention and the Comprehensive Test Ban Treaty.

Israeli officials justify resistance to the various non-proliferation regimes by appealing to the *sui generis* nature of the region. Accordingly, since the 1970s, Israel has favoured specific regional disarmament arrangements to non-proliferation and disarmament and has been tentatively supportive of a Middle East Nuclear-Weapon-Free Zone. According to Israeli elites, regional agreements and regimes can be tailored to regional conditions and requirements, verification procedures can be based on mutual and direct inspections by each party, and most importantly, their negotiations and implementation can be based on a step-by-step process aimed at building trust, reducing tensions, and contributing to achieving regional stability. In addition, a regional framework would be able to include both conventional and non-conventional capabilities, in contrast to the current non-proliferation and disarmament frameworks. Therefore, Israel's longstanding policy is that any arms-control framework has to be closely linked to progress in the overall regional peace process; a global regime like the NPT has limited relevance in the Middle East, a region with a poor track record of NPT compliance; a regional solution lies in the establishment of a mutually, effectively and comprehensibly verifiable zone free of Weapons of Mass Destruction (WMDfZ); prerequisites for regional discussions on such a zone, such as mutual recognition, do not currently exist in the Middle East, where the majority of Arab States, as well as the Islamic Republic of Iran, do not even recognise the existence of the State of Israel.

This approach is reflected in Israel's approach to the Treaty on the Prohibition of Nuclear Weapons (TPNW), which it has not yet signed nor ratified. Israel has consistently voted against any annual UN General Assembly resolution since 2018 that concerned the adoption of the Ban Treaty. When justifying its vote on the resolution on the adoption of the TPNW, Israel's representative argued that:

Israel's deep reservations regarding this initiative were based on substantive as well as procedural considerations. On the substantive side, Israel is concerned inter alia by arms control and disarmament processes that fail to give due regard to the security and stability context when drafting disarmament measures. Such endeavours may result in arrangements and agreements which hinder rather than reinforce disarmament processes as well as global and regional security. On the procedural aspect, Israel firmly believes that such negotiations should be undertaken in the appropriate forums, under the appropriate rules of procedure, which would not undermine the inclusiveness of any processes.⁴⁵

Conclusion: the importance of cutting-edge technology

Israel's pathway to security has been historically linked to cutting-edge technology, whereby policymakers in Tel Aviv have actively sought to exploit the potential of technology in order to enhance the country's national security. Necessity is the mother of invention, and Israel's transformationalism fully embodies this. But Israel's experience is also a unique, if not paradoxical transformationalist attitude. Israel is the only – yet undeclared – nuclear-armed state in the technological transformers category. However, advanced strategic non-nuclear weaponry seems to be the primary focus of Israel's national security policy in light of the immediate threats that the country faces domestically and regionally. Israel's nuclear weapons and nuclear deterrence seem to be substantially path-dependent and of cosmetic relevance in the national security policy of Israeli policymakers.

Israeli military and political leaders want to exploit the rapid technological advances at the heart of the Third Nuclear Age as a way to maximise national security interests and further enhance Israeli military hegemony across the region. Amid the uncertainty of a regional environment in constant flux, being able to respond to emerging threats by technological adaptation, especially in conventional warfighting, is central to Israel's pathway to security. The second, equally important, fundamental pillar is ensuring strong ties with its main ally – the United States – while, at the same time, exploiting the short-term economic gains of partnering with China and, to a lesser extent, India.

Israel's resistance to the global nuclear governance architecture will be reinvigorated by the gradual erosion of the non-proliferation and arms control infrastructure. As a non-member of the NPT and staunch critic of global non-proliferation and arms control regimes, Israeli elites do not see its pathway to security through normative frameworks.

Acknowledgement

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Notes

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- 8 Israel has never formally and cohesively articulated a national security strategy, or defence doctrine. Rather, it was partly an orally transmitted law expressed in many statements, comments, speeches, and lectures.
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14 The Republic of Korea (South Korea)

The ROK's military is demonstrating strong deterrence by promoting the development of overwhelming missiles capable of firing farther, stronger, and more precisely.
(Ministry of National Defense of the Republic of Korea, 2023)¹

The Republic of Korea (ROK) is a non-nuclear armed state that faces a committed and nuclear-armed adversary. The relationship with the North remains volatile, with multiple deadly clashes prominent in recent memory.² Whereas the ROK's defence relied on conventional weapons initially designed for manoeuvre-warfare on the hypothetical battlefields of World War III in the past,³ in the post-post-Cold War moment, the ROK increasingly relies on domestically produced advanced conventional/strategic non-nuclear weapons. These new systems have parallels with the "exquisite" kinetic capabilities of their American ally, particularly long-range precision strike weapons such as the Korean Tactical Surface-to-Surface Missile (KTSSM) that is similar to the US Army Tactical Missile System (ATACMS) and the Hyunmoo-3 cruise missile that is similar to the American Tomahawk (to pick two indicative examples).⁴ Based on official discourse from the early-2000s onwards, Korean decision-makers have positioned the ROK's long-term procurement strategy as part of a broader foreign policy objective to build greater domestic capability through weapons development.⁵ Of course, the implication is that growing capability would mean greater independence *from* the United States, but explicitly stating this in public remains imprudent.⁶ Gaining the advanced capabilities that were previously the preserve of their benefactor therefore contributes to national security along two dimensions: deterring the North and managing the alliance with the United States.

The ROK military leadership is secretive about the details of its targeting policies and long-range precision-strike posture.⁷ The government only released a defence white paper publicly for the first time in 1988.⁸ However, outsiders have interpreted occasional public releases of white papers, public relations material, technical capabilities and official statements as pointing towards a fairly coherent doctrine.⁹ This doctrine has elements of both conventional counterforce and conventional countervalue in the event of war with the DPRK. Western analysts have

described ROK's strategy as "unique" because of these features.¹⁰ The ROK's response to changes in technology and great power competition at the heart of the Third Nuclear Age has been to double-down on domestic weapons development and the extended nuclear deterrence alliance¹¹ with the United States and, to a lesser degree, relationships with partners in the region.

Conventional counterforce

The key technological change challenging the ROK is the North's successful pursuit of nuclear weapons. The ballistic missile and artillery threat from the North has been a constant feature of South Korean security planning since the Korean War. The key difference between fears of attack by SCUD and FROG missiles in the 1980s,¹² and attacks by newer DPRK systems, are the post-2006 *nuclear* capabilities of the North. As a secondary but still important corollary, the DPRK's missile capabilities have also improved across the board in terms of range, stealth and flexibility. The broader regional and global context of these changes has been the spread of missile technology that is much more accessible than the superpowers' experiences with the same challenges in the 1950s through the 1980s.

South Korean missile capabilities have grown in breadth since the beginning of the 21st century. The country now effectively has a conventionally armed mirror-image of the nuclear triad of the Cold War superpowers: land-based missiles, air-launched weapons and submarine-launched ballistic missiles. It is primarily these conventional missile capabilities that successive Korean governments have positioned as underpinning both massive counterforce and countervalue strikes against the North in the event of war. These capabilities have been pursued across multiple administrations with little to no controversy, strongly suggesting a highly robust underlying consensus among the security elite.¹³ Secrecy and operational security make an exact assessment impossible, but the lack of leaks from disgruntled opponents to the programme underlines the existence of a united front, at least publicly. The Ministry of National Defense has gone so far as to openly state a goal of "build[ing] a sentiment of consensus internally and externally" to support its post-2022 "Defense Innovation 4.0" strategy.¹⁴

The public face of the ROK's doctrine and posture for its arsenal of missiles is the "3K Defense System," grouping concepts and technical systems into a kind of narrative.¹⁵ Before analysing 3K, it is important to note that terms of art have changed over the past two decades (the time period under which the Hyunmoo missile family was developed) to reflect Presidential preferences on inter-Korean policy.¹⁶ However, the underlying threat perception and weapons systems have remained fairly constant. The first element is the "Kill Chain," organising precision-strike assets to pre-emptively target North Korean ballistic missiles.¹⁷ The second is "Korean Air and Missile Defense" (KAMD), seeking to limit damage from any North Korean long-range strike assets that survive Kill Chain strikes.¹⁸ Finally, "Korean Massive Punishment and Retaliation" (KMPR) directly targets the North's leadership if they choose to attack the South with nuclear weapons.¹⁹ While the first two prongs emphasise counterforce, KMPR's logic is countervalue deterrence by

punishment. Taken together, the three prongs imply a narrative of how the ROK has prepared to respond to an attack from the North over time: massive counterforce comes first, with the threat of punishment held back and used if necessary “later” in an imagined future conflict. While this may be how South Korean security elites view the likely course of a future war, the DPRK leadership likely thinks differently. As Jeffrey Lewis quips, “both of them plan to go first. But they can’t both be right.”²⁰

A major absence from what is known publicly about South Korean capabilities is to what extent their long-range precision strike is reliant on US sensors, especially on-demand space-based reconnaissance that would be most useful for tracking DPRK missile forces during a crisis (before other assets, such as fixed-wing surveillance platforms, could be moved into theatre). There is a sense in the South Korean security community that the United States keeps the ROK reliant on American ISR as “a way of keeping control,” but even this appeared to start easing at the start of the 2020s.²¹ South Korea has a small (compared to the United States or China) but capable space industry and could also leverage the commercial sector for electro-optical surveillance such as photo-reconnaissance or synthetic aperture radar.²² Some of these capabilities could be mirrored to some degree by the medium altitude UAVs the Ministry of National Defense announced in the 2010 White Paper. This is an especially important unanswered question in light of the ROK’s mixture of counterforce and countervalue priorities for its kinetic response to any future DPRK aggression. While fixed targets such as airfields, missile support bases and government facilities are likely well-known to the ROK (through domestic and international all-source intelligence collection), missile launchers themselves will inevitably be mobile targets in crises and war. While the ROK clearly has the kinetic capabilities to reach out and destroy mobile missile launchers that their military *can see*, the fulcrum of success or failure for their doctrine in practice will be *how many* of the DPRK missiles they can detect (with precision) and *when*. Nevertheless, official discourse is keen to emphasise that the ROK, in partnership with the United States, is fully capable of finding and destroying mobile missile launchers.²³

Since any counterforce strategy always comes with the major caveat that some launchers, and therefore some warheads, will survive after any attack, the ROK defence consensus appears to endorse missile defence as a partial solution. By emphasising the terminal phase, Korean security elites have attempted to “minimize diplomatic and political controversies.”²⁴ The ROK armed forces tasked with providing offensive and defensive missile capabilities began a process of reorganisation in 2022, seemingly with the goal of responding to newer North Korean missiles with “wide-area multi-layered missile defence.”²⁵ The Defense Minister, Suh Wook, emphasised that *missile attack* and *missile defence* were “pillars of our deterrence force against North Korea.”²⁶ It is unclear whether ROK decision-makers have consistently believed that BMD systems could substantially reduce damage from an attack from the North or whether active defences would play into successful deterrence-by-denial. US capabilities in missile defence are possibly more capable than they were during the Gulf War, and some of the ROK’s efforts

in this area involve procuring US technology (e.g., the PAC-3 and potentially the Standard Missile family). This may be one source of confidence in the effectiveness of BMD. However, domestically designed and produced systems are increasingly part of the long-term procurement plan. One Korean researcher told the media that ROK domestic technical capacity is now equivalent to that required to produce a THAAD-like system.²⁷ With no missile defence tests of these newer systems, however, the capability is quite literally untested.²⁸

The strategic, and especially nuclear, aspects of ROK security are favoured topics for Western expert analysis. While important, they are not the only factors for Korean defence. The DPRK has continued to update its conventional forces across the board, and in order to maintain as much qualitative edge as possible, the ROK has continued to modernise conventional forces for war on the ground, in the air and at sea.²⁹ Conventional and nuclear weapons technological change are interlinked. This is not always in a “dual-use” sense. Rather, the nuclear threat that the South faces is on top of a substantial conventional DPRK military that is also engaged in taking advantage of newly accessible technical capabilities. There are signs that the ROK military is preparing to be able to fight on a nuclear battlefield, such as the establishment of a Nuclear and WMD Response Headquarters under the Joint Chiefs of Staff³⁰ and the public release of photos of troops undertaking manoeuvres in protective equipment.³¹

Alliance politics: enabling and constraining

The fallibility of the international non-proliferation and/or counterproliferation regime has been keenly felt in South Korea. Arguably, the DPRK’s successful nuclear test in 2006 was one of the early indicators that arms control would be in peril in the 21st century. At the same time, the DPRK’s bomb was itself a major shift in geopolitics, as the relative economic and military weakness of the North (compared to the United States and China) would clearly be offset using implicit or explicit nuclear threats.

Until 2006, the DPRK would have had almost no ability to deter the United States from fully supporting the ROK in the event of a reignition of the Korean War. After 2006, the possibility has grown that DPRK nuclear threats could keep the United States out. The US “trip wire” force, coupled with forward deployed air and missile defence assets, had previously made US participation a virtual inevitability. The airpower, especially precision guided munitions support, that the United States would bring to a full-scale conventional war were assumed in Korean and US circles to be decisive, if not essential, to United States-ROK success. The failure of international controls of the spread of nuclear weapons in the Korea case has therefore seriously impacted, and complicated, the United States-ROK alliance. Nevertheless, both states have made efforts to maintain the relationship, a good example being the attention-grabbing state visit from Korea’s President Yoon to Washington in 2023.³²

The ROK’s self-evident security threat, its northern neighbour, is China’s only treaty ally. The South’s government was disappointed with the Chinese response

to the *Cheonan* incident in 2010 in which the North sank an ROK naval vessel, resulting in substantial loss of life. The perceived Chinese support for the North even despite the violent provocation, coupled with the lack of results after a decade of a more pro-China approach to ROK foreign policy in general, made it clear in Seoul that the Sino-DPRK alliance still had substance.³³ Policymakers in Seoul cannot simply pivot away from China, however.³⁴ As the ROK's largest trading partner,³⁵ China has shown a willingness and capability to punish South Korea in the economic realm for perceived transgressions.

As China's power has continued to grow and the United States has made halting steps towards building a group of partners to offset it, South Korea has played a substantial role. Official ROK discourse recognises that growing United States-China competition is the inescapable wider context of its international security, although it is careful not to pick a side outright.³⁶ Japan and South Korea have built up more security ties in the first decades of the 21st century, despite historical animosity.³⁷ The United States has also made some efforts to promote trilateral cooperation between itself, Japan and the ROK.³⁸ That being said, the nuclear weapons dimension of China's "rise" does not play so much into South Korean security politics in the way they might for Taiwan. The prevailing conventional wisdom expects China to give the DPRK military support under some circumstances, but so far at least there is little public discourse from the ROK or United States that China would try to use nuclear threats to keep the United States from intervening in a future Korean war. Where the ROK's more recent technological procurement *has* impacted Sino-ROK relations is missile defence. Although the introduction of THAAD to the Korean Peninsula posed no direct threat to the PRC's nuclear deterrent, the AN/TPY-2 radar that accompanied it caused real consternation in the PRC security elite due to its perceived warhead/decoy distinguishing capability.³⁹ Expert commentary has warned that the ROK's enthusiastic and multi-faceted approach to missile defence may eventually result in the PRC responding with military procurements, partly because as ROK missile ranges continue to increase, PRC targets become theoretically targetable (even with no indication of an intended threat from Seoul).⁴⁰ However, the PRC's recent nuclear build-up has not been linked to ROK BMD capabilities so far (beyond the US deployment of THAAD).

The ROK's growing military power and substantial economic might do pose the question of whether South Korea itself could cement a position as one of the world's great powers. However, there is serious doubt within the South Korean foreign policy and security communities that great power status is feasible.⁴¹ In 2022, President Yoon talked about the ROK becoming a "Global Pivotal State" and that "It is incumbent upon us to take on a greater role befitting our stature as a global leader."⁴² North Korea poses such a massive threat that, coupled with a possible lack of sufficient interest in Washington,⁴³ the ROK's rise to great power status is far from certain.

One final aspect of ROK nuclear politics in the Third Nuclear Age is the importance of the nuclear energy industry. Although a decision was taken to phase out nuclear energy in 2017, after coming to power in 2022, President Yoon promised to return nuclear energy as a "strategic priority" both domestically and internationally,

with a goal of achieving 30% of electricity from nuclear by 2030. “Team Korea” has already built four nuclear reactors in the United Arab Emirates, and agreements have been signed with Egypt and Poland, and nuclear exports are a key component of ROK foreign policy.⁴⁴ As Industry Minister Bang Moon-kyu explained,

To achieve carbon neutrality and strengthen energy security, I’ll quickly complete the restoration of the ecosystem of nuclear power plants and foster them as a new energy industry, along with small modular reactors, carbon capture, utilization and storage and hydrogen.⁴⁵

Death of the Six Party talks and the failure of “nuclear order” to constrain the DPRK

South Korea remains a signatory to the Non-Proliferation Treaty (NPT).⁴⁶ The prevailing narrative of the ROK’s relationship with the pursuit of nuclear weapons is that it began a programme in the 1970s only for it to end after the US exerted pressure.⁴⁷ Official discourse is keen to emphasise the ROK’s compliance with international treaties and norms such as the Biological Weapons Convention, Chemical Weapons Convention and others.⁴⁸ Nevertheless, questions have persisted (especially in the United States) whether the ROK might pursue its own nuclear weapons in the future.⁴⁹ Potentially unplanned comments by President Yoon in early 2023 precipitated media speculation that a consensus was growing among South Korean security elites that nuclear weapons would be necessary.⁵⁰ However, the negative reaction from the international media and especially the discourse in Washington led to the Yoon administration clarifying that the remarks were not a reflection of any policy change. While it is always difficult to prove the shaping role of norms, the backlash and resultant “clarification” do serve as an illustration of how strongly the norm of non-proliferation remains in South Korean security politics.

The Six Party Talks offered a possible multilateral resolution to the issue of nuclear weapons on the Peninsula between 2003 and 2008.⁵¹ The Talks collapsed in 2009 when the DPRK elected to withdraw. However, when the North Korean military sank the South Korean ship *Cheonan* in 2010, killing 46 sailors, the chance of resuming negotiations became virtually nil.⁵² In light of the failure of the Six Party Talks, there is no sign that the ROK’s security elite see norms and institutions as a viable route to security. A newcomer to global nuclear politics, the 2017 Nuclear Ban Treaty (or TPNW), therefore has little relevance to the Korean Peninsula as far as South Korean decision-makers are concerned. As one of the most isolated regimes on the planet, the North has historically demonstrated ample ability to sidestep international law, institutions and norms. ROK governments have (tacitly) accepted (if not relied) on US nuclear extended deterrence, something that signing the TPNW would prohibit. Perhaps it is no surprise, then, that South Korea has consistently opposed the TPNW.⁵³

South Korea joined the Missile Technology Control Regime (MTCR) in 2001.⁵⁴ This came after benefiting from technology transfer from Russia in 1994 that fell within its proscriptions.⁵⁵ However, for the ROK, MTCR membership is perhaps

less important than the direct US-ROK agreement on what are “acceptable” Korean missile capabilities. The MTCR, not being a treaty, rests in the space of “norms of behaviour,” with little prospect that the South would be punished in the event its leaders saw a national security requirement that would breach it. The limit of 300 km range is a factor when South Korean launchers could be up to 1000 km away from North Korean targets without leaving sovereign territory. The agreement with the United States, by contrast, would open the ROK up to abandonment if the terms were to be flouted – abandonment being one of the main fears about the future of the alliance that Korean officials point to in their rhetoric. However, what could have been a decisive limit on domestic Korean ballistic missile capabilities is increasingly less constraining. As Ankit Panda has argued, the terms of the agreement have slackened over the past few decades.⁵⁶ The most important recent changes allowed the ROK to build space launch vehicles of their own, including using solid-fuel boosters. While still proscribed in the agreement, allowing the South Korean defence industrial base to gain capacity on solid-fuel propulsion leaves a strong possibility of militarising the know-how in the future. This is because solid-fuel rockets are substantially more useful to militaries than their liquid-fuel equivalents due to more rapid response times and superior storability. The AUKUS agreement, especially the component that granted Australia access to nuclear-powered submarines, set a normative precedent that South Korean decision-makers seem keen to exploit. South Korean leaders, most prominently President Moon, have called for ROK nuclear-powered submarines in the past.⁵⁷

The ROK is constrained by norms and institutions in some areas, but not necessarily the major international bodies and agreements that the 20th century architects intended to both secure and constrain states like South Korea. Instead, the United States-ROK alliance is highly institutionalised and norm-laden, just in a bilateral rather than multilateral sense. While not exactly the same as the United States-ROK alliance in the Cold War, rather than multilateralism on the Korea Peninsula, the old “hub and spoke” model of alliance politics persists.

Conclusion: conventional weapons as the route to security

South Korea’s decision-makers are grappling with the full range of factors that are driving a sense of a new era in nuclear politics. ROK security elites view conventional weapons technology as the only valid path to security. Since 2006, South Korea’s governments (of both parties) have attempted to transform their conventional military into a tool that can offset, or even overcome, the DPRK’s nuclear advantage. Fully embracing the potential of long-range precision strike weaponry and ballistic missile defence, the three-pronged strategies of counterforce, BMD and countervalue/decapitation, South Korea is the epitome of an actor empowered by strategic non-nuclear weapons. Behind the headlines of the most eye-catching novel weapon systems, South Korea provides a salutary lesson for analysts of nuclear politics in the Third Nuclear Age. Namely, the threat of major conventional war is a real possibility, and technological choices made to win the

next combined-arms battles are impacting (nuclear) deterrence dynamics. The conventional-nuclear nexus is more important than Second Nuclear Age literature and policy gave credit.

Technological transformation is coupled with a careful attempt at retrenchment of the alliance with the United States while being mindful not to enrage China's leaders. Alliance politics and the politics of weapons technology are closely interrelated for Korea, however. The United States continues to be a source of future technical capability – especially in the areas of ISR and naval nuclear propulsion. South Korea's impressive economic, scientific and technological foundations mean that the United States will not inevitably maintain this position over the longer term. In the meantime, it is the norms and institutions of the United States-ROK alliance that shape the latter's policies much more than the multilateral institutional changes taking place elsewhere in the Global Nuclear Order.

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15 Republic of China (Taiwan)

Build “technologised, professionalised, universalised” and “exquisite quality, disciplined, powerful” combat capabilities; seek and create relative strategic advantage; and accomplish the task of effective deterrence¹ and defence.

(ROC Army Mission and Vision Planning, March 2021)²

All too often thought of as a mere “playing piece” caught between great powers, Taiwan is a potent politico-military actor in its own right. The 21st century has seen the country shake off the legacies of authoritarian rule, and a growing political consensus that *de facto* independence will have to be underwritten with military capabilities. The overwhelming rationale for the existence and shape of Taiwan’s military is the conventional threat from the People’s Republic of China (PRC).³ As the ROC Army Mission and Vision Planning⁴ explains, the goal is to build “technologised, professionalised, universalised” and “exquisite quality, disciplined, powerful” combat capabilities; seek and create relative strategic advantage; and accomplish the task of effective deterrence and defence.”⁵ Unlike the 20th century, Taiwan today is not solely reliant on the United States for advanced weapons capabilities. The Taiwanese domestic arms industry has developed a fearsome array of long-range precision strike, air defence and anti-ballistic missile capabilities. Unlike other states procuring similar strategic non-nuclear technologies, however, Taiwanese security politics shows no sign of rejecting the nuclear revolution. That is, conventional counterforce is out of the question (and conventional *counter-value*, even, is anathema). Instead, Taiwan’s security establishment views long-range precision strikes as invaluable tools for fighting a conventional war against PRC aggression and, therefore, by extension, a method of shoring up the unusual “alliance” politics with the United States.

Taiwan is unlikely to be targeted *directly* by the PRC with a nuclear weapon, a perception that seems to be shared among the country’s national security elite.⁶ There is little to no appreciation in elite or popular discourse that the 1958 Taiwan Strait Crisis almost went nuclear.⁷ Rather, PRC nuclear weapons threaten the potential of US intervention in response to an invasion or blockade of Taiwan. One expert recalled the words from a Chinese official to a US Assistant Secretary

of Defence in the 1990s, to the effect that American leaders “care more about Los Angeles than they do about Taiwan.”⁸ This is perhaps the biggest reason that the pairing of missile defence and long-range strike is not a recipe for conventional counterforce. In the publicly available data, however, there does not yet seem to be an appreciation that paranoia among the PRC’s security elite may result in them assessing these capabilities as a proxy US threat against China’s ground-based second-strike assets. Taiwan is in some ways, both deliberately and also potentially indirectly, shaping the meaning and impact of strategic non-nuclear weapons in the Third Nuclear Age.

Taiwan’s awkward status in international law and institutions has not stopped it from embracing a fairly typical endorsement of the “global nuclear order,” especially on the Non-Proliferation Treaty. While some of this enthusiasm for treaty adherence (despite a lack of recognition from most other signatories) may well be part of a strategy of rendering Taiwanese sovereignty visible to the international community, there are other significant factors. The most important is that Taiwan has not attempted to pursue its own nuclear weapons for almost half a century and has left no room for a nuclear weapon-sharing agreement with the United States. The loftier goals set out by initiatives like the Treaty on the Prohibition of Nuclear Weapons (TPNW) have little to no relevance within domestic Taiwanese security discourse: unlike many signatories, Taiwan faces a clear conventional threat to its existence, a threat backed by the substantial Chinese nuclear arsenal. Taiwanese leaders see no path to nuclear security that does not involve conventional weapons to deter and, if necessary, defeat a Chinese invasion. Additionally, their most important security partner is the United States. This cannot help but add a nuclear dimension to the partnership even though it is never officially acknowledged (and has no formal grounding in any case).

A new era of domestic advanced weaponry

Taiwan’s conventional forces are mainly reliant on the United States for their equipment. Yet, this rule of thumb only holds for traditional capabilities like tanks, planes and tube artillery. Taiwan has increased its strategic reach with a range of cruise and ballistic missile capabilities that can hold targets in the PRC at risk, including deep into the interior if necessary.⁹ In 2021, “Long-range strike” was listed as the first “Force Buildup Goal” for the future.¹⁰ While these capabilities can be thought of as a kind of “counterforce” – the Republic of China Army (ROCA) quite explicitly target the PLA – according to policy analyst J. Michael Cole Taiwanese decision-makers almost certainly do not think of counterforce in a nuclear form.¹¹ Crucially, these weapons have solely Taiwanese launch authority, taking some of the difficult considerations of managing the US partnership/quasi-alliance out of the equation, at least in a strictly operational sense for these strategic strike platforms. Taiwan is not sprinting to a large arsenal of these weapons, however, mainly due to cost, but Taiwanese experts stress that even a modest number of long-range weapons can have a significant deterrent effect against the PRC.¹² The government signalled a greater commitment to creating substantial stockpiles in

2023, citing a ramp-up from 500 missiles produced in 2021, 800 in 2022 and 1000 per year in 2023.¹³ While these numbers are hardly small, there are two important factors that contextualise these figures. First, this figure includes all roles, including air/missile defence, anti-ship and ground attack. Second, the PLA's size means a defence of Taiwan would require firing thousands of missiles. The PLA Navy alone has around 400 hulls,¹⁴ with requisitioned civilian shipping boosting those numbers for amphibious assaults,¹⁵ and the Southern and Eastern Theater Command Sectors contain dozens of airbases.¹⁶ By way of rough comparison, Russia expended around 4,500 ground attack missiles alone in the first six months of its 2022 invasion of Ukraine,¹⁷ arguably a smaller and less complex adversary than the PLA. Nevertheless, increased spending and a public-facing commitment to stockpiling indicate a robust political consensus behind Taiwan's military transformation.

Taiwan's posture strongly implies a concept of deterrence by denial. For example, there was a public backlash against a former official who argued Taiwan could strike the PRC's Three Gorges Dam in retaliation for an invasion.¹⁸ "Countervalue" attacks with long-range precision strikes therefore seem to be morally unthinkable and logistically unwise, when there are already a plethora of tempting military targets.¹⁹ Parliamentary debate on Taiwan's defence emphasises defensive measures, such as anti-air and anti-ballistic missile technology. The online public records of Taiwan's legislature, the Legislative Yuan, make no reference whatsoever to the Tien Chi (天戟) ballistic missile, for example, despite the publication of other deliberations on defence issues.²⁰ Taiwan's lack of interest (so far) in offensive cyber capabilities and electronic warfare have so far been offset by more pressing needs to bolster conventional defence forces – degrading PRC C4ISR can only go so far to counter their conventional superiority – although jamming the PRC's Beidou navigation system is a tempting target.²¹

Taiwanese defence discourse does not discuss any *nuclear* relevance for advanced air and missile defence capabilities. Rather than a way to limit damage from a Chinese nuclear strike – that no mainstream domestic expert expects – these capabilities represent a way to reduce the impact of the opening salvos of the PRC's own long-range precision strike capabilities. The greatest fear of Taiwanese defence experts is that Chinese missile attacks could destroy the Taiwanese air force.²² Moreover, Taiwanese defence planners do not appear to have an unrealistic level of confidence in active ballistic missile defence techniques,²³ with one expert describing attempts to defend all possible targets as "nonsense."²⁴ Instead, Taiwan's plans strongly indicate that commanders expect BMD's impact to be specific, limited, but nevertheless useful for blunting (not escaping) debilitating PRC preparatory strikes against critical infrastructure and the most valuable military targets.²⁵ The best evidence for this position is the plethora of passive defensive measures increasingly adopted by Taiwan's own missile, air and artillery forces. Unlike the fixed positions of the past, new and updated systems are increasingly mobile²⁶ or sheltered. Taiwan's famous mountain-housed airbases are on the opposite side of a mountain range to most PRC ballistic missile firing positions and are protected by thick layers of rock.²⁷ Furthermore, in expectation of these attacks, Taiwan has invested in rapid repair crews for critical infrastructure.²⁸ Taiwan's

approach to defence is not purely “high-tech,” then, but incorporates a mixture of organisational and “low-tech” responses too.

Taiwan is known to benefit from at least some of the United States’ C4ISR network. The presence of a PAVE-PAWS ballistic missile radar site in Taiwan ensures the country has access to some US-quality sensor technology (it is unclear whether it is tied into US networks, however).²⁹ Taiwanese security experts speculated that the United States could access the information collected by the radar with Taiwan’s permission.³⁰ It is publicly unclear exactly how much Taiwan’s military directly benefits from US C4ISR, protected as it is by significant classification on both sides.³¹ In the wake of the war in Ukraine in 2022, where US targeting information is almost assuredly being passed to Ukrainian artillery units, it now seems more likely than ever that even low-level US support in the event of PRC aggression would include sharing targeting data. Additionally, Taiwan’s targeting requirements are perhaps less demanding for its conventional strategic strike capabilities because of how military planners envisage their use, namely, striking fixed targets such as airfields and logistics infrastructure.³² Commercial satellite imagery, likely bolstered with human intelligence, is more than sufficient for keeping abreast of large, valuable targets in the PRC.

Taiwan’s interservice competition is a major factor in deciding what the military will ask for in terms of procurement.³³ The sub-factions within the military, even within services, strive for attention and resources from the Ministry of National Defense, with the Legislature playing a relatively modest role.³⁴ The National Chung-Shan Institute of Science and Technology (NCSIST) is a powerful institution behind missile development.³⁵ President Tsai reformed NCSIST to be more closely linked to civilian technology companies, and Tsai has championed the Institute throughout her time in office.³⁶ Beyond interservice rivalry, Taiwanese experts identify Washington as the biggest influence and limitation on what Taiwan procures, although there is a sense among defence professionals that American constraint is declining.³⁷ Overall, Taiwan’s push for advanced conventional capabilities is a product of an intensification of a long-standing security issue: the PRC. Despite the PRC’s nuclear armament, Taiwan’s innovative military technologies are not being procured in response to changing *nuclear* politics. Nevertheless, Taiwan is on track to continue developing these capabilities, and if they do become more potent, then decision-makers will feel the implications for United States-China-Taiwan nuclear stability more keenly.

By way of context and comparison to non-nuclear kinetic threats, national security experts sometimes identify the PRC’s non-kinetic, long-term influence operations as a greater threat than the PRC’s advanced non-nuclear weapons, or at least a major issue because of the difficulty in countering it.³⁸ There have been fears in the past that pro-China electoral candidates have become suddenly popular due to PRC disinformation operations or that the PRC is ultimately the source of rumours targeting Taiwanese leaders.³⁹ Taiwan’s status as a target of PRC disinformation also gives it a kind of soft power; the European Union sent a delegation to Taiwan to learn from it, for example.⁴⁰

China's not so peaceful rise and the Milk Tea Alliance

Taiwanese domestic politics are a key shaping force of “great power competition” in the Pacific region. At the beginning of the 21st century, it was far from clear what path the Taiwanese electorate would take: support the newly democratised Kuomintang (KMT) party and its moderate rapprochement agenda towards the PRC, or break with the past and vote for the Democratic Progressive Party (DPP). The last two decades ultimately showed that, at the national level, the KMT will be unable to dominate Taiwanese politics for the foreseeable future. The KMT of the authoritarian era had a programme to make Taiwan's citizens feel “Chinese,” and that project has now undoubtedly failed. Over two-thirds of citizens now consider themselves “Taiwanese” rather than “Taiwanese and Chinese,” with 92% of DPP voters self-identifying in this way.⁴¹ The KMT, for its part, is less moderate on the question of the PRC than it was in the 2000s, and so a near-super majority of Taiwanese voters rejected the KMT in the election of DPP Presidential Candidate, Tsai Ing-wen. The ramifications for the PRC are clear: “peaceful” reunification through KMT incremental cooperation is impossible. It is these domestic Taiwanese trends that have set the stage for an increasingly militarised Taiwanese national security strategy. As the Taiwanese people become increasingly (quietly) assertive on their right to self-determination, in a form that obviously runs counter to the PRC's restrictive and domineering approach, the official PRC line becomes more and more divorced from the groundtruth. Continued PRC (self-induced) insecurity on the question of Taiwan seems all but inevitable, with the major ramification that Taiwan's status will continue to be the main “bone of contention” in United States-China relations.⁴²

Taiwanese security elites still view the United States somewhat as the “hub” of Asia-Pacific security, along broadly the same lines as the Cold War “hub and spoke” model.⁴³ For example, when US President Biden continued the “Indo-Pacific” characterisation of policy, Taiwanese journalists and security elites followed suit.⁴⁴ Taiwan's leaders embraced aspects of President Trump's more antagonistic approach to China, and Taiwan's public polled in favour of a Trump re-election in 2020.⁴⁵ Despite the massive difference in social values between Trump and Taiwan's electorate, the public support for him shows how US security assistance remains the “hub” of Taiwan's foreign and security policy. Trump's policy was ultimately an intensification of existing US support for Taiwan, however. US naval ships transited the Taiwan Strait more often than in the past, although they had already performed these operations multiple times a year under the Obama administration.⁴⁶ Similarly, the United States has sold weapons and equipment to Taiwan for many decades, but the Trump administration ensured Taiwan had larger arms packages with technologies like fighter jets and anti-ship missiles previously judged too provocative to trade.

Growing interaction with India is one avenue where Taiwan might begin to be a player in broader great power politics beyond the age-old United States-PRC-Taiwan nexus. It also puts flesh on the bones of the “Indo-” prefix of the

“Indo-Pacific” framing that Taiwanese security elites have adopted from the United States. The partnership is in an exploratory phase, with some initial dialogues but no concrete planks of cooperation.⁴⁷ A key benefit could be data exchanges for naval and aerial surveillance to allow tracking of Chinese ships, submarines and planes that move between identification zones.⁴⁸ At the time of writing, the Taiwan-India relationship is understood by Taiwanese political analysts as primarily economic.⁴⁹ Indian domestic politics diverge significantly from the social values of Taiwan, yet “politics make for strange bedfellows,” as Taiwanese journalist Brian Hioe put it: a shared perception of a threat posed by the PRC provides a strong basis for strengthening India-Taiwan links.⁵⁰ Nevertheless, like-minded citizens from both countries, and in the region, are part of a growing sense of regionalism dubbed the “Milk Tea Alliance” (in reference to a shared taste for distinct, yet comparable, styles of milk tea drinks). As Hong Kong activist-journalist Christina Chan described it, “milk is thicker than blood.”⁵¹

The idea of a “Milk Tea Alliance” is far wider in scope than just India. It began with a solidarity campaign made up of Hong Kong and Taiwanese online activists attempting to counter PRC online propaganda during the PRC’s crackdown on Hong Kong after 2019.⁵² Additionally, pre-dating more modern, online notions of the “Milk Tea Alliance,” the Taiwanese public have a favourable view of Japan quixotically because Japan formerly colonised Taiwan⁵³ (and is remembered more favourably than the White Terror brought by the KMT in the 1940s).⁵⁴ Despite the sum of these cultural synergies and grass-roots expressions of international solidarity, Taiwan’s position in regional and global politics is far from straightforward. One of the barriers to Taiwan’s engagement with regional allies are ongoing territorial disputes in the South China Sea, where Taiwan is in direct dispute with future potential allies such as the Philippines.⁵⁵ There is tension between the soft-power, bottom-up international politics of Taiwan and its more historic, elite security politics of disputes over territory or resources.

Supporting the established nuclear order from the “outside”

Norms and institutions have special importance for Taiwan. The Ministry of National Defense (MND) states that “The ROC (Taiwan) staunchly supports and abides by all international security norms of non-proliferation,”⁵⁶ an especially notable sentiment since the MND is not the Ministry of Foreign Affairs, and so is going beyond the expected legalistic language militaries typically engage in. The Taiwanese government holds itself to the stipulations of the Non-Proliferation Treaty, which fits with a trend of Taiwan implementing international agreements despite not being legally party to them.⁵⁷ Taking pains to signal wholehearted support of international norms and institutions is evidence of how Taiwan’s national identity is that of an international outsider hoping to have more normal international relations.

Under the authoritarian regime that preceded Taiwanese democracy, the government covertly pursued nuclear weapons only for a mixture of US pressure and public embarrassment to draw it to a halt by the end of the 1970s.⁵⁸ More recently,

the United States and Taiwan have continued civilian nuclear cooperation that has fallen firmly within expected norms and procedures set out by the NPT and IAEA. Indeed, in the 2010s, the United States held up the agreement with Taiwan as a potential new “gold standard” for civilian nuclear cooperation that was weapons-proliferation-safe.⁵⁹ Regional proliferation concerns are perhaps less important than alliance management politics, however: the AUKUS deal left Taiwan “feeling left out again”⁶⁰ rather than concerned of the damage to proliferation norms. Despite the strong anti-nuclear weapons sentiment within the national security elite (and public), the Treaty on the Prohibition of Nuclear Weapons (TPNW) has little to no public profile in Taiwan.⁶¹ There is simply no sense that the “Nuclear Ban Treaty” could lead to greater security for the country. For their part, advocates of the Ban Treaty face an interesting choice regarding Taiwan: campaign for its participation, benefit from Taiwan’s sincere anti-nuclear tendencies and risk robust opposition from the PRC – or continue to ignore⁶² a central nuclear-inflected US alliance in the Pacific.

Conclusion: conventional counterforce against conventional targets

Taiwan’s security and foreign policy elite are coming close to a consensus pathway to security in an era of changing great power politics that revolves around the parallel procurement of advanced conventional capabilities from allies, but crucially also from a vibrant domestic defence sector. Domestic weapons programmes and defence reforms serve a mutually beneficial political purpose of boosting material capabilities to resist future PRC aggression, signal Taiwanese resolve to maintain American trust and support and ensure the ROC is not entirely reliant on US military assistance to survive a PRC invasion (and thereby hedge against “abandonment” by the United States).

Taiwan’s leaders have specific targets in mind for their growing conventional arsenal.⁶³ The implied doctrine is one of conventional-tipped counterforce aimed at the conventional forces of the PRC. The PLA is a web of targets with supporting infrastructure that is geographically distributed over thousands of miles. Whereas in the past, the ROCA would have only been able to engage PRC forces once they had begun sailing across the Taiwan Strait, in the 21st century, Taiwan can jeopardise the PLA’s ability to properly support its invading troops. Creating these tactical benefits for Taiwanese defenders also meshes with desirable operational and strategic effects. Forcing the PLA to fight from a more dispersed posture and from more distant and disaggregated logistics hubs would create further strategic hinderances for a PRC invasion, making operations more resource intensive.

Taiwan’s military-focussed strategy does not come at the expense of normative and institutional commitments. A need to maintain the moral high ground, both for reasons of self-identity and arguably for strategic reasons, means that international norms are genuinely important according to Taiwan’s decision-makers. However, the scale of commitment should not be misunderstood: Taiwan’s security elite do not see international law and institutions as viable routes to security in-and-of themselves. Taiwan’s governments have been increasingly candid that only

conventional military power will deter and, if necessary, defeat PRC aggression. In the Third Nuclear Age, Taiwan's leaders perhaps reluctantly have committed themselves to a conventional weapons-based path to security.

Notes

- 1 Note that to denote 'deterrence', Taiwanese discourse tends to use 嚇阻 (xiàzǔ) not 威懾 (wēishè), as the PRC's military does. See 吳自立 [Wú Zili], '中共軍演的省思：要「拒止」而非「嚇阻」' [Reflections on the CCP's military exercises: "Resist" rather than "deter"], *INDSR*, 8 August 2022, <https://indsr.org.tw/focus?uid=11&pid=414&typeid=25>. For comparison see 中国人民解放军国防大学 [National Defense University], '第八章 战略威慑' [Chapter 8: Strategic Deterrence] in 战略学 (2020版) [Science of Military Strategy, 2020 Ed.] (中国人民解放军国防大学出版社 [National Defense University Press], 2020), <https://interpret.csis.org/translations/science-of-military-strategy-2020-ed-chapter-8-strategic-deterrence/>.
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Summary

The “Technological Transformers” are united by the fact that they all appear to be pursuing strategic non-nuclear weapons technologies as the central means to deter nuclear-armed adversaries. By “strategic non-nuclear,” we mean advanced conventional military capabilities that can be employed for strategic missions⁶⁴ – including those that in the past may only have been carried out with nuclear weapons – and that are qualitatively different from capabilities used for traditional manoeuvre warfare (such as tanks and artillery). This does not mean that these states are all developing and deploying the same technologies, or doing so at the same pace and scale, but that this is the direction of travel.

With the exception of Israel, the Technological Transformers have eschewed the pursuit of either an independent nuclear weapons capability or the (re)deployment⁶⁵ of an allies’ nuclear weapons on their territory (at least for the moment) in favour of significant investment in strategic non-nuclear weapons. This includes the pursuit of sophisticated and integrated air and missile defences (often plugged into US regional BMD systems); different types of long-range precision missiles and guided bombs; significant investment into autonomous weapons systems/drones; hardened command and control; 4th and 5th generation “stealth” aircraft; and, in the case of Australia, conventionally armed nuclear-powered submarines.

Taiwan and South Korea are the best examples of states seeking to ramp up conventional capabilities to meet the challenges posed by their immediate neighbours: China and North Korea – albeit in slightly different ways. For Taipei, the mission is building missiles and aircraft that can hold at risk Chinese conventional forces on land, at sea and in the air that might be used in an invasion through a counterforce/denial strategy. For Seoul, it is about demonstrating the ability to undermine any nuclear attack from the North through pre-emptive strikes and potentially targeting the North Korean leadership. Israel is seeking technological solutions to meet a range of different security threats ranging from non-state actors to a possible nuclear-armed Iran, allowing it in turn to keep the nuclear threat implied rather than overt.

Japan and Australia have both recently moved to place greater emphasis on their commitment to conventional military forces for regional security and particularly meeting the perceived threat/challenge from China (and to a lesser extent, North Korea). Japan appears to be making tentative steps towards enhancing

its conventional capabilities while at the same time seeking to strengthen the nuclear alliance with the United States. In part due to geography, the threat facing Australia is less acute, but it is clear that the Australian government sees a major commitment (or at least aspiration) to hi-tech conventional forces as key to meeting the challenges posed by China and a more unstable region. This arguably moves them from Hedgers and Balancers to Technological Transformers – at least in their ambitions and direction of travel. While each of these states faces slightly different immediate security threats and is transforming at different speeds and scale, they appear united by the belief and notion that planning for – and potentially undertaking – conventional warfare will be a major component of the Third Nuclear Age.

The Technological Transformers are not homogenous in their approaches or specific geopolitical circumstances, nor are they transforming at the same speed or to the same extent, and this can be explained in part by the different security contexts facing Taiwanese, South Korean, Israeli, Japanese and Australian policymakers. While not included in this study, Poland might also be another case of a state seeking to achieve its immediate security requirements through enhanced conventional forces⁶⁶ (albeit under the NATO nuclear umbrella). But what does unite this group is a perception that planning for interstate conventional war (possibly under the nuclear shadow) will be a central component of the Third Nuclear Age. That said, many of the states that we classify as Technological Transformers have a degree of nuclear latency, and the option of either an indigenous or enhanced extended nuclear deterrence capability (such as nuclear deployments on their territory and possibly nuclear sharing) in the future cannot be ruled out.

Australia, Japan and South Korea all have overtly extended *nuclear* deterrence relationships with the United States; Israel has its own albeit undeclared nuclear capability and while Taiwan gave up pursuit of nuclear weapons in the 1980s, the US nuclear arsenal looms large over United States-China-Taiwan security politics. Each of the Technological Transformers also benefits from the transfer of cutting-edge non-nuclear military technologies, especially from the United States. It is at least conceivable that this is a deliberate US ploy to keep its allies from pursuing the nuclear option by facilitating other means of deterrence. At the same time, Australia, Japan, South Korea and Taiwan may see investment in strategic non-nuclear weapons (including burgeoning domestic production) as a guard against possible future US abandonment, whereby they will have to rely more on regional allies and national capabilities for security. In general, non-nuclear routes to security are arguably far more politically palatable for Japan (given the history of nuclear use and the influence of the Hibakusha) and Australia (given its membership in the South Pacific Nuclear Weapons Free Zone); and more viable for South Korea (there is little appetite in the United States to redeploy nuclear weapons to the peninsula, but a persistent fear that an indigenous programme could be restarted) and Taiwan. This suggests that the non-nuclear route to deterrence and security may only be feasible for a small group of advanced nations.

Global norms play a more limited role in the decision-making calculus of the Technological Transformers than for the Activists and Protesters and Hedgers and Balancers. Neither Israel nor Taiwan are members of the NPT, but have very

different approaches to the treaty: in Israel it is largely ignored, while the Taiwanese security elite seek to adhere to the treaty's norms more broadly. Institutions such as the NPT and a general adherence to arms control and restraint are more significant for Australia, Japan and South Korea – all of whom have a vested interest in defending the status quo global nuclear quo. This is arguably one of the reasons that makes conventional pathways to security appealing for elites in those countries. There is some engagement in Australian and Japanese politics with the TPNW, but neither are likely to sign the treaty. There is far less interest in Israel, Taiwan and South Korea, where the perception is that a global nuclear ban is neither feasible nor helpful in meeting their immediate security interests.

Arguably the category of Technological Transformer wouldn't have been possible in previous nuclear ages – with perhaps the exception of the United States – because the capabilities and resources simply didn't exist to follow this pathway. This is what makes strategic non-nuclear weapons a genuinely transformative element of the Third Nuclear Age. In terms of what this means for the future, four key dynamics stand out: (i) it has become increasingly possible and credible to deter a nuclear-armed adversary with advanced conventional weapons rather than nuclear weapons; (ii) this suggests that other states could follow this model as a pathway to future security – in theory this could apply to those with nuclear weapons too; (iii) however, each of the states pursuing a non-nuclear pathway is ultimately reliant on nuclear weapons (either through a commitment from an ally, or from a undeclared capability); (iv) and none of these states currently see the TPNW (or an Activist and Protestor approach) as a viable mechanism to meet their security challenges (despite a history of disarmament advocacy in Australia and Japan).

The major implication of states moving towards an advanced conventional deterrent posture against nuclear-armed (and nuclear hedging) adversaries is that it becomes far less clear where red lines are, what type of use of force might lead to escalation and how nuclear and non-nuclear systems may become commingled in a crisis. This has major consequences for the possibility of stability and war, especially in the Middle East, Northeast and East Asia.

Part IV

The nuclear traditionalists



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16 The United States of America

as long as nuclear weapons exist, the fundamental role of U.S. nuclear weapons is to deter nuclear attacks on the United States, on our allies, and partners. The United States would only consider the use of nuclear weapons in extreme circumstances to defend the vital interests of the United States, its allies, and partners.

(Anthony Blinken, speech to the NPT Review Conference, August 2022)¹

Introduction: the United States and nuclear ages

Perhaps more than any other country, the United States has borne a particular responsibility for the shape and evolution of the global nuclear order since 1945, and, accordingly, US policymakers, professionals and academics have played a fundamental role in the transition into a new “Third” Nuclear Age. This should perhaps come as no surprise given that scholarship and practice in the United States have also been the main drivers of the nuclear ages concept in general,² and that nuclear ages are intrinsically bound up with the major nuclear threats, challenges and dynamics that US policy elites have conceived of at any given time.

At its heart, the shift towards a new nuclear era appears to be underpinned by a conspicuous move by the US policy community away from “rogue state” nuclear threats towards the challenge posed by the return of great power nuclear rivalries. While the US military establishment has spent the best part of three decades pursuing different non-nuclear technologies to augment the role played by nuclear weapons to meet the challenges of the Second Nuclear Age, today the emphasis has returned to the centrality of *nuclear* deterrence, both national and extended. US military commanders are undoubtedly interested in pursuing the benefits of novel advanced technologies for military applications, but these are principally for conventional warfighting and conventional deterrence, and, in some cases, the application of these technologies is still to be formulated.³ Ultimately, these non-nuclear systems – and the non-nuclear systems of US allies covered by extended deterrence guarantees – are undergirded by the commitment to a secure US nuclear force. Maintaining nuclear credibility in an era of renewed nuclear competition seems likely to be a major challenge for the United States in the Third Nuclear Age.⁴

While the United States has played a key role in shaping and determining nuclear order in the past, it is less clear that the United States or Western countries in general will remain the central shaping forces of global nuclear order going forward. Indeed, the Third Nuclear Age may see the United States and other Western powers forced to respond to as much as create the contours of the evolving global nuclear landscape as nuclear multipolarity and an increasingly fractured system of global nuclear governance is challenged. US officials (and key personalities in the Republican and Democratic parties) may still be trying to understand the new nuclear landscape, but what is clear is that the United States won't necessarily be the only or main shaper of global nuclear order going forward.

As of 2022, the United States had approximately 5,428 nuclear warheads in the stockpile, of which 1744 were deployed, most as part of the strategic triad of bombers, submarines and ICBMs based in the United States, and around 100 gravity bombs forward deployed at NATO air bases in Europe.⁵ These capabilities contribute to three functions: (i) deterrence of nuclear and non-nuclear attack; (ii) assurance of allies and partners; and (iii) achievement of US objectives if deterrence fails. A fourth, the capacity to hedge against an uncertain future, was removed from the 2022 Nuclear Posture Review (NPR).⁶ As the 2022 NPR puts it, "For the foreseeable future, nuclear weapons will continue to provide unique deterrence effects that no other element of US military power can replace."⁷ However, as former Deputy Assistant Secretary of Defense Brad Roberts noted in a 2023 interview, simply replacing the existing nuclear capability may not be enough to meet the requirements of deterring two major peer competitors and reassuring allies in the years ahead.⁸

Towards integrated deterrence?

The United States has been at the forefront of technological change throughout the nuclear age, often being the first to deploy new or enhanced types of military capabilities. The same is generally true today. Consequently, in addition to the ongoing programme to "recapitalise" the nuclear triad in order to sustain its life and veracity into the second half of the 21st century, the Department of Defense is also continuing to increase investments in advanced non-nuclear technologies with potential strategic applications. However, we argue that the nuclear component is fundamental to US Third Nuclear Age security politics. As Robert Legvold explains:

The stress on flexibility, the role of conventional weapons in nuclear deterrence, and the importance of keeping technological options open is not treated, as earlier, as part of an evolution away from nuclear deterrence, but as recognition that nuclear deterrence provides a margin of safety that conventional deterrence cannot.⁹

In terms of *nuclear* modernisation, the United States is committed to building a minimum of 12 Columbia-class SSBN's armed with Trident SLBMs, deploying a new generation of 400 Sentinel ICBMs by 2029, modernising the B52 bomber

fleet and fielding (at least 100) B21 Raider stealth bombers armed with 2500 km+ range Long-Range Stand-Off air-launched cruise missiles by the mid-2020s, as well as enhancing (and hardening) nuclear command, control and communications, maintaining stockpile stewardship and building new nuclear warheads. The United States will also continue development of the W93 warhead programme, which is believed to be key to the UK nuclear modernisation effort.¹⁰

While some aspects of modernisation have been driven by the fact that many current US nuclear systems are quite old and reaching the end of their planned service lives (and in some cases have already gone well beyond what was originally planned¹¹), there is also a recognition that newer capabilities may be needed to meet a more challenging deterrence environment. As the 2018 Nuclear Posture Review released by the Trump Administration points out, these expensive programmes are being driven by concerns about vulnerability and future efficaciousness of the current systems.¹² Even the most-survivable “leg” of the deterrent force may become vulnerable:

The Ohio-class cannot be extended further. In coming decades, advances in adversary anti-submarine warfare and missile defense capabilities could challenge the effectiveness of current SSBN and SLBM systems.¹³

In addition, the US military will deploy the dual capable F35 aircraft for a possible tactical/sub-strategic nuclear role. These aircraft will be able to drop nuclear-armed B61 free fall bombs. The United States has a stockpile of approximately 230 B61 nuclear weapons, with roughly 100 of these deployed in Europe under the NATO nuclear sharing mission.¹⁴ There has also been some debate about developing a “new” nuclear-armed submarine launched cruise missile (SLCM-N) capability for non-strategic regional purposes (the previous version was retired in 2010), and some SLBMs have reportedly been modified to provide a “low yield” nuclear option (W76-2¹⁵).¹⁶ However, the megaton B83-1 nuclear bomb (the largest in the current arsenal) seems set to be retired.

In 2019, the Trump Administration released its Missile Defense Review,¹⁷ which outlined the plan to “integrate offensive and defensive capabilities for deterrence, and includes active defense to intercept missiles in all phases of flight after launch, passive defense to mitigate the effects of missile attack, and attack operations during a conflict to neutralize offensive missile threats prior to launch.”¹⁸ There are currently 64 long-range interceptors planned for deployment in Alaska and California as part of the homeland GMD system, in addition to the THAAD, Aegis and Patriot systems that form part of the “regional and transregional missile defense” architectures in other parts of the world (notably in Europe and Northeast Asia). The Department of Defense is also developing a “Low-Power Laser Demonstrator” for possible uninhabited boost-phase missile defence applications, and is reportedly engaged in developing “cyber” options for “left of launch” operations against adversary missile systems.¹⁹ However, there is a feeling that these capabilities may be more suited to the “rogue state” nuclear challenges of the Second Nuclear Age than the great power nuclear challenges of the Third.²⁰

The United States has continued developing a variety of non-nuclear weapons with potential strategic applications. The most prominent of these are the continuation of various prompt global strike ambitions, notably a range of different hypersonic missile programmes (such as the boost-glide Long-Range Hypersonic Weapon)²¹ as well as sub- and supersonic precision-strike cruise missiles (such as the dual-capable AGM 86 and Tomahawk, and the conventionally armed AGM 188 JASSM). All of these capabilities are supported by a sophisticated and extensive C4ISR architecture, including powerful space-based radar, global positioning and communications systems and data fusion centres. In 2006, the then Bush administration requested funding for a conventionally armed Trident missile to be deployed alongside nuclear-armed SLBMs onboard Ohio-class submarines, but this idea was subsequently scrapped.

As the Third Nuclear Age unfolds, and especially if both Russia and China build up their own nuclear capabilities, pressure will be placed on US policymakers to do likewise. Indeed, this is exactly the point made by the Congressionally mandated “America’s Strategic Posture” report released in October 2023: “The current modernization programme should be supplemented to ensure U.S. nuclear strategy remains effective in a two-nuclear-peer environment.”²² Given that the current modernisation programme will not be completed for the best part of a decade, this could pose some difficult questions for policymakers in Washington beyond uploading more weapons to nuclear bombers.

Towards nuclear multipolarity?

A central feature of the Third Nuclear Age is that the United States is no longer the sole nuclear superpower, and instead is confronted with a world of powerful nuclear-armed revisionist (or at least competitor) states. As the 2022 NPR puts it, “By the 2030s the United States will, for the first time in its history, face two major nuclear powers as strategic competitors and potential adversaries.”²³ This is also a world of nuclear “poles” and multipolarity where Russia, China and perhaps, to a lesser extent, India will all play increasingly significant roles in global politics, and each of these actors will require a different set of responses from the United States. It will also be a world where US allies in Europe/NATO, the Middle East and Asia may require different or enhanced mechanisms to be reassured of the US extended deterrence guarantee.

This is not to say that the nuclear challenges posed by North Korea, Iran, nuclear terrorism or future would-be nuclear proliferators have disappeared, but rather have been superseded in the US nuclear threat hierarchy. Essentially, the United States is facing a world where it may have to deter two major nuclear-armed adversaries at the same time, in addition to the established proliferation (and extended deterrence) problems of the previous nuclear age. A context Brad Roberts describes as “deterrence 3.0.”²⁴

At its heart, the shift towards a new nuclear era appears to be bound up with a conspicuous move by the US policy elite away from “rogue state” nuclear threats to a return of great power nuclear rivalries and a concomitant interest in different

technologies for different nuclear and strategic missions. Indeed, the 2018 NPR was fairly explicit about how the nuclear threat environment facing the United States had changed since the Obama Administration's 2010 posture review, which "placed the prevention of nuclear terrorism and proliferation at the top of the US policy agenda."²⁵ As the Executive Summary to the 2018 Nuclear Posture Review explains:

The United States now faces a more diverse and advanced nuclear-threat environment than ever before, with considerable dynamism in potential adversaries' development and deployment of programs for nuclear weapons and delivery systems.²⁶

The idea of a "return" of great power politics has been gradually gaining traction in US policy discourse for the past decade and was a concept most strongly advanced by the Trump Administration in its 2018 Nuclear Posture Review.²⁷ Initially, this return to great power competition was about China, and the threat posed by China to the US-led order and allies in Asia, especially Northeast Asia. While the "rising China" narrative is certainly not new, an increasingly assertive and militarily capable China seeking to challenge US dominance in and around the South China Sea has drawn focus for US planners to the question of how to deter Chinese actions and less conspicuously how to fight and win a *conventional* war under the nuclear shadow. Many experts have argued that the need to counterbalance China (not Russia) was a major reason for US withdrawal from the INF Treaty, and is almost certainly a driver behind the AUKUS agreement unveiled in September 2021, which, among other things, will see the US and UK support Australia to build nuclear-powered submarines and develop other advanced military capabilities.²⁸ The challenge is compounded by the fear that China may be preparing to expand the number of ICBMs and nuclear warheads that are deployed.

While Russia never went away as a major nuclear power, it did effectively disappear as a major challenger to the US-led nuclear order in the Euro-Atlantic for the best part of a generation. This "holiday from history" essentially created the space for the United States and Russia to make massive cuts in their nuclear stockpiles without any real effect on deterrence or stability. But the nuclear challenges posed by Russia have reemerged over the past few years, notably with the announcement of a raft of new "exotic" nuclear delivery systems specifically designed to counter US missile defence deployments,²⁹ and particularly as part of the rhetoric that accompanied the 2022 invasion of Ukraine. Thinking about Euro-Atlantic deterrence, and particularly nuclear and conventional deterrence of current and future Russian aggression in Europe, has returned after a 30-year hiatus. In addition to replacing the NATO dual-capable aircraft (and possibly storing US weapons again elsewhere in Europe),³⁰ there have been calls for new nuclear and advanced conventional weaponry to be deployed on the continent to meet this new great power challenge.³¹ Russian sabre rattling and ostensive warnings of tactical nuclear use during 2022 caused major headaches for the Biden Administration and what

appropriate responses beyond threatening that “any nuclear use would be met with ‘catastrophic consequences’” might look like.³²

The fourth pole of this emerging global order, India, presents a slightly different challenge for the United States. India is not a direct nuclear competitor to the United States in the way that China and Russia appear to be and is a key player in The Quadrilateral Security Dialogue (or Quad³³), but will nevertheless play a significant balancing role in the Third Nuclear Age. Various US administrations have been trying to court India over the past couple of decades, notably with the 2005 “123” Civilian Nuclear Deal³⁴ but also by trying to build other mechanisms to move India into the Western orbit. India for its part has a central role to play for US policy given its apparent desire to balance its relationship with the United States and Russia and at the same time deter China.

Taken together, US policymakers face an unprecedented nuclear challenge: two major peer competitors (the so-called “two-peer problem”) that may expand the number or role of nuclear weapons that they possess and seek to use these for regional coercion and to “outcompete” the United States; a group of allies increasingly uncertain about the veracity of the US extended deterrence guarantee; alongside North Korea that can probably now hit the continental United States with nuclear weapons, and an Iranian leadership moving ever closer to the bomb. This suggests that a rethink of what is needed for US nuclear deterrence in the Third Nuclear Age may be required in Washington.

The end of arms control?

There is a feeling that one of the main casualties of the Third Nuclear Age will be the arms control and global governance architecture that has been built up over preceding decades, most of it by and arguably for the United States and its allies. The mixture of great power competition and the development and deployment of new weapons systems doesn’t bode well for negotiated measures of restraint, let alone the long-term goal of nuclear disarmament championed by President Barack Obama back in 2010.

It has become popular to speak of an “end of arms control” in the US debate,³⁵ and while this may in some cases be overstated, it is clear that many of the frameworks that were deemed essential to previous nuclear eras have lost centrality – or at least have become more difficult to maintain – for the US policy elite. There is perhaps no better example of this than the end of the Intermediate-Range Nuclear Forces (INF) Treaty in 2018, but it is also reflected by the end of the Conventional Forces Europe (CFE) and Open Skies Treaties and perhaps also by the decision to pull out of the Joint Comprehensive Plan of Action with Iran. These pressures on arms control are also highlighted by the uncertainty about what – if anything – will replace the New START treaty between the United States and Russia after its expected expiry in 2026 (New START was extended in 2021, but Russia suspended participation in February 2023).³⁶ Any ideas of further United States-Russian strategic nuclear reductions beyond the current levels seem unlikely, and the possibility of trilateral United States-Russia-China nuclear arms control looks very unlikely from

the current vantage point. Nevertheless, as the 2022 NPR puts it, “Mutual, verifiable nuclear arms control offers the most effective, durable and responsible path to achieving a key goal: reducing the role of nuclear weapons in US strategy.”³⁷ While future arms control agreements are not impossible, the Third Nuclear Age seems most likely to be characterised by nuclear competition rather than nuclear cooperation. In fact, there may already be a recognition in Washington that the era of nuclear arms control that began in the 1980s has finished.³⁸

A broader challenge for the United States comes from the weakening of the global nuclear governance regime centred on the Non-Proliferation Treaty (NPT). The NPT is an institution that arguably favours the status quo and thus the relative position of the United States within the global nuclear system, particularly vis-à-vis the non-nuclear armed states. But many non-nuclear NPT members are growing tired of the perceived lack of interest by the nuclear-armed states in disarming. While the Biden administration’s NPR said that the United States is committed to the ratification of the Comprehensive Test Ban Treaty (unlike the previous Trump administration), there are no concrete public plans to achieve this.³⁹ Both 2018 and 2022 NPRs also stated that the United States would not resume explosive nuclear testing, although the 2018 version added the caveat “unless required for the safety and effectiveness of the nuclear arsenal.”⁴⁰ There remains a strong constituency in Washington for arms control and finding ways to engage external stakeholders. Vice President Kamala Harris’ push for a direct ascent ASAT ban in April 2022 may be a good example of this.⁴¹

The Western nuclear order is also being challenged from the outside, notably by the agreement and entry into force of the Treaty on the Prohibition of Nuclear Weapons (TPNW). The United States is not a signatory to the TPNW and has effectively ignored its materialisation and downplayed its significance; the 2019 NPR, for example, criticised the TPNW for being:

fuelled by wholly unrealistic expectations of the eliminations of nuclear arsenals without the pre-requisite transformation of the international security environment. ... [which have] polarized the international community ... [and] could damage US security.⁴²

However, the Treaty does mark a challenge to the centrality of nuclear weapons to global politics, and particularly the role that nuclear weapons play in US deterrence thinking.

The United States government remains publicly committed to the “ultimate goal of nuclear disarmament” and the Nuclear Non-Proliferation Treaty as the cornerstone of the global non-proliferation regime, and, in 2022, the Biden Administration reiterated its commitment to avoiding nuclear war.⁴³ But it is difficult to see the next steps. The Trump Administration’s “Creating the Conditions for Nuclear Disarmament” initiative seems to have stalled, as has the Biden Administration’s strategic dialogue with Russia. The more likely approach will be a building up rather than a reduction of nuclear capabilities in the years ahead. As Brad Roberts put it in 2023, “in this new strategic environment, the United States

should re-assess the measure of strategic self-restraint it exercises in the name of nuclear order and stability. ... the strategic benefits of restraint are less clear while its costs are increasingly clear.”⁴⁴

Peaceful nuclear cooperation remains a key plank of US nuclear diplomacy, and US companies continue to play an important role in the global nuclear energy market – albeit there is a concern that the United States is losing out to Russia and China. What are often known as “123 agreements” after Section 123 of the US Atomic Energy Act have been signed with 47 countries.⁴⁵

Conclusion: returning to nuclear competition

Notwithstanding significant technological change in conventional weapons systems, *nuclear* weapons and *nuclear* deterrence will continue to form the bed-rock of national security policy for US policymakers, officials and perhaps especially for US extended deterrence partners in the Third Nuclear Age. In this way, the United States is perhaps best thought of as a Nuclear Traditionalist that wants to be a Technological Transformer. A major reason for this is that for the first time in a generation, Russia presents a major nuclear challenge to the Euro-Atlantic security order, and for the first time ever, US policymakers are presented with two revisionist nuclear armed great powers as China seeks to assert itself in the Asia-Pacific region. If the Second Nuclear Age was about US primacy, the threat of horizontal proliferation, and the prioritisation of arms control and cooperation, the Third Nuclear Age seems likely to be about nuclear and strategic competition, vertical proliferation and a much more challenging global nuclear landscape facing Washington.

While the United States may remain comparatively the strongest player in the global nuclear order, its influence and ability to shape that order are weakening. This is the result of two factors: first, the nuclear arsenals of Russia and China. Their nuclear weapon “upload” and production capability when combined are greater than that of the United States and its allies, and nuclear threats seem to be increasingly linked with conventional warfighting. Second, it is intrinsically bound up with what appears to be a shift from a world where the United States was the preeminent nuclear actor to a world of increasing nuclear multipolarity and diffusion of power. This is important because US nuclear capabilities and credibility ultimately allow key allies to seek to meet their own security requirements through non-nuclear means.

The result is that the United States will spend billions of dollars modernising (and maybe even expanding) its nuclear weapon infrastructure over the next decade,⁴⁶ so that both strategic and tactical/sub-strategic nuclear delivery platforms remain fit for (both military and political) purposes for decades to come. This may involve the development of new, or at least the return of previously retired, nuclear delivery systems, and at the same time an increased investment in non-nuclear technologies with possible strategic effects. While there are those in the centre ground of US politics that remain committed to nuclear arms control and eventual multilateral disarmament, at the time of writing it is not impossible to see a future

increase in deployed US nuclear forces to meet the perceived challenges posed by Russia, China as well as Iran and North Korea. Instead, nuclear weapons may become important for the United States in the years ahead, and meeting various deterrence requirements may require building up rather than building down the nuclear force. However, as one senior Washington-based analyst put it in an off-the-record interview in 2023, “US nukes may not have as much bang for their buck in the Third Nuclear Age as they did in the past.”⁴⁷

Notes

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17 France

Nuclear deterrence has played a fundamental role in maintaining peace and international security, particularly in Europe. I am firmly convinced that our deterrence strategy maintains all of its stabilizing virtues, a particularly valuable asset in the world which we see before us, one of competition between powers, disinhibited behaviours and the erosion of norms.

(President Emmanuel Macron, February 2020)¹

Introduction: nuclear continuity

The French government is in the process of “recapitalising” the country’s nuclear forces and remains committed to deploying a dyad of strategic nuclear-armed submarine-launched ballistic missiles (SLBMs) and air-launched cruise missiles (ALCMs). France has approximately 300 nuclear warheads, the majority of which are allocated to SLBMs, although these are currently de-targeted.² Three of France’s four submarines, which can each carry up to 16 SLBMs each, can be at sea at a few days’ notice, with at least one and sometimes two or even three deployed on patrol (as part of a policy of continuous-at-sea-deterrence). France also retains a small number of nuclear weapons for use on dual-capable land and carrier-based aircraft, though these are de-mated from their cruise missile delivery systems. Either the sea or air leg can be used for a “final warning”³ function, to “re-establish deterrence,” before more weapons are employed for retaliation.⁴ According to a senior French official speaking off-the-record, they are not designed for “tactical” nuclear warfighting.⁵ The size and force posture has remained stable since French land-based intermediate-range missiles were retired in the early 1990s, and seems unlikely to change in the near future. The French nuclear force structure is ostensibly based on what is believed would cause intolerable damage to a potential enemy rather than on the size of other states capabilities (albeit constrained by financial, geographical and technological factors).⁶

The notion of a Third Nuclear Age has slowly begun to appear in French academic debates,⁷ but it is unclear how much the notion of “nuclear ages” impacts French nuclear thinking. However, in 2022, President Macron referred to the

disintegration of the global order and the threat of a new nuclear arms race – two key Third Nuclear Age dynamics.⁸ In this emerging context, French nuclear thinking continues to reflect the “all azimuths” approach to deterrence that has undergirded French nuclear policy since the 1960s, whereby no specific threats are identified and planned for. Moreover, according to one expert, there is a feeling among the French policy elite that the long-standing centrality of the nuclear programme has been vindicated by recent global events, including the Ukraine War.⁹ What is also clear is that nuclear weapons remain central to official French government and military thinking about deterrence, and there is little public debate within France about their salience and value. While there is clearly an important national identity and prestige aspect to the nuclear force (though not formally), French nuclear weapons are believed to serve three main functions: deter major power attacks, preserve freedom of action/prevent coercion and contribute to Euro-Atlantic security. They are also guided by the notion of “sufficiency” and “independence,” which in turn is shaped by the French cultural and historical experience, particularly of the two world wars.¹⁰

While France may be best characterised as a Nuclear Traditionalist, this does not mean that nuclear weapons play the same role in French security thinking as they do in Russian, North Korean, or Pakistani strategy. In fact, there are arguably far more commonalities with the United Kingdom, India and the United States in terms of (relative) transparency and the importance of the “responsible” stewardship narrative of nuclear weapons. For France, nuclear weapons are about *nuclear* deterrence and are very separate from use on the battlefield.¹¹ That said, the notion of *epaulement*, meaning mutual support between conventional and nuclear forces, is gaining influence in defence circles.¹²

Nuclear modernisation

The central component of the response from French officials to the pressures of the Third Nuclear Age seems to be a doubling-down on the importance of nuclear weapons for national security. There is some interest in developing new non-nuclear capabilities that could have strategic effects, but this is very much subservient to (and strictly separate from) the nuclear force. Unlike in other countries, there is no perception among military and policy elites that anything else could replace the role played by nuclear weapons in French national security strategy.¹³ According to one senior official interviewed off-the-record, in the past there was a determination to keep nuclear and non-nuclear capabilities distinct for fear of blurring the fire breaks between the two, but the idea of long-range conventional strikes in particular has begun to gain ground among French strategists.¹⁴

In recent years, the French government has committed significant resources to replacing and modernising its nuclear deterrent forces, which may reach €6 billion per year by the mid-2020s.¹⁵ The centrepiece of this programme is a new generation of four nuclear-powered ballistic missile submarines that are being built to replace the current *Le Triomphant*-class that form the Strategic Oceanic Force (FOST). These new submarines, which will be larger than those in the current fleet

and include upgraded stealth and quietening technology, are scheduled to begin being commissioned by 2035. There is little official concern that these systems could be vulnerable to adversaries' anti-submarine warfare or other disruptive capabilities.¹⁶

At the same time, France is developing an upgraded M51.4 SLBM capability to replace the current M51.1/2. The new missile will have the same capacity to carry multiple 100 kt MIRV warheads to ranges in excess of 9,000 km, and will include enhanced stealth capabilities and possibly a new "post-boost vehicle" to counteract projected developments in ballistic missile defence systems.¹⁷ It is unclear whether these upgrades have been driven by the actions of specific adversaries (Russian BMD, for example) or a concern about advancements in anti-submarine warfare capabilities in general. The French Ministry of Armed Forces is also exploring hypersonic boost-glide technology (known as *V-Max*), though this is not believed to be for nuclear delivery.¹⁸

The French military also deploys nuclear weapons on dual-capable aircraft as part of the Strategic Air Forces mission. This mission is fulfilled by the ASMPA air-to-surface ramjet (supersonic) cruise missile deployed on the Rafale B and M aircraft and, in the future, on the SCAF/Next-Generation Fighter multi-role combat aircraft (which is being developed with Germany and Spain).¹⁹ The warheads and missiles for these weapons are not deployed with the delivery aircraft or on the only French aircraft carrier *Charles de Gaulle*. France has begun developing a new ASN4G cruise missile, which will potentially include hypersonic technologies for delivery by aircraft. In turn, these aircraft may include enhanced stealth characteristics. Both are driven by the perceived requirement to penetrate enhanced air defences. The French nuclear modernisation programme also includes significant investments in supercomputers and other technologies for warhead stockpile management and the development of new nuclear warheads sometime in the future.²⁰

French government officials traditionally rejected the principle of ballistic missile defence (and did not respond favourably to the US abrogation of the Anti-Ballistic Missile Treaty in 2002) and appear to still believe that defence cannot replace the deterrent effect of nuclear forces (as evidenced by the French approach to the Sky Shield initiative). But this may be becoming more nuanced, and France is developing tactical BMD systems for protection of military bases and troops deployed abroad.²¹ That said, French officials are wary of any discussion about defensive non-nuclear capabilities playing a similar role to nuclear weapons in NATO.²² This is because French officials feel uncomfortable with the idea of "integrating" deterrence being discussed by others. As one official put it, "nuclear deterrence can't fail; conventional deterrence can."²³ However, according to Emmanuelle Maitre, during a series of hearings in the French National Assembly on the sidelines of discussion about the "Loi de Programmation Militaire" (LPM) in 2023, many French Parliamentarians sought more information about the impact of "emerging technologies" on the credibility of French deterrence.²⁴ The final LPM also noted concerns about the impact of technological developments and their implications for the French nuclear force.²⁵

The French Ministère des Armées has recently moved to develop long-range strike programmes, including the European Long-Range Strike Approach (ELSA) – alongside Germany, Italy and Poland. France also deploys the 1000 km+ range Storm Shadow air-launched cruise missile, which was developed with the United Kingdom, and deploys the MdCN variant of Storm Shadow aboard Barracuda-class nuclear-attack submarines. This can at least partly be explained by the immediate security context facing French policymakers.

Geopolitics, Russia and Euro-nukes

There is an understanding in Paris that the global nuclear order is in a period of flux and that the relative stability of the strategic environment of the past is under threat. As French Ambassador to the Conference on Disarmament Camille Petit put it, “Our collective security architecture is currently challenged, as is our rules-based world order.”²⁶ At the heart of this is the renewed challenge from Russia in Europe, but it also reflects a feeling that the security situation is deteriorating in other parts of the globe too. Nevertheless, there is consensus that nuclear deterrence must be the basis of French strategy in this unfolding context.²⁷

While French nuclear doctrine does not formally point to any particular adversary, since the end of the Cold War there has been a distinction between the threats posed by “major” and “regional” powers.²⁸ This, in many ways, is a continuation of the “all azimuts” policy developed by President De Gaulle in the 1960s.²⁹ French doctrine reserves the right to use nuclear weapons first (including in a “final warning” role), but official documentation and comments have been quite explicit that the French nuclear force is for deterrence by punishment through a secure second strike, and that nuclear weapons will not be used in a counterforce or warfighting role. This doesn’t appear to be changing as we enter the Third Nuclear Age.

France is a member of NATO but does not formally assign its nuclear weapons to NATO (as the United Kingdom and United States do), nor does it participate in NATO nuclear planning. At least part of the reason for this is a historical desire not to rely on the United States for security, a feeling that arguably was enhanced during the Presidency of Donald Trump (2017–2021). Instead, France has traditionally followed an independent path when it comes to nuclear politics, although in recent years the idea of how French nuclear weapons can support European security has re-emerged. This appears to have been bolstered (or perhaps rationalised) by the Russian invasion of Ukraine in early 2022 (especially for France’s allies). Since Brexit, France is the only nuclear-armed member of the European Union.

In February 2020, President Macron spoke of a “strategic dialogue” with European partners due to an erosion of “the comprehensive security framework” that protects Europe and affects France’s defence strategy, which means that “France’s vital interests now have a European dimension.”³⁰ In early 2022, President of the German Parliament Wolfgang Schäuble even suggested that Germany should contribute towards the cost of the French nuclear force.³¹ However, this idea is far from new and appears unlikely to happen.³² Instead, French nuclear policy in Europe

appears to be governed more by creating strategic uncertainty for potential adversaries rather than by formally extending deterrence.

France continues to have a close nuclear relationship with the United Kingdom, including the 2010 Teutates Treaty – which involves collaboration on nuclear stockpile stewardship and associated technologies.³³ However, unlike the United Kingdom, the French government and military retain national control of all aspects of the nuclear deterrence mission, which again reflects its unwillingness to put too much faith in external partners. The UK decision to leave the European Union in 2016 (as well as fears of isolationist tendencies in the United States) were seen as potentially weakening the collective ability for France and its allies to deal with the challenges of the Third Nuclear Age and have put more emphasis and responsibility on the French nuclear capability in official circles.³⁴

Nuclear governance

Formal arms control mechanisms remain central to French governmental thinking about global nuclear governance. At the heart of this remains the Non-Proliferation Treaty and the commitment to work towards incremental multilateral disarmament under Article VI. French officials were disappointed by the end of the Intermediate-range Nuclear Forces Treaty in 2019, and the policy elite appears keen for Europe to be involved in any agreement that might seek to replace it (and not to have a new agreement forced upon them).³⁵ Predictability and stability in the global nuclear order suit French policymakers as there is little desire (or the resources) for arms racing. The French government is also one of the most transparent about its nuclear capabilities, making public warhead numbers and capabilities.³⁶ However, there is a strong feeling in French policy circles that arms control is something that should only be pursued if it has a clear security advantage for France and is perhaps something for others to focus on first given that France already has a “minimum” nuclear force.³⁷

France joined the other P5 members in January 2022 in reaffirming that “nuclear war cannot be won and must never be fought.”³⁸ But also like the other P5 states, France has been unequivocal in its rejection of the Nuclear Ban Treaty. According to the French Ministère de L’Europe et des Affaires Étrangères (Foreign Ministry):

The TPNW is unsuited to the international security context, which is marked by renewed threats of the use of force, Russian military rearmament, regional tensions and proliferation crises. It is aimed solely at Western democracies, meaning that it places no pressure on States other than those in Europe. That means it will not serve the disarmament cause, as no State with nuclear weapons will sign it. It undermines a realistic, step-by-step approach to disarmament.³⁹

For the French government, formal arms control, such as the continuation of the New START Treaty between the United States and Russia, are seen as important mechanisms of regional and global security. However, it is unlikely that French officials would publicly condemn the United States if, for example, Washington

decided that New START or similar limitations were no longer in their interest and needed to raise the number of nuclear weapons deployed.⁴⁰

In general, there is very little domestic political push for nuclear disarmament in France, especially unilaterally, and there is very little engagement in nuclear issues from the public more generally. Unlike in other countries (notably the United Kingdom), none of the major political parties or even the more radical MPs have made abolishing French nuclear weapons a recent campaign issue.⁴¹

However, nuclear technology for power generation remains a central component of French politics. According to World Nuclear, France derives about 70% of its electricity from nuclear power and has been very active in exporting nuclear technology in the past.⁴² The French state-owned EDF operates 8 nuclear power reactors in the United Kingdom,⁴³ and has projects underway in India, the Czech Republic and Poland. In the past, France has provided nuclear research or power reactors or assistance to China, Finland, Iraq, Israel, South Africa and South Korea. The sale of a nuclear reactor to Iran was ended in 1979. While a coup in Niger in 2023 raised questions about the supply of Uranium for France's nuclear industry – Niger accounts for approximately 20% of natural uranium imports,⁴⁴ this does not impact warheads or submarines.

Conclusion: continuity and stability

French security policy in the Third Nuclear Age appears little changed from that which has gone before: a reliance on a secure second nuclear strike for deterrence of both great and regional power threats. There appears to be some interest in technological innovation for certain military missions, particularly hypersonic capabilities, but these should be seen as distinct and separate from the nuclear mission set already in existence. A recognition that BMD could play a role in national security strategy is perhaps slowly taking hold in military circles, and France does have sophisticated conventionally armed precision strike cruise missiles, but policymakers appear to remain committed to traditional notions of deterrence based on *nuclear* punishment.

The French reaction to an unfolding system of nuclear multipolarity has centred on the role of French nuclear forces in Europe and the importance of creating uncertainty for any adversary threatening NATO or the EU. This isn't necessarily something that is new but has perhaps been exacerbated by the concern surrounding the future US commitment to Europe and NATO in this new global environment. Russia and China are clearly potential strategic adversaries, but this is not explicitly stated in French government publications – instead, French doctrine remains inherently flexible.

Nuclear weapons remain central to the way that French officials think about deterrence and defence planning. To the extent that arms control is entertained in Paris, it is via an incremental and multilateral approach centred on the Non-Proliferation Treaty. For French policymakers, deterrence in the Third Nuclear Age will be nuclear-centric. As President Macron put it in February 2020, “We have no choice but to accept that we live in an imperfect world and to realistically and honestly face the problems which this brings.”⁴⁵

Acknowledgement

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18 The Russian Federation

The Russian Federation reserves the right to use nuclear weapons in response to the use of nuclear and other types of weapons of mass destruction against it and/or its allies, as well as in the event of aggression against the Russian Federation with the use of conventional weapons when the very existence of the state is in jeopardy.

(Basic Principles of State Policy of the Russian Federation on Nuclear Deterrence, June 2020).¹

Introduction: nuclear renaissance

The Soviet Union was a principal player in what we might think of as the First Nuclear Age, but despite retaining a substantial nuclear arsenal consisting of many thousands of warheads and myriad delivery systems, Russia became far less prominent in the three decades that followed, as (Western) attention shifted towards horizontal proliferation and what were considered “rogue” nuclear actors. But as we stand on the cusp of the Third Nuclear Age, Russia appears to be re-emerging as a major player in global nuclear politics, both in how it is responding to the actions of other powerful states in an increasingly multipolar system and also in how the actions and decisions taken by officials in Moscow are increasingly shaping this emerging order. Notwithstanding a growing interest in strategic non-nuclear weapons for deterrence and conventional warfighting, for the Russian political and military elite, the Third Nuclear Age will remain fundamentally about nuclear weapons, hard power and a “traditional” understanding of nuclear order. As Anya Loukianova Fink and Olga Olikier put it in 2020:

As the geostrategic context evolves, Russia wants to protect and grow its global standing and its ability to respond to emerging threats. As global power balances shift and new technologies emerge, the ways that nuclear weapons fulfill these tasks may change as well. But Russians expect that, one way or another, nuclear weapons will remain important.²

Russia has the largest and most diverse nuclear arsenal out of the nuclear-armed states. While the total number of warheads and delivery systems has reduced

significantly over previous decades, as of 2022, Russia was believed to have a stockpile of approximately 4477 warheads that could be delivered anywhere in the world by numerous different missiles and aircraft. These comprise 1588 deployed strategic warheads on ICBMs, SLBMs and long-range bombers, and 977 strategic and 1912 non-strategic warheads held in reserve.³ These systems ultimately undergird Russia's "strategic deterrence" mission. The main objective of this mission is deterring a disarming strike or nuclear coercion by its main adversary – the United States – this has changed little since the First Nuclear Age. However, Russia is also interested in developing strategic non-nuclear weapons, particularly long-range precision-guided missiles, but these are primarily for conventional warfighting rather than as a replacement (at least for the time being) for the broader tactical deterrence roles played by nuclear forces.

A Russian expert speaking off-the-record suggested that while there is a feeling in Moscow policymaking circles that the global nuclear order is changing, this doesn't really fit with the western concept of nuclear ages. Instead, recent Russian nuclear history can be split into three phases: the transitional period 1992–2000, where little changed following the Cold War; the period 2000–2015 as Russia began to rely more on nuclear weapons to deter superior NATO conventional forces and invest heavily in dual-use systems; and 2015–present with the introduction of "non-nuclear deterrence" and modernised nuclear and non-nuclear weapons.⁴ As Kristen ven Bruusgaard explains, this broadly mirrors internal Russian developments:

In the early 2000s, Russian conventional capabilities were so inferior, compared to NATO's military capabilities, that Russia deemed it necessary to threaten the early and limited use of nuclear weapons in the face of conventional threats. Since then, Russia has acquired conventional precision strike and improved air and missile defence capabilities, and its need to convey a low threshold for nuclear use has receded. Russia now has more credible conventional options that it can use for deterring and managing escalation in regional conflicts of scale that do not threaten state existence.⁵

However, nuclear weapons – both tactical and strategic – remain the centrepiece of Russia's approach to the Third Nuclear Age. This has been demonstrated by repeated nuclear signalling/threats since the start of the Ukraine war in February 2022.

Technological change and strategic modernisation

For over two decades, the Russian military has been embarking on a twin policy of both nuclear and conventional modernisation of its strategic and tactical forces. While a number of political and military drivers underpin this shift, perhaps the two most significant explanators are the decision by the George W Bush administration to abrogate the Anti-Ballistic Missile Treaty in 2002 and begin deploying a US national ballistic missile defence system, and the concern caused by the development of advanced US conventional weapons as part of the Revolution in Military Affairs of the early 1990s and the Kosovo War of 1998, which culminated in the

US Prompt Global Strike programme.⁶ A perception of considerable technological change in US and Western military capabilities was seen as major challenges by Russian policymakers, both in terms of what this would mean for “localised” warfare and possibly coercion, but also potentially as a direct threat to Russian strategic nuclear forces. However, while Russian planners are concerned about the challenges posed by Western “emerging and disruptive technologies,” considerable thinking and investment is being made in countermeasures.⁷

The nuclear component of the modernisation programme involves replacing “legacy” nuclear delivery systems with more capable nuclear delivery platforms better able to defeat US missile defences. The mainstay of this effort is the Sarmat heavy ICBM and a new generation of nuclear-powered submarines, but it also includes the Avangard hypersonic glide vehicle, testing of the Burevestnik nuclear-powered cruise missile, as well as the “Status 6” or Poseidon nuclear-armed torpedo.⁸ In many ways, this modernisation programme is business as usual – essentially replacing nuclear delivery systems with upgraded platforms and making them more resilient against US offensive and defensive capabilities. At the same time, Russian military strategists continue to see value in tactical or short-range nuclear weapons (typically with ranges less than 500 km) for regional or battlefield deterrence purposes. These include versions of the Kalibr cruise missile, the Kinzhal air-launched ballistic missile and the Iskander short-range ballistic missile, as well as various defensive interceptor missiles.⁹

The conventional or advanced conventional component of the modernisation programme is focused on the development of increasingly capable non-nuclear strategic capabilities to support the regional deterrence and possibly warfighting mission. These include the replacement of the nuclear-armed A135 missile defence system that surrounds Moscow with a non-nuclear version (the A235) that will use the S500 missile defence system¹⁰; a revamped ASAT capability as demonstrated by the 2021 test¹¹; development of the Peresvet and Zadira laser weapons; investment in conventional precision strike tactical weapons, particularly advanced cruise missiles (as seen in Syria),¹² and the non-nuclear version of the Kinzhal missile (reportedly demonstrated in Ukraine in 2022).¹³ The idea seems to be that these strategic non-nuclear capabilities can fill particular gaps on the deterrence spectrum and allow for a move away from an over-reliance on nuclear threats (and the ostensible need to “escalate to de-escalate”¹⁴). It is at least conceivable in the longer term that non-nuclear capabilities could slowly augment or even replace *non-strategic* nuclear weapons for certain regional deterrence functions (particularly in the Euro-Atlantic) over time. As one report puts it:

Confusingly, Russia ceaselessly emphasizes its nuclear weapons, and its nuclear projects continue to proliferate. Such actions could be construed as evidence that the value of nuclear weapons remains undiminished for Russia. The primary function of Russia’s strategic nuclear deterrent is arguably political, whether or not it regards it exclusively as such. By contrast, some of the systems that underpin Russia’s non-nuclear deterrent can be and have been used by it in anger, which demonstrates their coercive potential.¹⁵

Taken together, Russia appears to be building a nuclear force comprising of both nuclear weapons for strategic deterrence and nuclear and non-nuclear components for regional/tactical deterrence and warfighting. There is a concurrent focus on making tactical systems dual use (similar to China) to increase flexibility but also uncertainty for adversaries. Analyst Dmitri Stefanovich describes these as “hot swappable” systems that could be used for nuclear or conventional roles.¹⁶

For a large part of the Second Nuclear Age, tactical nuclear weapons were seen as a substitute for weak Russian conventional forces, but years of investment have slowly altered this balance (and this is reflected in the evolution of doctrine in the 2000, 2010, 2014 and most recently 2020 official texts).¹⁷ Consequently, as Russia’s advanced conventional capabilities increase, it is possible that officials in Moscow will move towards embracing a more balanced deterrent posture, potentially similar to the United States.¹⁸ That said, it remains to be seen how depleted this advanced conventional arsenal will be after the Ukraine war and whether the economic power will exist to recapitalise. There is also a feeling that nuclear weapons remain a key mechanism for Russia to compete with the United States.¹⁹ Consequently, strategic nuclear weapons for deterrence of attacks on the homeland and tactical nuclear weapons for regional conflict and coercion remain central to Russian statecraft in the Third Nuclear Age.

Geopolitics: Russia resurgent?

Experts suggest that the Russian leadership believes that the unipolar global system centred on the United States is merging into one of multipolarity (or becoming “polycentric”) and that this has created space for Russia to reassert itself.²⁰ The United States (and to a lesser extent NATO) remains *the* major strategic threat facing Russia, particularly US/NATO precision conventional weapons deployments in Europe and ballistic missile defence plans, but also current and possible future NATO nuclear capabilities too. There are some concerns about increases in UK and French nuclear weapons stockpiles when the numbers are combined with those of the United States. This is part of the reason why Russia sees the future of nuclear arms control as having to be multipolar.²¹

During the era of US unipolarity, broadly contiguous with the Second Nuclear Age, Russia sought to maintain a balance with the United States in strategic nuclear forces, and this essentially explains the willingness of Moscow to sign the SORT and START nuclear reduction treaties in 2002 and 2010, respectively. It also partly explains Russia’s longstanding concerns with US BMD and global strike ambitions: essentially, Russian military planners are fearful that the United States and NATO could create a situation whereby they could coerce or threaten Russia by potentially undermining either the deterrent value of tactical battlefield nuclear weapons or even the strategic second-strike nuclear capability. This is at least one reason why it is difficult to see significant further reductions in the size of the deployed (and reserve but “uploadable”) Russian nuclear stockpile.

The perception of a relative decline in US power and a parallel growing confidence in Russia’s military modernisation programme probably help to explain the

significant strategic gamble taken to invade Ukraine in early 2022. The Ukraine war is also arguably the first major conflict of the Third Nuclear Age; the use of nuclear threats, hi-tech military equipment and associated geopolitics may signify a lowering of the threshold for the use of force by states other than the United States in the future. The overt use of nuclear threats by Russia during the conflict, including an announcement that nuclear weapons were being “alerted” appears to be primarily about signalling to the West, although the spectre of Russian tactical nuclear use against Ukraine remains.²²

Russia’s relationship with the two fastest growing great powers within the emerging nuclear order is also important. China is increasingly being seen as a prospective partner, not least against the United States and its allies, following years as a threat to Russia’s south-eastern border. Indeed, rather than being the *subject* of military exercises and planning as in the past, China actually took part in the Vostok 2018 military exercise.²³ Russia has also started selling advanced military equipment to China, including the S500 missile defence system, and is reportedly involved in building a Chinese nuclear early warning system.²⁴ Dmitri Stefanovich has suggested that the partnership has “all the benefits of a formal alliance without the downsides.”²⁵ As a result, and while Russia may still have underlying concerns about future Chinese aspirations, there is a growing fear in the West of a budding Russia-China alliance designed to undermine the United States and its allies.²⁶ A high-profile summit meeting between Vladimir Putin and Xi Jinping in March 2023 did little to assuage this concern.

The Russia-India relationship is also significant, as Moscow seeks to understand the implications and opportunities provided by transformations in global power structures. Russia already plays a significant role in India’s civilian nuclear infrastructure,²⁷ and may be expanding this into the military sphere through the lease of nuclear-powered submarines.²⁸ The Indian leadership was also very slow to call out the Russian invasion of Ukraine in 2022. However, the Russia-India relationship is likely to be contingent on China: Russia may become increasingly reliant upon China and even be seen as the “junior partner” in their partnership, and this will complicate Russia-Indian relations due to Indian-Chinese relations.²⁹ This suggests that Russia will be at the heart of a four-way great power competition in the Third Nuclear Age.

Since 2010, Russia has allegedly extended its nuclear deterrence guarantee to members of the Collective Security Treaty Organisation (CSTO),³⁰ although this remains vague and publicly unacknowledged (and potentially problematic for Activist and Protestor states such as Kazakhstan heavily invested in the current disarmament movement). More recently, geopolitical thinking in the Kremlin has ostensibly moved towards placing Russian nuclear weapons outside of Russian territory, notably in Belarus. While this is clearly linked to the deterioration of the Euro-Atlantic security complex in the wake of the Ukraine war, Belarussian Su-25 jets have nevertheless apparently been upgraded to carry Russian tactical nuclear weapons.³¹ With the exception of Cuba in the early 1960s, the Soviet Union did not deploy nuclear weapons outside the Warsaw Pact (the United States deployed nuclear weapons in both Europe and Asia³²) during the Cold War.

Controlling, not banning, nuclear weapons

For Russian officials, the main goal in the Third Nuclear Age will be seeking to maximise relative strategic and nuclear advantages against its major competitors. This will likely involve seeking to constrain the development of US and NATO strategic non-nuclear capabilities, especially BMD, and potentially working to include other nuclear-armed states (United Kingdom and France for certain, and maybe China, India and Pakistan too) in formal agreements and treaties in the medium term. There is very little appetite for disarmament or the Ban Treaty in either Russian policymaking circles or among the public more broadly. Indeed, Russia is probably getting close to what it conceives of as a minimum nuclear capability for strategic and tactical deterrence – more likely is that the Kremlin will deploy more rather than less nuclear weapons in the near future.

While Russian officials and state media have made much of the various nuclear and non-nuclear modernisation programmes, it is unclear that the Russian state has the economic capability or political will for long-term major quantitative arms racing. Although this does not mean that we won't see an increase beyond New START levels if that treaty is allowed to expire. Instead, Russian elites may believe that national interests in the Third Nuclear Age are best served by pursuing measures of restraint from its competitors that largely reinforce the status quo ante based on mutual nuclear deterrence. The Russian political elite want predictability and surety rather than reductions in the relationship with the United States and not rapid nuclear expansion by other nuclear powers that might complicate deterrence planning. This is part of the reason why Moscow condemned the United States' decision to abrogate the Intermediate-range Nuclear Forces treaty in 2019.³³ But ultimately, as Pavel Podvig has suggested, arms control is much more about status than numbers for the Kremlin.³⁴

President Putin agreed to extend the New START Treaty with the United States for 5 years in early 2021. But inspections were suspended in August 2022 allegedly due to visa issues,³⁵ and Putin announced that Russia would be suspending participation in the treaty in February 2023 (although stopped short of abrogation).³⁶ While such agreements remain important for Russia, not least in the great power symbolism that they ostensibly impart, continued Russian adherence to New START restrictions is not a foregone conclusion. Indeed, the decision by the Duma to de-ratify the Comprehensive Test Ban Treaty in 2023 is perhaps indicative of this.³⁷

Russian membership in the Non-Proliferation Treaty and especially its status as a legally recognised Nuclear Weapon State is also important, but Russian delegates appear more likely to follow rather than lead in disarmament diplomacy. As the head of the Russian delegation to the 2023 NPT Prep Com explained:

Russia remains unwaveringly committed to seeking ways towards a world free of nuclear threat, in full compliance with Article VI of the NPT in its entirety. For decades, our country has made a significant practical contribution to the reduction of nuclear weapons. We are convinced that further progress in this field can

be achieved only on the basis of a step-by-step and consensual approach, persistent work to improve the politico-military climate and respect for the security interests of all parties.³⁸

The statement also strongly reiterated Russia's support for Article IV of the treaty, and particularly that safeguards should "not be a pretext for discrimination against certain countries with regard to the exercise of the right to use nuclear technology for peaceful purposes."³⁹ The Russian involvement in ongoing negotiations with Iran over its nuclear programme should be seen partly in this light, albeit Moscow has also been deepening defence cooperation with Tehran at the same time.⁴⁰

In January 2022, President Putin signed a joint statement with leaders of the other P5 nations, declaring that "...nuclear war cannot be won and must never be fought."⁴¹ But just a few months later, it was made clear that Russian nuclear weapons were being placed on alert to deter outside intervention in the Ukraine war.⁴² Ultimately, the Russian political and military elite has little interest in greater transparency, disarmament, the Humanitarian Impacts Initiative or the Nuclear Ban Treaty and generally seems to think of such initiatives as unrealistic and potentially harmful for Russia.⁴³

A final strand of Russia's engagement in the emerging Third Nuclear Age is its role as a supplier and exporter of civilian nuclear technologies.⁴⁴ The state-owned company Rosatom is the leading global supplier of nuclear reactors, constructing ten reactors in other countries between 2011 and 2022. According to Hartmut Winker, Rosatom has started – or is expected to start – building power plants in China, India, Bangladesh, Turkey, Hungary, Belarus, Finland and Egypt, and has cooperation agreements with about twenty countries in Africa.⁴⁵ This suggests that the role of the Russian state in all aspects of the global nuclear order will be important in the years ahead.

Conclusion: nuclear weapons as guarantors of power, stability and influence

Nuclear weapons are deeply ingrained in Russian security culture, both as symbols of prestige and as mechanisms of deterrence and regional warfighting and coercion. While the Russian military-industrial complex has been working to diversify the types of capabilities that might be used for these missions (often at least partly as a hold-over from the bureaucratic politics of the Soviet era), nuclear weapons – both strategic and tactical – continue to fulfil a number of important functions.

The Third Nuclear Age will be characterised in part by the return of Russia as a major player in shaping the global nuclear order, and for the Russian policy and military elite, nuclear weapons continue to play a fundamental role in global politics. Indeed, the overwhelming feeling is of business as usual: Nuclear and conventional deterrence in the Euro-Atlantic facilitated by modernised nuclear and new non-nuclear capabilities and constrained, or at least codified, by strategic bilateral arms control with the United States; new partnerships with emerging great powers India and China and a global nuclear order that continues to place nuclear

weapons and deterrence, not disarmament, at the heart of international relations. At the same time, the Russian state seems set to play an increasingly influential role in shaping the future of the global nuclear power industry as many states across the world seek the perceived benefits of nuclear technology for economic development from state-owned Rosatom.

While nuclear weapons remain politically important for Russia, the Ukraine war may have demonstrated to the Kremlin that tactical nuclear weapons and more generic nuclear threats have limited utility beyond preventing direct outside interference in “local” conflicts. Nuclear posturing has not prevented extensive military support for Ukraine, particularly from NATO and the West, nor have ostensible threats of nuclear use impacted the Ukrainian willingness to continue fighting. The result may be to double-down on advanced conventional weaponry not as a way to transform deterrence but more as a way to fight local future conventional wars.

Notes

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19 Pakistan

The Pakistani people are united in their resolve to safeguard, at all costs, Pakistan's independence, sovereignty and territorial integrity. I would like to congratulate the nation on the achievements of our scientists and engineers. They have made it possible for the people of Pakistan to enter the next century with confidence in themselves and faith in their destiny.

(Prime Minister Muhammed Nawaz Sharif, May 1998)¹

Introduction: securing the regional rather than global order

The focus of Pakistani policymakers in the Third Nuclear Age is inherently regional and fundamentally about the security threat posed by its immediate neighbour, India. While some global geopolitical changes are significant, not least the relative importance of the changing relationships with the United States and China, Pakistani security concerns continue to focus on Indian conventional military superiority and threats to Pakistani territorial integrity. At the heart of the response to this challenge are nuclear weapons for both strategic deterrence and increasingly for tactical and battlefield purposes. The centrality of nuclear weapons for Pakistani security has changed little since the region "went nuclear" in 1998, but the quantity of nuclear warheads and the range and sophistication of delivery platforms have slowly expanded over the past two and half decades. During the same period, Pakistani and Indian forces have repeatedly clashed, including the Kargil War of 1999, and there are concerns about stability and unintended escalation.

Today, it is estimated that Pakistan possesses 170 nuclear warheads and is moving towards deploying a nuclear triad of air-, land- and sea-based delivery systems.² This mostly consists of ballistic missiles and air-delivered weapons. Pakistani military leaders have shown some interest in advanced conventional technologies, but these remain very much subservient to the nuclear force. A major reason for this is that the Pakistani defence-industrial complex does not have the resources for qualitative conventional competition with India, and political elites therefore see nuclear weapons as a strategic balancer.

The Pakistani nuclear programme was at the heart of the thesis about a Second Nuclear Age as scholarship and strategic thinking moved away from the Cold War framework towards prioritising regional nuclear proliferation challenges. Notwithstanding the budding nuclear arms race in South Asia and the gradual incorporation of new nuclear and non-nuclear weaponry by both Pakistan and India, the strategic picture facing Pakistani political and military elites has changed little in two and half decades. Perhaps the major development has been the growing relationship with and influence of China. This has been exacerbated by a perception that the United States has been seeking closer strategic ties with India. While the relationship with China is important (not least for technology transfer and military hardware), it does not mitigate the perceived immediate security advantages of deploying a secure and varied nuclear capability. Pakistan remains outside of the Non-Proliferation Treaty (NPT) and blocked from membership of many global normative frameworks, and despite publicly committing to disarmament, it is very difficult to see a pathway to Pakistani nuclear disarmament in the Third Nuclear Age without a fundamental change in the South Asian security context.

Nuclear modernisation and diversification

Over the last two decades, the Pakistani military has invested significant resources to modernise its nuclear capabilities. While obtaining official information about the numbers and characteristics of the nuclear force is difficult, a recent study suggests that Pakistan is enhancing its nuclear arsenal, working on expanding the number and increasing the precision of its nuclear delivery systems and producing more fissile material.³ These technological developments are crucial to understanding Pakistan's position within the Third Nuclear Age, albeit the driving forces of this position (Indian conventional superiority) remain essentially unchanged.

The Pakistani military is in the process of completing a nuclear triad of sea-, land- and air-based nuclear delivery systems. In 2017, the Pakistan Armed Forces tested the Ababeel, a medium-range ballistic missile that is capable of delivering multiple warheads and circumventing possible Indian missile defences.⁴ The Strategic Plans Division is also working on an intermediate-range ballistic missile, the Shaheen-III, which could hit north-eastern India and the Andaman and Nicobar Islands.⁵ In addition, there are indications that Pakistan may be developing small nuclear warheads to be delivered by the Babur and Ra'ad cruise missiles.⁶ Some progress has been made to strengthen the air-leg of the nuclear triad: Pakistan has replaced the Mirage-3 and Mirage-5 with JF-17. The aircraft, capable of carrying nuclear warheads, is jointly built by Pakistan and China.⁷ Concerning its sea-based nuclear forces, Pakistan has been working hard to catch up on India's growing nuclear naval capabilities.⁸ In 2012, the Pakistani Navy announced its intention to establish the Headquarter Naval Strategic Forces.⁹ To respond to "provocative nuclear strategies and posture being pursued in the neighborhood,"¹⁰ Pakistan has worked on the Babur-3 submarine-launched cruise missile. According to a Pakistan Inter-Services Public Relations press release, the Babur-3 will provide a secure

“second strike capability, augmenting the existing deterrence regime.”¹¹ In addition to this, growing concerns about India’s Cold Start Doctrine have driven Pakistan’s decision to develop tactical nuclear weapons. In 2011, Pakistani authorities announced the successful test of the Nasr, a short-range tactical ballistic missile (60–70 km).¹² Former Pakistani Ambassador to the United States, Maleeha Lodhi, described the Nasr as contributing “to counterbalance[ing] India’s move to bring conventional military offensives to a tactical level.”¹³

India’s evolving nuclear capabilities and its acquisition of strategic non-nuclear weapons are seen as a source of great concern in Pakistan. According to Feroz Khan, a former Brigadier in the Pakistan Army, the relationship between the two rivals is characterised by lack of trust and understanding about intentions, doctrine and capabilities, which is exacerbated by the introduction of new and more advanced technologies. The launch of a BrahMos missile into Pakistani territory in March 2022 was seen by some in Islamabad as an attempt to test Pakistan’s air defence system, and not just an accident, as claimed by the Indian authorities.¹⁴ According to some members of the military, “Pakistan [had] not ruled out the possibility that the launch was an intentional act to gauge Pakistan’s war readiness and/or ability to track India’s BrahMos.”¹⁵ Pakistan publicly condemned India for this incident.¹⁶ For example, the Pakistani National Security Adviser Moeed Yusuf claimed that it was “highly irresponsible” of India not to immediately notify Pakistan and demanded an investigation of the causes leading the incident in order to establish “if this was an inadvertent launch or something more intentional.”¹⁷

Pakistani officials have never publicly announced a specific nuclear doctrine or outlined nuclear capabilities because ambiguity is believed to help strengthen deterrence.¹⁸ In spite of the limited official information available, the main features of Pakistani nuclear doctrine can be inferred from statements released by government officials and retired policymakers.¹⁹ Islamabad has made it clear that its nuclear policy is “India-centric,”²⁰ and includes a First Use option to deter conventional and nuclear attacks.²¹ Nuclear weapons are seen as a tool if the survival of the state is at stake, but it is unclear how and when they would be employed. As Feroz Khan points out, Pakistan has kept “its strategic nuclear redlines-loss of space, significant destruction, economic strangulation, and threat to internal stability-intentionally vague.”²² Following the 1998 nuclear tests, Pakistan adopted a posture of Credible Minimum Deterrence, but it has never clarified how many weapons would be indispensable to meet this goal.²³ As explained by a Pakistani official, the “minimum cannot be quantified in static numbers.”²⁴ This approach is seen as indispensable for Pakistan to respond to changes in India’s nuclear and conventional capabilities.²⁵

The United States-India civil nuclear deal in 2005 and the emergence of India’s Cold Start Doctrine a few years later pushed Pakistan to reassess its deterrence requirements and rethink its nuclear posture.²⁶ These developments pushed Pakistan to adopt a Full Spectrum Deterrence (FSD), meaning that “Pakistan possesses the full spectrum of nuclear weapons in three categories: strategic, operational and tactical.”²⁷ As explained by the Pakistani authorities, the adoption of FSD does not undermine Pakistan’s commitment to the policy of Credible Minimum

Deterrence.²⁸ This has also been confirmed by Lieutenant General (Retired) Khalid Ahmed Kidwai, who declared that Pakistan's posture remains "within the larger philosophy of Credible Minimum Deterrence."²⁹ South Asia expert, Mansoor Ahmed, points out that Pakistan's Full Spectrum Deterrence is designed to deter India from thinking that there are gaps in Pakistan's deterrence posture at the tactical level, and represents "an extra layer of protection."³⁰

Balancing relations with the United States and China

The interplay existing between global geopolitical changes and regional dynamics is crucial to understand how Pakistan is responding to the new nuclear age. Pakistani policymakers are closely watching the deterioration of the relationship between the United States and China, but their major source of concern remains India. Pakistan has traditionally tried to maintain friendly ties with both the United States and China, but since 2011, there has been a progressive shift in Pakistan's foreign policy towards Beijing.³¹ The intensification of the United States-China rivalry has created a complex situation for Pakistani leaders, given the important economic, political and security ties with both powers and the impact that these developments are going to have on South Asia.

The United States-Pakistan relationship has historically been characterised by close cooperation and estrangement. During the War on Terror, Pakistan was a major non-NATO ally of the United States, and Islamabad received significant US military and economic aid.³² In the last few years, their bilateral relationship has undergone a deep transformation, owing to the increasing competition between the United States and China, the US withdrawal from Afghanistan and its close ties with India.³³ Even though Afghanistan has become a less prominent issue in United States-Pakistan diplomatic interactions, the change in US perceptions and policies towards China and India represents an obstacle to their improvement. The decision of the Biden administration to focus on China and on preserving US influence in the Indo-Pacific makes India rather than Pakistan a better candidate to play a central role in US strategy.³⁴ Since 2005, the United States has broadened its defence and security cooperation with India. The two countries have regularly conducted joint military exercises and exchanges of military personnel, and are both members of the Quadrilateral Security Dialogue.³⁵ India is also currently one of the major importers of US military technology and it is estimated that the two countries have signed defence contracts that are worth \$20 billion.³⁶ The increasing cooperation between Washington and New Delhi could have serious implications for Islamabad and for the balance of power in the region.³⁷

To counterbalance the United States-India relationship, Pakistan has continued to deepen its partnership with China.³⁸ Initially, the Sino-Pakistani friendship was forged on the basis of mutual hostility towards India, but the rapprochement between India and the United States and China's Belt and Road Initiative (BRI) gave a fresh impetus to the relationship.³⁹ China has signalled a strong commitment to further develop its cooperation with Pakistan through a series of initiatives and infrastructures, such as the new port at Gwadar and the China-Pakistan Economic

Corridor.⁴⁰ These projects were seen as a way to advance China's ambitions and were described by Pakistani officials as a "game changer" and a way to be less dependent from foreign aid.⁴¹ In 2015, when the initiative was announced, it was estimated that China's investment in Pakistan was around US\$46 billion, which reached US\$62 billion in 2017.⁴² However, the progressive weakening of Pakistan's economy has led Washington to question the impact of Beijing's economic influence and has raised serious concerns about how Islamabad is going to deal with its increasing dependence from Beijing's loans.⁴³

Pakistan shares close military ties with China.⁴⁴ Chinese help has been extremely important for Pakistan in the development of its nuclear programme and missile delivery systems, owing to the strict restrictions and export controls imposed by western countries on sensitive technologies.⁴⁵ In the last few years, Pakistan's reliance on China for military equipment has also grown because of the worsening of its relationship with the United States. It is estimated that around 47 per cent of China's arms exports went to Pakistan during the period 2017–2021.⁴⁶ China has also supplied military hardware to Pakistan, including naval frigates and fighter aircraft.⁴⁷ Moreover, the two countries are working together to expand Pakistan's ability to indigenously produce military equipment.⁴⁸ China is working with the Pakistan Aeronautical Complex to build the JF-17 Thunder.⁴⁹

In 2015, China announced the sale of eight Hangor-class diesel-electric attack submarines,⁵⁰ and it has been reported in the media that China will deliver the Hangor II submarine in 2024.⁵¹ Mansoor Ahmed declared that this submarine will contribute to closing the gap in terms of capabilities existing between India and Pakistan and of enhancing Pakistan's second-strike capability. He also stressed that "only a more survivable, flexible and numerically balanced Pakistani submarine fleet can act as a deterrent in a future crisis, for which these Hangor submarines are a much-needed addition that will undoubtedly help improve strategic stability in South Asia."⁵² Since 2014, the Pakistani Navy (PN) and the People's Liberation Army Navy (PLAN) have also been conducting joint maritime exercises, such as the Sea Guardian exercises. The Sea Guardian 3, held in November 2023, was the largest exercise between the PN and PLAN in the Arabian Sea, an area that has become increasingly relevant for the bilateral economic initiatives between the two countries and for the CPEC.⁵³ This exercise was significant because it was the "first time that Pakistan hosted one of China's most advanced Type-052D destroyers, which reportedly features improved radar detection capabilities."⁵⁴ The PN also stressed that the aim of the Sea Guardian 3 was "to share professional experiences on contemporary traditional and non-traditional threats in (the) Indian Ocean region as well as to enhance bilateral cooperation and interoperability between the two navies."⁵⁵

A de facto nuclear weapons state

Pakistan's relationship with the non-proliferation regime is complex and largely affected by regional dynamics. Pakistan remains outside many of the structures of formal global nuclear governance, and the dominant view in Islamabad is that the

non-proliferation regime is unfair and discriminatory.⁵⁶ Pakistan cannot join the NPT in its current guise as a Nuclear Weapons State, and has refused to join the Comprehensive Test Ban Treaty and the Fissile Material Cut-off Treaty, owing to India's decision not to sign these agreements.⁵⁷ However, it continues to promote nuclear disarmament and non-proliferation that should be carried out in a "universal, verifiable and non-discriminatory manner."⁵⁸

National security considerations continue to play a significant role in shaping the way in which Pakistani elites see the non-proliferation regime (and nuclear weapons). The US's decision to enter a civil nuclear deal with India and the Nuclear Suppliers Group waiver granted in 2008 contributed to shaping Pakistan's negative views about the discriminatory nature of the non-proliferation regime.⁵⁹ This is because, from Pakistan's point of view, India is now seen as a responsible *de facto* nuclear power that can enjoy all the advantages deriving from access to sensitive technology without being subject to the NPT.⁶⁰ These developments have also intensified Pakistan's concerns about India's conventional military superiority. The transfer and sale of technology to India has helped Pakistan's rival to further develop and expand its capabilities.⁶¹ Rizwana Abbasi and Sufian Ullah also point out that India's expansion and upgrading of its conventional and nuclear forces is perceived by Pakistan as "offensive,"⁶² and that this contributes to deepening the level of misperception and mistrust, widening the gap existing in terms of technologies and capabilities between the two rivals, and increasing instability.⁶³

Pakistan has not signed the Treaty on the Prohibition of Nuclear Weapons (TPNW). The Ministry of Foreign Affairs has made it clear that the TPNW "was negotiated outside the established UN disarmament negotiating forums" and that the state does "not consider itself bound by any of the obligations enshrined in this Treaty."⁶⁴ Pakistan's refusal is linked to the fact that the TPNW does not adequately take into consideration the "the vital security considerations of each and every State."⁶⁵ So far, none of the nuclear weapons states (NWS) have signed the TPNW because it prohibits the development, testing, production and possession of nuclear weapons and it strengthens the existing measures on the use, non-proliferation and disarmament of nuclear weapons.⁶⁶ These norms are incompatible with the security requirements of Pakistan that sees nuclear weapons as indispensable to deter the threat posed by India.⁶⁷

Some scholars have stressed the importance of establishing regional arms control agreements and Confidence Building Measures (CBMs), but these have so far been limited.⁶⁸ The lack of risk reduction measures contributes to increasing the chances that a conflict between New Delhi and Islamabad could spiral out of control.⁶⁹ In the past, India and Pakistan have negotiated a series of nuclear and missile CBMs, such as the agreement not to attack each other's nuclear facilities (signed in 1988) and the pre-notification of flight testing of ballistic missiles, but there has been no new initiative since then. Pakistani officials have periodically advanced the idea of a Strategic Restraint Regime with India to promote peace and stability in South Asia, but New Delhi has repeatedly declined the offer.⁷⁰ India's rejection is largely driven by its concerns that China has shown no interest in participating in nuclear talks with India.⁷¹

Conclusion: nuclear first

Nuclear weapons play the prominent role in the Pakistani response to the challenges and the pressures of the Third Nuclear Age. But this is essentially a continuation of a nuclear-centric approach to security that has underpinned Pakistani policy since at least the nuclear tests of 1998. In the ensuing quarter of a century, very little public information available about Pakistani nuclear strategy has been published, and Pakistani officials very rarely talk about nuclear weapons in public. This makes Pakistan quite different to the other nuclear traditionalists – all of whom have either published nuclear/defence policy documents outlining the role of nuclear forces, or given high-level speeches on the subject. What does unite Pakistan with North Korea and perhaps Russia too is a perception that tactical nuclear weapons can deter and offset the perceived advantages of conventionally superior adversaries. This makes Pakistan not just different from the United States and France, but also different to Taiwan, Japan and South Korea – who face a nuclear-armed adversary but have chosen to respond conventionally. Conventional military capabilities are clearly important to Pakistani security thinking, and officials have expressed an interest in the acquisition of strategic non-nuclear weapons, but this is severely limited by available resources and infrastructure. This makes a credible nuclear force central to Pakistani security.

While nuclear policy has remained fairly consistent over the past two decades, the two major changes for Pakistani security and nuclear policy from the Second to Third Nuclear Ages are the de facto recognition of India as a normalised nuclear armed state and the rise of China as a major geopolitical player. The exceptions granted to India (the civilian nuclear deal and Nuclear Suppliers Group waiver) have effectively pushed Pakistan closer to China, and, at the same time, hardened the Pakistani belief that the established nuclear order is unfair and prejudiced against Pakistan. The impact is that South Asia increasingly reflects and contributes to the broader geopolitical rivalry between the great powers, and Pakistan feels increasingly isolated outside the global nuclear order.

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20 Democratic People's Republic of Korea (North Korea)

In the face of the collapse of the world socialist system and the vicious offensive of the imperialist allied forces to stifle the Democratic People's Republic of Korea, Comrade Kim Jong Il administered Songun politics; thus he safeguarded with honour the achievements of socialism which are the precious legacy of Comrade Kim Il Sung, developed the DPRK into an invincible politico-ideological power, a nuclear state and an unchallengeable military power, and opened a broad avenue for the building of a thriving nation.

(Preamble of the Constitution of the DPRK)¹

Introduction: *Juche* and *Songun*

The concept of “nuclear ages” appears to have little relevance for North Korean nuclear policy, and the leadership’s view of the importance of nuclear weapons has been largely linear since a nuclear programme was initiated in the 1960s. Essentially, ever since the end of the Korean War in 1953, the DPRK has been seeking the means to defend itself against the perceived military threat from the United States, South Korea and their regional allies, and a central component of this has been the development and acquisition of a nuclear deterrent. This desire is reflected in the state ideologies of *Juche* (self-reliance) and *Songun* (military-first politics), whereby the DPRK leadership has never wanted to rely on another state for its security (despite close relations with China and previously with the Soviet Union). *Songun* means the DPRK’s national security strategy is inherently confrontational²: the military is the foundational tool the Party wields to maintain the regime against external threats. Kim Jong Un’s rise to power saw him reviving (and revising) the “*Byungjin* Line” slogan originally coined by his grandfather, Kim Il Sung.³ While the rhetorical framing of *Byungjin* calls for the simultaneous development of the country’s economy and military, the reality under Kim Jong Un has been a heavy prioritisation of the Strategic Rocket Force (SRF).⁴ As two Western DPRK watchers described it, this “materialised in an uncannily fast push for public proof that the DPRK’s nuclear deterrent is fully operational, which was achieved through uncommonly transparent coverage of practically every step required along the way.”⁵

At the end of 2022, the maturation of the SRF appeared to be almost complete. Beyond the steady programme of missile tests and military parades, the North has made it clear that “tactical” nuclear strikes are central to its warfighting posture. As the DPRK’s official news agency described military exercises in late 2022,

Through seven times of launching drills of the tactical nuclear operation units, the actual war capabilities ... of the nuclear combat forces ready to hit and wipe out the set objects at any location and any time were displayed to the full.⁶

Coupled with a revision of the law governing nuclear release authority that specifically allowed for pre-emption and perhaps greater delegation than ever before, the official DPRK policy line was definitive: its nuclear threats are backed by substantial preparation and capability.⁷

The main challenge for North Korea in the Third Nuclear Age will be how to ensure the credibility of its nuclear deterrent in the face of rapid military technological change by its adversaries. In particular, the DPRK leadership is concerned about the strategic non-nuclear weapons being developed by the United States,⁸ South Korea and others, and how this might impact both the likelihood of conventional war on the peninsular and a possible disarming strike against its nuclear weapons. This in turn appears to be driving a doubling down on the nuclear programme as a fundamental component of national security.⁹

Technological change: ramping up the nuclear arsenal for operational effects

The technological change at the heart of the Third Nuclear Age is a direct challenge for the DPRK and has created a more complex deterrence environment. The pursuit of a mixture of strategic non-nuclear weapons for possible deterrence by denial and conventional counterforce operations by the United States and South Korea has forced the North Korean leadership to increase efforts to build a secure and reliable nuclear capability. In particular, the threat posed by kinetic and “cyber” precision strike weapons to strategic forces including missile launchers, the “Kill Chain policy” that could be used to decapitate the leadership and destroy missiles before launch, as well as ever-expanding and integrated regional missile defence architectures, has created at least the perception that the DPRK could be vulnerable to a disarming strike. Without access to the debates within the domestic elites of the DPRK on this issue, it is nevertheless important to emphasise that the specific meaning of “secure and reliable” in both rhetorical and capability terms is unique. What is clear is that interest in Pyongyang has been strong enough to support the procurement of a swathe of short- and long-range nuclear weapons systems and has led to a change in doctrine towards incorporating nuclear weapons for warfighting on the Korean peninsula.

The DPRK carried out its first explosive nuclear test in 2006, and since this time has conducted a further five tests – each with an increasing explosive yield – and worked to expand its nuclear stockpile and the means to deliver its nuclear

weapons to a variety of different targets. While the exact size of the North Korean nuclear arsenal is not known, in 2022 Hans Kristensen and Matt Korda, "...cautiously estimate[d] that North Korea might have produced sufficient fissile material to build 45 to 55 nuclear weapons and might have assembled 20 to 30 warheads for delivery primarily by medium-range ballistic missiles."¹⁰ The majority of these would be single-stage fission devices in the 10–20 kiloton range, although the DPRK may have a few thermonuclear warheads too.¹¹ Estimates vary on how quickly the nuclear stockpile could be expanded, with Kristensen and Korda suggesting that depending on warhead type, it may be possible for the DPRK to build approximately six warheads per year.¹² The DPRK is also suspected of having a stockpile of both chemical and biological weapons and is working on a variety of different missile delivery systems, including ICBMs.¹³

The DPRK appears to have three main missions for its nuclear capabilities, each driven by a perceived challenge to its nuclear security: long-range missiles that can hit the United States to deter it from initiating or intervening in any conflict in the Korean peninsula; missiles that can target US military forces and key allies (Japan) based in the East Asia region; and more recently, short-range "tactical" nuclear-armed missiles that might be used in a conflict with South Korea. All of these are united by a renewed determination to create a secure nuclear second-strike capability. At the time of writing, the DPRK leadership appears to believe that each requirement is best met by nuclear rather than conventional weapons. At the heart of this has been considerable focus on new types of delivery systems, warhead miniaturisation, an ICBM re-entry vehicle, as well as work on penetration aids against the United States and allied BMD systems. The main component of this is work on a credible ICBM that can hit targets in the United States; these include the Hwasong-14, Hwasong-15 and Hwasong-17. Some of these missiles are still in development and could be road-mobiles, based on Transporter-Erector-Launchers (TEL), making them difficult to target. In 2022, the DPRK conducted a record-breaking 65 ballistic missile tests, 8 of which were reportedly for ICBMs.¹⁴ North Korea has also been working on a series of SLBMs (Pukguksong), with a much shorter range, that can be deployed on the Sinpo-class submarine (which can only carry one missile), as well as a ground-launched cruise missile (also for land-attack and anti-ship roles).¹⁵ Reports in 2022 suggested that the DPRK might also be working on a hypersonic glide vehicle and manoeuvrable warhead (Hwasong-8).¹⁶ The DPRK appears to be pursuing every possible technological avenue for delivering nuclear weapons.

North Korea has revealed a surprising amount about potential long-range and theatre-range nuclear targeting.¹⁷ As a backdrop (in the literal sense) in an official photo of Kim signing a new major policy document on nuclear weapons, a huge map could be seen. The map showed lines running from North Korea to what would be key targets in a future war: Busan, San Diego (the home of the US Pacific Fleet), Pearl Harbor, Barksdale Air Base (hosting B-52s) and Washington, DC.¹⁸ The division of "strategic" and "tactical" weapons favoured by elements of the Western literature on nuclear weapons does not fully capture what the DPRK government seemed to intend as its message. In military theory terms, all of the targets

have important operational functions, such as providing major nodes for US (and allied) air power, sea power and logistics. Although an ICBM would indeed make the North capable of a “city busting” countervalue posture, the official message from the government has been focussed on the use of nuclear weapons to win, or avoid losing, a large-scale war. In a strange echo of the past of its main adversary, this long-range mission is eerily reminiscent of early US nuclear war plans such as OFFTACKLE. More than a curiosity, this close comparison should remind onlookers that counterforce and countervalue are only ideal types, and if one’s adversary ultimately values its conventional military power most of all, then targeting its forces combines ideas of denial and countervalue on the level of operational planning.

The ICBM, IRBM and cruise missile programmes are highly complementary. The startling ramp-up of missile capability means *en masse* strikes against the South and the US’s regional allies have become possible since the early 2020s. The North has regularly displayed large numbers of the Hwasong-12 in order to suggest mass production and undertaken exercises that fire tens of missiles at once, suggesting ample stocks.¹⁹

The move to battlefield use is detectable in terms of weapon system procurement and public policy announcements to an international audience. North Korea had presumably been highly reliant on HUMINT and OSINT for targeting data in the past – data better suited for locating fixed targets rather than dispersed air forces, shipping or mobile missile launchers. If successful, the satellite reconnaissance programme would be a major step to providing the SRF with closer to real-time and tracking intelligence.²⁰ Even without sophisticated ISR, having reached the potential to launch 80 missiles an hour under wartime conditions, the DPRK military has developed the capacity to overwhelm United States-ROK defences and suppress crucial assets such as airbases without using nuclear warheads.²¹ This is an important point because the number of DPRK physics packages could remain relatively low compared to the other nuclear powers – an SRF that is strong in conventional warfare offsets the (relative) lack of nuclear weapons in the stockpile.

A closely related strand of the nuclear programme has been moves to harden the nuclear command and control system and conceal weapons, making it more difficult for any adversary to be confident of the success of a disarming attack. This includes rail and road mobile missile launchers, solid fuel launchers (which are easier to transport), as well as a comprehensive bunker system.²²

In September 2021, Kim Jong-un announced that North Korea had become a “nuclear-armed state” and appeared to lower the threshold for using nuclear weapons, saying they were no longer simply about deterrence but could be used pre-emptively to win a war.²³ This updated nuclear doctrine, which according to Hyun-Binn Cho and Ariel Petrovics, amounts to a “more coherent first-use nuclear strategy,” could include pre-delegation of launch control to commanders in the field.²⁴ This is likely a direct response to fears of a (conventional) decapitation strike that destroys the DPRK leadership by the United States and/or South Korea.

The DPRK’s military technology is being driven beyond the nuclear-conventional nexus into a cohesive warfighting posture. Unlike Taiwan, the ROK’s military sites

are not hardened to resist massed missile strikes – even if their payloads are conventional explosives. North Korean nuclear weapons exist within an environment of intense conventional military competition and threat. The DPRK spends nearly a quarter of its GDP on its military,²⁵ and has a large conventional military force (fourth largest in the world – with an estimated 1.2 million personnel), focused on warfighting on the Korean peninsula as part of a deterrence by denial policy (to defend against a United States-ROK invasion) or perhaps even to reunite the Peninsula under DPRK rule by force.²⁶ The term “tactical” strike may therefore be slightly misleading given the large number of soft targets that the DPRK would almost certainly want to destroy to undermine ROK-United States logistics (such as ports, petrochemical infrastructure, road and rail tunnels) and thereby create favourable *operational* effects.

The role of China

Since the 1950s, the main strategic threat facing North Korea has been a military attack or coercion by the United States and, to a lesser extent, its regional allies. This began during the First Nuclear Age, rose to prominence in the Second and seems unlikely to change in the Third. Successive US Presidential administrations have refused to acknowledge the DPRK as a nuclear-armed state, seeking instead to roll back the programme under a policy of “denuclearisation.” Despite a feeling that this is increasingly out-of-sync with the material reality, this remains the policy under US President Joe Biden.²⁷ The primary mechanisms used to achieve this goal have been coercion and the use of sanctions, occasionally combined with diplomacy. On a few occasions, such as in 2017, there have even been fears that military force might be used.²⁸ In 2021, US and South Korean officials announced that they would be developing a new operational war plan for a conflict with the DPRK.²⁹ This threat of *conventional* attack by the United States and its allies remains a fundamental driver of the nuclear programme and at the heart of North Korean security thinking.

The relationship with China remains an essential component of North Korea's security strategy, and the DPRK is heavily reliant on Chinese economic assistance. The DPRK and China signed the “Treaty of Friendship, Cooperation and Mutual Assistance” in 1961, which was renewed by President Xi Jinping and Kim Jong-un in July 2021. Under this agreement, China commits “to aid” North Korea if it is attacked, and Chinese officials have made it clear that China would help to protect North Korea against US or South Korean aggression – though it isn't clear what form this would take.³⁰ The Cold War era formal alliance that the DPRK had with the Soviet Union/Russia was downgraded in 1995.

Some experts suggest that China has a certain influence over North Korea, its nuclear programme and its actions, but this is quite difficult to judge. Chinese political and military elites are not particularly worried about North Korean denuclearisation, but they do have a vested interest in stability and maintaining the status quo (and avoiding a post-conflict vacuum) and may well subtly encourage North Korean actions that weaken the United States and its extended deterrence

relationships in the East Asia region. However, the DPRK has continued to test missiles despite Beijing's request to stop. There is no direct evidence that China has played a role in the DPRK nuclear programme, but there is evidence of cooperation on missile technology in the past. In May 2022, Russia and China vetoed a UN Security Council resolution proposing tighter sanctions on North Korea (the first in 15 years).³¹ China's geographical position and comparatively close ties to the DPRK mean that it is a key player in the North's economic fortunes. The PRC has largely allowed low-level sanctions-busting activities to go on and has benefited from illicit coal imports.³²

The relationship with the Republic of Korea has ebbed and flowed since the armistice agreement (but not peace treaty) declared in 1953, with a number of military clashes. Over the past decade, there have been moments where relations seemed to improve, and the South Korean political leadership remains committed to the denuclearisation and reunification of the Korean peninsula. South Korea previously hosted several hundred US tactical nuclear weapons on its soil, but these were removed in 1991 in a policy initiative that led to the 1992 Joint Declaration of the Denuclearisation of the Korean Peninsula agreement. In 2018, the North and South signed a joint statement that called on both parties to "commi[t] to bring a swift end to the Cold War relic of longstanding division and confrontation."³³ However, the idea that these weapons might provide extra security against North Korea has never gone away, and in early 2023, comments made by President Yoon Suk-yeol appeared to reopen the discussion about re-deploying US tactical nuclear weapons in South Korea as a deterrent and possibly holding United States-ROK nuclear exercises. US officials were quick to refute this³⁴ but it is easy to assume that any statements on this topic from the South will nevertheless factor into threat perceptions in the North.

Breaking (and making?) nuclear norms

For the past 30 years, North Korean nuclear ambitions and activities have been at the heart of the agenda to manage global nuclear threats. In 1985, then leader Kim Il Sung signed the Non-proliferation Treaty as a Non-Nuclear Weapons State, thereby legally relinquishing the right to acquire nuclear weapons. However, by the early 1990s, concerns began to mount, especially in the Western world, that the DPRK was operating a clandestine nuclear weapons programme. Despite over a decade of diplomacy seeking to prevent North Korea from acquiring nuclear weapons, the DPRK left the NPT in 2003 (the only state ever to do so) and in 2006 tested its first nuclear device. While this could be seen as the DPRK's total disinterest in global norms, analytically it is important to remember two things. First, North Korea is still not entirely unconstrained by global norms, as shown by its choice of official rhetoric and some behaviours. Second, when DPRK elites have chosen to break international norms, that in itself sets new standards of precedence that could be taken up by other states, fomenting a counter to the "global nuclear order" as it stood at the start of the 21st century.

Kim Jong-un's rhetoric at the end of the 2010s and into the early 2020s struck a tone that the DPRK was a legitimate and responsible nuclear state.³⁵ While there is little doubt that the law itself could constrain Kim's nuclear-release authority in practice, the creation and publication of laws that govern nuclear use are central to the North's self-portrayal to other governments. The 2013 and 2022 nuclear laws served as strategic communication to adversaries on the specifics of the DPRK's nuclear threats while also indicating a resolve that the existing posture was necessary and even "just."³⁶ When the North has flown missiles over Japan, it has taken pains to reassure the world that the tests are "safe," and at one stage made use of Notice to Air Missions (NOTAMs) to warn other airspace users of military activity.³⁷ As mentioned earlier, North Korean elites have portrayed their targeting policy as focussed on military targets – a gesture towards conforming with the laws of war.³⁸ The fact that the DPRK engages in language of justice, legality and legitimacy at all indicates its decision-makers are not totally unconstrained by international norms; they seem to feel a need to engage with them. The overall result is that the DPRK is not only breaking existing norms but (whether intentionally or not) is in a *de facto* process of establishing new norms. Justifying nuclear weapons in response to supreme national security threats is not new, but doing so outside of the NPT is only done by a handful of states. The DPRK's route of utilising the legal mechanism to leave the NPT before pursuing a fully-fledged weapons programme could be taken up by other states in the future. After all, norms are not merely "good" or "progressive" precedents; they are merely what is considered "normal" among a given group of states at a specific time in history.

Official rhetoric has clashed with the actual policies and activities of the DPRK. Since the decision was taken to leave the NPT and begin building a nuclear weapons capability, the North Korean leadership has also been accused of undermining global security by exporting WMD-related technologies and know-how to a number of other states (notably, Egypt, Libya, Myanmar, Syria, UAE, Vietnam and Yemen).³⁹ These illegal exports are believed to be essential to the North Korean economy but represent a major concern for the international community. However, Kim's rhetoric should demonstrate to outsiders that the DPRK will not be shamed into abandoning nuclear weapons. The choice to leverage "responsibility" language is a canny approach that highlights the less-than-salutary historical practices of other nuclear-armed states that nevertheless claim the mantle of "responsibility." Such whataboutism could be helpful for the DPRK if it is seeking to weaken the Western-led nuclear order.

The DPRK has unsurprisingly not signed the TPNW and voted against the treaty at the UN general assembly in 2020, despite its occasional claims to pursue global nuclear disarmament.⁴⁰ Instead, the DPRK appears determined to continue to enhance the nuclear capability. In late 2022, Kim unveiled a set of new military goals at a meeting of the Workers Party, which included "exponentially" increasing the production of nuclear weapons, including tactical nuclear weapons that might be used in a war against South Korea, as well as building hypersonic warheads and nuclear-powered submarines.⁴¹ Flying in the face of what had become a strong

global norm, the DPRK is the only state to have tested nuclear weapons in the 21st century, and the prospect of future nuclear tests shows no sign of being taken off the table. As a result, and despite decades of discussion about denuclearisation and high-level talks between Kim Jong-un and US President Donald Trump in 2019, there seems little appetite or likelihood for change in the Third Nuclear Age.

Conclusion: an enduring nuclear challenge

The nuclear ambitions of the DPRK's first leader, Kim Il Sung, were a major driver of what would become characterised as the Second Nuclear Age. The determination to build a secure and credible nuclear deterrent force has been continued by his successors Kim Jong-il (1997–2011) and Kim Jong-un (2012–) and remains a central challenge for the global nuclear order in the Third Nuclear Age. Despite multiple rounds of diplomacy since the early 1990s, little appears to have changed when it comes to the calculations of the DPRK leadership.

North Korean military officials have always been concerned about a possible attack or coercion by the United States, South Korea and their regional allies, but the technological changes at the heart of the Third Nuclear Age are exacerbating this. Highly sophisticated US conventional weapons, including precision strike capabilities, cyber operations and missile defence, alongside South Korea's conventional "Kill Chain," have resulted in a doubling-down by the North Korean leadership on the centrality of the nuclear programme. Indeed, it has arguably driven an expansion not just in terms of capabilities but also missions, with the move to deploy tactical nuclear forces as well as ICBMs. North Korea's response to the pressures of the Third Nuclear Age therefore seems likely to follow an established pattern of prioritising its nuclear deterrent.

Notes

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Summary

The Nuclear Traditionalists do not all adhere to one particular “nuclear tradition,” but are united by their belief that a secure, credible and in some cases expanded or enhanced nuclear capability is essential to meeting the security challenges of the Third Nuclear Age. Fundamentally, there is a belief among political and military elites that nuclear weapons continue to represent the best way to achieve security against immediate and possible future threats. In this way, they all appear to adhere to the general principles of “the nuclear revolution” – that a secure, and in some cases, second-strike nuclear capability will deter adversaries from coercive or aggressive behaviour and provide a level of security and safety.

The United States is spending billions of dollars to modernise its decades-old strategic nuclear triad to meet a variety of different (and growing) deterrence needs; Russia is developing a range of new strategic nuclear weapons ostensibly to overwhelm US missile defences as well as deploying new shorter range battlefield systems; France is recapitalising its dyadic nuclear force; while both Pakistan and North Korea continue to slowly increase and diversify their nuclear weapons stockpiles and associated missions. There is also still a feeling among members of this group (perhaps less so in the United States) that possessing nuclear weapons provides a level of prestige and that such capabilities are reflective of modernity and are important to national identity. This is quite different from the United Kingdom, China, Israel and India, where nuclear weapons are much more in the background. None of the Nuclear Traditionalists have engaged with the TPNW, although all but North Korea are publicly committed to working towards a nuclear-free world. There are other important differences between this group too.

Perhaps the major point of difference between those we classify as Nuclear Traditionalists is between a view of nuclear weapons as a means for strategic retaliatory deterrence (the United States and France) and those who see a role for nuclear weapons on the battlefield (Russia, Pakistan, North Korea). Russia, Pakistan and North Korea all face immediate security threats from adversaries with qualitatively superior conventional military forces that they cannot match, which has led to the return of battlefield and tactical nuclear weapons. The United States and France (along with the United Kingdom and India) have increasingly sought to paint themselves as “responsible” nuclear powers because they ostensibly reject these applications. However, it should be noted that the United States retains a

stockpile of tactical nuclear bombs, including approximately 100 deployed at bases in Europe for use by NATO allies in a time of war.

Another point of difference within this group is between those who have embraced the possibility of non-nuclear pathways to ensuring security but ultimately continue to rely on nuclear weapons (the United States and Russia) and those whose approach to the value of nuclear deterrence has remained largely unchanged (France, Pakistan and North Korea). This may be as much the result of economic and industrial constraints shaping policy as a deliberate choice – nuclear first remains a much cheaper way to deter than large, advanced conventional forces.

The United States is a good example of a state that has tried over several decades to move towards a far greater role for advanced conventional/strategic non-nuclear weapons in deterrence strategy through technological transformation but has ultimately been forced into a position of doubling down on the nuclear component. There are three reasons for this: (i) the key security challenge facing Washington has shifted from small “rogue” actors and a focus on deterrence by denial to great power challenges and deterrence balances with major powers; (ii) key US allies in Europe and Asia see a strong nuclear component as central to the credibility of extended deterrent relationships in the face of growing challenges from Russia, China, North Korea and Iran; (iii) and the rise of the “2-peer deterrence problem,” whereby there is a perception of needing enough nuclear weapons to deter two nuclear peers at the same time. For different reasons, Russia has also embarked on a major programme of developing strategic non-nuclear forces, but the experience in Ukraine has shown the limits of these often very expensive capabilities for prolonged conventional warfare and has instead reiterated the importance of both strategic and tactical nuclear weapons (and nuclear signalling) for Moscow.

The value of nuclear weapons (of all types) for Pakistan and North Korea is directly linked to the conventional military superiority of its immediate neighbours and potential adversaries (India, South Korea and the United States). While we don’t classify India as a Technological Transformer (yet), this could easily be the direction of travel for Indian elites in the near future, especially as the Indian economy expands. An even greater Indian qualitative strategic military advantage would surely drive further Pakistani nuclear proliferation. Likewise, the Technological Transformation of the South Korean military, and, to a lesser extent, the general military power of the United States is a major reason why North Korea remains wedded to the nuclear option. The normative shifts driven by the Activists and Protestors have had little if any impact on the thinking of political and military elites in Islamabad and Pyongyang. France remains something of an outlier in that two of the major rationales for nuclear deterrence are (i) an unwillingness to solely rely on the United States and NATO, and (ii) a continued belief that strategic non-nuclear weapons cannot replace the functions of nuclear weapons.

Another important factor for the Nuclear Traditionalists is the role of arms control. The United States and France continue to place a high priority on arms control agreements and risk reduction measures and in pushing for nuclear restraint. This continues to be centred on the NPT. It could be argued that this commitment

is partly to assuage the concerns from other states, but more practicably it may also be to minimise the pressure to change or expand their own nuclear forces. Russia has made arms control discussions contingent on including all types of strategic forces; Pakistani elites appear open to arms control discussions with India but have little hope of progress, while arms control doesn't seem to factor into North Korean thinking. This, of course, in turn creates security pressures for those that feel threatened by the continued possession of nuclear weapons by these states.

A final demarcation is between those Nuclear Traditionalists broadly wedded to the status quo (the United States and France), and those that might be considered revisionist (from a Western viewpoint) or at least seeking to challenge the nuclear status quo (Russia). This puts the United States and France closer to other relatively status-quo-orientated actors such as Germany, the United Kingdom and Japan and arguably Russia closer to China and maybe Iran. Pakistan and North Korea are difficult to classify, because while the status quo doesn't necessarily favour them militarily, they do not appear driven by revisionism but rather by enhancing deterrence.

The fact that these five states remain wedded to nuclear weapons, and see nuclear deterrence as a fundamental pathway to security, suggests that nuclear weapons will remain central to the Third Nuclear Age. The reliance on tactical and battlefield nuclear forces arguably makes the deliberate or inadvertent use of nuclear weapons more likely than in the recent past.

Conclusion

Competing pathways to security in the Third Nuclear Age

The nuclear shadow that loomed over humanity last century has returned with a vengeance. The nuclear risk is higher than at any moment since the depths of the Cold War.

(UN Secretary General, Antonio Guterres, February 2024)¹

There are two main arguments made in this book. First, we are moving into a new chapter of our collective global nuclear history where the nature of the nuclear challenge has and will change. And second is that the experience, understanding and responses to this Third Nuclear Age will be different, diverse and contested, and that this has significant implications for strategic stability, nuclear disarmament, arms control, proliferation, escalation, deterrence failure and possible nuclear use.

We argue that the nuclear world has experienced a fundamental transition over the past decade, which has seen the main focus of nuclear politics shift from horizontal weapons proliferation, arms control and reductions, and an emphasis on “rogue” actors and nuclear security, towards a world of strategic nuclear competition, arms build-ups, the return of interstate conventional warfighting, more fluid security relationships between states, and a major bifurcation in global nuclear governance. Part of this is a result of the full manifestation of a process of “nuclear globalisation” that started a generation ago, whereby an increasing number of interconnected stakeholders are playing a more vocal and influential role in global nuclear politics.

There is a general consensus in policymaking, professional and academic circles that the nature of the global nuclear order is changing, but we are still very much in the infancy when it comes to fully conceptualising what this means for the future of global nuclear politics. What we can suggest is that the Third Nuclear Age is both more complex and potentially riskier, or at least complex and riskier in different ways, than either the First or Second Nuclear Ages that came before it. This is because (i) there are more (often multi-party) adversarial relationships where nuclear weapons play a role than in the past; (ii) the intermingling of strategic non-nuclear weapons and nuclear weapons has created new pathways to deliberate or inadvertent nuclear use; (iii) the rough consensus (that the global benefits

of non-proliferation were worth an open-ended commitment to disarmament) that underpinned nuclear order since the 1970s has begun to fall apart; and (iv) there are more influential voices being heard and reshaping the normative nuclear context than before.

The Third Nuclear Age will therefore be more intellectually complex and multifaceted than the two nuclear ages that preceded it, and this is because the frame of analysis must be broadened to look beyond the historical focus on the major powers, nuclear deterrence and the most powerful nuclear-armed states. Essentially, we argue that it is important to look at who wields different types of power in the international order, how and why. To understand the Third Nuclear Age, we therefore have to look not just at the most powerful but also at those that power is being wielded over and how these actors attempt to respond. It is impossible to understand the new nuclear order without an appreciation that this will be truly global, differentiated and about the role of nuclear technology, politics and norms more broadly, not just nuclear weapons. It will also be a global order where diametrically opposed visions of imagined nuclear futures come into much starker conflict than in the past.

The central thesis of this book is that there are three core dynamics that are shaping the Third Nuclear Age: technological change that is driving the development of nuclear and non-nuclear weapons systems with new missions and creating different challenges for proliferation, stability, deterrence and crisis management; geopolitical shifts in the global balance of power that are pushing the global system towards multipolarity, which in turn is reshaping political alignments and driving great power competition; and an increasing normative dislocation in global nuclear governance between those wedded to and challenging the existing status quo. This combination of potentially disruptive change in many ways makes our current epoch unique from those that have gone before.

Technological innovation, advancement and diffusion are essential components of the Third Nuclear Age, but as the preceding chapters show, this is far from uniform. This is because it will involve a mixture of horizontal and vertical proliferation of both nuclear and strategic non-nuclear weapons systems. For the political and military leaders of some states, embracing technological change is about a perceived need to make existing *nuclear* weapons more capable or secure due to fears that these platforms may have become vulnerable; for others, it is about new applications and missions for *nuclear* weapons to meet new security challenges. For others still, it is about developing sophisticated *strategic non-nuclear weapons* systems for warfighting or deterrence, both instead of – or in order to augment – nuclear missions. For a final group, technological change is about reaping the benefits of nuclear technologies for power generation, economic growth, sustainable development, submarine propulsion, and potentially “Net Zero.”

Likewise, ongoing geopolitical shifts in the global distribution of power are more complex than might first appear. The centrepiece is undoubtedly a feeling that the era of relatively uncontested US primacy and leadership of the global nuclear order is coming to an end, and a generation of unipolarity is morphing into a

system of nuclear multipolarity. This is co-constitutive with a return of great power competition between the United States, Russia and China, but also increasingly India. This shift in global power balances is having significant knock-on effects for other actors too, as “middle powers” consider their options in terms of geopolitical alignment, extended deterrence guarantees, balancing and bandwagoning and seek to maximise the advantages of relationships with the major powers. The result could be a more fluid global nuclear order split between competing blocks of alliances and a greater role for groupings such as BRICS, ASEAN, the NAC and the Non-Aligned Movement.

The breakdown in the established structure of global nuclear governance is perhaps what makes the Third Nuclear Age conceptually as well as materially different from how the First and Second Nuclear Ages have been theorised. This is partly because the central institutions of global nuclear order based on the NPT have remained fairly stable since the 1960s, but also because it draws our attention to the importance of nuclear issues beyond nuclear weapons. The gradual erosion of agreements that were built up over decades to manage and control nuclear risks is at the centre of this challenge, but it also incorporates a growing bifurcation between those actors that continue to see the NPT as the centrepiece of global nuclear governance, and those that for different reasons have pushed for other means to achieve their disarmament and risk reduction goals, most notably the Treaty on the Prohibition of Nuclear Weapons. However, the TPNW itself masks an ongoing split between those states wanting total nuclear abolition and those wishing to disarm nuclear weapons arsenals but expand access to nuclear technology for applications other than building nuclear warheads.

A second major contribution of this book is that as a result of these diverse global pressures, the Third Nuclear Age will be experienced differently by different actors and that there will be different pathways that political and military elites may choose to follow to achieve nuclear security and maximise power and influence. For sure, different leaders and elites have always sought to achieve their security goals in different ways, and this is clearly a function of domestic politics, culture, immediate security concerns, budgetary considerations and resources, and geography. But whereas in the past the nuclear literature focussed primarily on nuclear weapons and nuclear proliferation as the major instruments to achieve this, today the options and toolkit are more conspicuously diverse. We argue that there are four pathways that can be used to categorise responses to the pressures of the Third Nuclear Age (although, of course, actors across the different pathways are clearly interlinked and nuclear politics unfolds across strategic geopolitical chains).

First, there is the group of states that we refer to as the Activists and Protestors that are seeking to challenge the acceptance of nuclear deterrence at the heart of existing nuclear order. These are states that do not possess nuclear weapons and are not members of any extended nuclear deterrence relationships (with the possible exception of Kazakhstan as part of the CSTO), and are united by their frustration with the lack of progress towards disarmament and concerns about a worsening nuclear geopolitical environment. However, this resistance is not uniform. Austria, alongside Ireland, New Zealand, Malta and several other states, has championed

the eradication of *all* types of nuclear technology, not just nuclear weapons. This places them in direct contrast with the majority of the Activists and Protestors (and many TPNW signatories) who view access to nuclear technologies as an unalienable right. For example, Brazil, as well as many members of the Non-Aligned Movement and states from the “Global South” and developing world (especially in Africa), appear just as interested in seeking to protect their rights within the current global nuclear system, especially the ability to access nuclear technologies for development (and in the Brazilian case, nuclear-powered submarines). Brazilian officials (and counterparts in Argentina, Mexico and Vietnam) have strongly pushed back against what is seen as excessive regulation and safeguards imposed by “the West” and pushed ahead with their own indigenous nuclear industries (and regulation). South Africa straddles this divide, being both a strong supporter of nuclear disarmament (and the only state to give up its own nuclear weapons in the early 1990s) and an advocate for greater access to nuclear technology for energy generation and scientific research. Lastly, Indonesia reflects many other non-Western states in its desire to uphold global nuclear norms and work through established institutions while at the same time championing the nuclear disarmament cause. While all Activists and Protestors are united by their belief that nuclear *weapons* disarmament is the best pathway to security in the Third Nuclear Age, this does not include a shared commitment to reducing the role and proliferation of nuclear technology for other purposes. Importantly, what arguably differentiates these states from the others looked at in this book is that they do not face a direct and immediate nuclear or conventional threat to their security. That said, most would clearly be negatively impacted by nuclear use in any of several potential flashpoints in Europe, the Middle East, South Asia and Northeast Asia.

Second are the states that, for different reasons, are Hedging and Balancing and not overly committing to any particular approach to managing their Third Nuclear Age security requirements. The Hedgers and Balancers should not be mischaracterised as “indifferent” – their response is active rather than passive. Again, the approaches of these “pragmatists” are not uniform: the United Kingdom and India currently deploy a “minimum” nuclear deterrent capability that is being updated and are making tentative steps towards developing advanced conventional weaponry: the United Kingdom through burden sharing across its alliances (especially NATO and AUKUS) and India through partnerships with Russia, Israel and others. Indian military elites certainly appear to have some interest in advanced conventional weaponry to manage the security challenges posed by Pakistan, but this remains relatively rudimentary at the time of writing. There are fears that China may expand its nuclear forces to “enhance” deterrence at the same time as amassing an enormous arsenal of conventional weapons – especially ballistic missiles – ostensibly for a regional war against the United States/Taiwan. Policymakers in Berlin are seeking to balance the role as host for NATO nuclear (and US long range conventional strike) weapons and the renewed challenge to Euro-Atlantic security from Russia with an ongoing commitment to finding new mechanisms of arms control and stability. While Iran is in many ways the classic hedger given the ongoing moves towards acquiring a possible nuclear weapons capability and a

suite of ballistic missiles to deliver a future bomb. Finland and Sweden, given their historic recent move to join NATO, and Saudi Arabia with its ongoing interest in acquiring the latest weaponry might also be considered under this label.

Third is a response that prioritises strategic non-nuclear weapons and planning for conventional warfare as the principle means of meeting the immediate security pressures of the Third Nuclear Age. Again, these Technological Transformers are not homogeneous in their approaches or specific geopolitical circumstances, nor are they transforming at the same speed or to the same extent, and this can be explained in part by the different security contexts facing Japanese, Australian, Israeli, South Korean, and Taiwanese policymakers. What does unite each of these states is a strong relationship with the United States and, for Australia, Japan and South Korea, an extended *nuclear* deterrence guarantee. This nuclear commitment (and Israel's undeclared nuclear arsenal) is arguably an important factor in creating the space for a strong commitment to conventional rather than nuclear responses to security pressures (it is also arguably a key reason why nuclear weapons remain important for the United States). Taiwan and South Korea are the best examples of states ramping up advanced conventional capabilities to deter nuclear-armed adversaries in China and North Korea, albeit the challenge is slightly different. For Taipei, the mission is to build missiles and aircraft that can hold at risk Chinese forces on land and at sea that might be used in an invasion; for Seoul, it is about demonstrating the ability to target North Korean nuclear weapons and possibly its leadership in order to limit the impact of any North Korean nuclear use. Israel is slightly different in that it already has (undeclared) nuclear weapons, but policymakers in Israel are determined to find hi-tech non-nuclear solutions for the range of problems that they face, not least a possible nuclear-armed Iran. Japanese policy elites appear to be making tentative steps towards enhancing the countries conventional capabilities while at the same time seeking to strengthen the nuclear alliance with the United States. In part due to geography, the threat facing Australia is less acute, but it is clear that the Australian government sees a major commitment (or at least aspiration) to hi-tech conventional military forces as key to meeting the challenges posed by China and a more unstable region. While not included in this study, Poland might also be another case of a state seeking to achieve its immediate security requirements through enhanced conventional forces (albeit under the NATO nuclear umbrella).

Last is a "nuclear-first" response whereby nuclear weapons are seen by policy and security elites as the dominant mechanism to counter emerging security pressures. However, this is not to suggest that these Nuclear Traditionalists all view the role and value of nuclear weapons in the same way. For sure, a secure nuclear capability appears to be important for national prestige for France, Russia, North Korea, Pakistan and perhaps to a lesser extent the United States. But the role of these weapons is quite different. For example, leaders in Russia, Pakistan and North Korea all appear to see nuclear forces as having a tactical/battlefield/sub-strategic/coercive value or application and see a difference between deterring existential threats and prevailing in "local" conflicts, whether in Eastern Europe, the India-Pakistan border or on the Korean peninsula. Alternatively, French doctrine is

explicit that there is no planning for nuclear warfighting, and the US modernisation programme primarily focusses on the strategic triad for a credible, assured nuclear response, not least for extended nuclear deterrence, although this still includes a tactical nuclear component. This is not to say that French or US nuclear forces couldn't be used in other ways, but that there is a much starker distinction between nuclear and non-nuclear forces and between strategic and tactical use. There is also (along with the United Kingdom and India) a more explicit determination to act (or be seen) as "responsible nuclear powers."

Our argument is not so much that each pathway is in competition – although there is a clear divergence between the Activists and Protestors and the Nuclear Traditionalists – but rather that the Third Nuclear Age has made different approaches to our nuclear future more practicable. This suggests that the core interaction and disjuncture is between those wedded to (or at least accepting of) a status-quo based on the primacy/acceptance of nuclear deterrence and those attempting to pursue different types of revisionism, whether it be challenging nuclear-centrism directly by pushing for disarmament or seeking to embrace non-nuclear deterrence and security as a possible alternative to nuclear weapons.

In terms of what our analysis means for global nuclear politics going forward, we suggest ten key takeaways:

- 1 While we have outlined four pathways to security in the Third Nuclear Age, these are not fixed, and it is possible that different actors could move between pathways in the future depending on circumstances. For example, it is conceivable that some of the Hedgers and Balancers could move to either the Technological Transformer or Nuclear Traditionalist camps – India fully embracing strategic non-nuclear weapons or Iran deciding to build nuclear weapons. It is also possible that some Technological Transformers move to acquire their own nuclear capability if a non-nuclear deterrence posture is seen as insufficient or an extended nuclear deterrence guarantee is weakened (most likely South Korea or Japan). The United States and Russia could potentially move (back) closer to a Technological Transformer position if the perceived value of nuclear forces were to be reduced. And perhaps least likely, one of the Activists and Protestors could also move closer to a Technological Transformer or Hedging position if security circumstances changed (possibly Brazil, maybe Indonesia).
- 2 Despite a significant increase in the influence and reach of a number of middle/normative powers that we describe as Activists and Protestors, the nuclear-armed states appear no closer to disarmament today than in the Second Nuclear Age. In fact, nuclear weapons have become more rather than less important for some countries in the Third Nuclear Age, with modernisation and new missions replacing reductions and rhetorical restraint. Nuclear weapons continue to represent a fundamental component of security for some actors, and this is becoming even more so for those challenged by adversaries with qualitatively superior conventional military forces.
- 3 While the potential to transform deterrence and security thinking through a reliance on strategic *non-nuclear* weapons is central to the Third Nuclear Age, this

model may have limited wider applicability in the short term. This is because all of the actors pursuing this pathway rely to some degree on nuclear deterrence to undergird their security (Australia, Japan and South Korea through extended deterrence; Israel, through its undeclared capability, and Taiwan indirectly through its relationship with the United States). That said, it is highly likely that advanced non-nuclear weapons proliferation (both vertical and horizontal) becomes as if not more important than nuclear proliferation in the medium to long term (especially for wealthy, developed states) and that *quantitative* nuclear arms racing will be replaced by *qualitative* arms competition between the major powers in the Third Nuclear Age. Arms control discussions will therefore have to be about more than nuclear weapons in the future, and potentially as much about behaviours and actions as numbers.²

- 4 The nature and shape of deterrence are different and arguably more complex in the Third Nuclear Age than in the past, and this means that the chances of deterrence failure are also different and potentially heightened. At the risk of oversimplifying, in the First Nuclear Age, deterrence was about securing nuclear first-strike stability between two major powers/blocs; in the Second, it was about guarding against a handful of “irrational” nuclear actors, while in the Third, it is about complex interactions between nuclear-armed and non-nuclear-armed adversaries with a broader range of defensive, offensive and disruptive strategic technologies. It is less clear in this environment what might be considered unacceptable escalation, what constitutes a red line, and how nuclear-conventional interaction could lead to miscalculation. There are also several major nuclear fault lines where nuclear and non-nuclear weapons may interact in unpredictable ways (and across different military domains) in Eastern Europe, the Middle East, the India-Pakistan border, the Korean peninsula, and around Taiwan and the South China Sea. Nuclear terrorism threats have not gone away but have been superseded for many actors in the overall nuclear threat hierarchy.
- 5 Of those states that we classify as Hedgers and Balancers, all continue to see a role for nuclear weapons. While each country in this group puts emphasis on working towards nuclear disarmament, and all are engaged in the development of strategic non-nuclear weaponry, neither of these approaches are currently seen as more viable pathways to security than continued reliance on a latent, minimum or extended nuclear capability. To some extent this makes the Hedger and Balancer group quite unique, though it is possible that other states join this group in the future should security contexts deteriorate (most likely from Europe or the Middle East). As nuclear and advanced missile technology diffuses to more actors, the risks of nuclear weapons hedging well may well increase.
- 6 The central institutions of global nuclear governance are under pressure, but none of the groups looked at in this book necessarily want the Non-Proliferation Treaty or the myriad different ongoing structures between different stakeholders to collapse. The Nuclear Traditionalists see the NPT as an important negotiating forum and vehicle to prevent proliferation, the Hedgers and Balancers view

the NPT as the best framework for moves towards incremental multi-lateral disarmament and restraint, and most Activists and Protestors view the NPT as complementary to the TPNW (and as a way to protect Article IV rights to nuclear technology). Likewise, most states, continue to see a role for arms control, though it is less clear how to pursue this.

- 7 The most powerful actors in the global nuclear are nuclear-armed states, and this means that those actors that we characterise as Activists and Protestors (as well as their NGO counterparts) have relatively few levers with which to achieve their political aims. The TPNW is symbolically significant, but ultimately has no power or mechanism to force the nuclear-armed and extended nuclear deterrence states to conform. That said, disarmament messaging is arguably more powerful and influential in certain Western nuclear-armed or extended nuclear deterrence states, and could be a reason for adopting a Hedging and Balancing or Technological Transformer approach.
- 8 Nuclear competition between the “great powers” is unquestionably at the heart of the challenges of the Third Nuclear Age, as the evermore conspicuous clash between the largely Western “status quo” powers, and the links between what the Western states view as “revisionist” powers including Russia, China, Iran and North Korea. But the current debate largely fails to see beyond this. It is essential to understand the impact of an emerging system of nuclear multipolarity on other actors, and how that in turn conditions their responses to the Third Nuclear Age. Arguably nuclear competition between the United States, Russia and China is shaping perceptions in the rest of the system about what is needed for deterrence, the credibility of extended deterrence, the likelihood of conventional conflict, the perception of nuclear risk, and the best pathway to security. Great power nuclear competition is therefore a key driver of activism and protest.
- 9 While the Activists and Protestors may be broadly opposed to the nuclear-armed states, some of these same actors are also an important source of technology transfer when it comes to expanding civilian nuclear energy capacity. This potentially gives Russia, China and to a lesser extent the United States and other Western suppliers, some leverage over those seeking such capabilities. It also means that some Global South states might occasionally prioritise access to nuclear technologies over disarmament and non-proliferation.
- 10 The locus of power and influence in the Third Nuclear Age will no longer be disproportionately centred on the Western, developed world, and especially the United States. The shape of the First and Second Nuclear Ages was largely decided by the United States, both in terms of scholarship and policy focus, but other actors will increasingly shape the nuclear order (both nuclear-armed and non-nuclear-armed).

It perhaps should not be a surprise that there is not one single shared experience, understanding or response to the challenges of the Third Nuclear Age. Indeed, there is little consensus beyond the Euro-Atlantic world that the concept of nuclear ages – at least as it is presented here – has much relevance or impact on thinking

and policy. However, we argue that seeking to understand the significant technological, geopolitical and normative changes that are shaping our shared modern world as a global, holistic phenomenon is fundamental to seriously engaging with what seems likely to be a more dangerous, contested and complex global nuclear order for all. Thinking of this as a new stage in our shared nuclear history is meaningful because it draws our attention to what is an inherently global phenomenon. The idea of nuclear ages is a very useful mechanism with which to do this.

There is nothing pre-ordained about the Third Nuclear Age – or whatever others choose to call the period of nuclear history that will likely define global nuclear politics for the next generation. This is because the global nuclear order is the result of politics and political decisions taken – most often by small groups of policy and military elites – that shape the security context. Likewise, there is no timeline for when this current period may end, or transition into something different. There could be fourth, fifth and six nuclear ages as geopolitical configurations and conceptual lenses shift. It is also possible that the Third Nuclear Age is the last nuclear age and some type of major strategic development moves as to a *nuclear* disarmed world, but of course – not necessarily a more peaceful one.

Notes

- 1 “Secretary-General urges Conference on Disarmament to move humanity closer to peace” (26 February 2024), <https://press.un.org/en/2024/sgsm22139.doc.htm>.
- 2 For a thoughtful early examination of this, see Ulrich Kühn, & Heather Williams, “Behavioural arms control and East Asia,” *Journal for Peace and Nuclear Disarmament*, 7:1 (2024), pp. 143–156.

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