



DOCUMENTATION

Below are selections from United States Strategic Command (USSTRATCOM) and United States Northern Command (USNORTHCOM) testimony before the United States Senate Committee on Armed Services. The STRATCOM testimony illustrates the diverse and growing array of threats against the United States and its allies, while the NORTHCOM testimony provides insight into how U.S. leaders are planning to protect the homeland to counter rising threats. Also included in this section are select excerpts from the United Kingdom's (UK's) *Delivering the UK's Nuclear Deterrent as a National Endeavour*, which describes the massive endeavor that is the UK's independent nuclear deterrent. The document also outlines the government's support for each of the elements of the nuclear deterrent, including the infrastructure that supports the building of the UK's next generation of strategic submarines.

Document No. 1. Statement of Anthony J. Cotton, Commander, United States Strategic Command, before the United States Senate Committee on Armed Services, February 29, 2024, Select Excerpts

INTRODUCTION

United States Strategic Command (USSTRATCOM) is a global warfighting combatant command (CCMD). Our mission is to deter strategic attack through a safe, secure, effective, and credible global combat capability and, when directed, prevail in conflict. Our people are foundational to the Command's mission and success, ensuring the safety and security of our Nation and our Allies, 24 hours a day, 365 days a year. I want to thank the President, Secretary of Defense, and Chairman of the Joint Chiefs for their continued leadership in support of USSTRATCOM's mission areas. I would like to thank Congress for its continued support in providing USSTRATCOM with the necessary resources to execute our mission and for commissioning the recently-released bipartisan report on America's Strategic Posture, which provides valuable insight into our challenges and offers a number of recommendations to preserve existing advantages.

Today, the United States, its Allies, and partners continue to be confronted by two major nuclear powers as strategic competitors and potential adversaries: the People's Republic of China (PRC) and the Russian Federation. We are also faced with the growing nuclear threat posed by the Democratic People's Republic of Korea (DPRK) and Islamic Republic of Iran's continued expansion of its nuclear program. What's more, our potential adversaries are increasing their level of coordination and cooperation with one another. This threat environment raises the possibility of near-simultaneous conflicts with multiple nuclear-armed, opportunistic adversaries.

The United States addresses these challenges through integrated deterrence, campaigning, and actions that build enduring advantages—leveraging the capabilities of our Joint Force to ensure that the President has options to deter all potential adversaries. Integrated deterrence is the bedrock of our National Defense Strategy (NDS). As the NDS articulates, integrated deterrence spans all instruments of national power, all Allies and partners, all domains and capabilities, and is backstopped by a safe, secure, and effective



nuclear deterrent. USSTRATCOM's role, however, is not limited to nuclear plans and operations.

USSTRATCOM responsibilities span strategic deterrence, nuclear operations, nuclear command, control, and communications (NC3) enterprise operations, joint electromagnetic spectrum (EMS) operations (JEMSO), global strike, and missile threat assessment. Executing these responsibilities entails close alignment and collaboration with senior national and Department of Defense (DoD) leadership, CCMDs, defense agencies, and other elements of national power. Strategic deterrence is critical to the DoD's integrated deterrence approach.

OUR PEOPLE

To fulfill our strategic deterrence mission, USSTRATCOM relies on a team of military and civilian members who are steadfast in their dedication. People are the cornerstone of our organization, and I take pride in working alongside such a talented and dedicated group of professionals. I am committed to ensuring they have the support and resources needed to succeed, and I firmly believe that investing in our people is essential to our success. By providing comprehensive professional development opportunities, career-enhancing experiences, and targeted training programs to ensure our personnel are well-prepared to conquer the challenges ahead, we are fostering the growth of the next generation of strategic deterrence experts.

GLOBAL SECURITY ENVIRONMENT

The peace dividend once envisioned at the end of the Cold War has unfortunately failed to materialize in the long-term. Strategic competition is on the rise, including in the nuclear domain, as evidenced by Russia's comprehensive nuclear modernization efforts and the PRC's rapid and opaque nuclear weapons buildup. The emphasis on nuclear capabilities by potential adversaries, coupled with the incorporation of technologies like hypersonic weapons (HSW) and fractional orbital bombardment (FOB) capabilities, significantly escalates global security risks. As noted in the 2022 Nuclear Posture Review, the PRC and Russia also likely possess capabilities relevant to chemical and biological warfare that pose a threat to U.S., Allied, and partner forces, military operations, and civilian populations.

Taken individually, these developments are concerning; they are only exacerbated by the increasing levels of cooperation between and among the PRC, Russian Federation, DPRK, and Islamic Republic of Iran, which creates the possibility for simultaneous crises and raises the risk of opportunistic aggression. For example, Russian and PRC bombers flew joint patrols over the western Pacific this past November and conducted a joint maritime patrol near the Aleutian Islands over the summer. The DPRK and Iran have also delivered arms to Russia to support its war against Ukraine. This increasing cooperation and the risk of simultaneous crisis or conflict place a premium on credible, robust, and flexible joint force response options that signal our readiness and commitment to potential adversaries, Allies, and partners.

THE PEOPLE'S REPUBLIC OF CHINA

The 2022 NDS identified the PRC as the Department's pacing challenge and our most consequential strategic competitor. PRC leadership has stated that the expansion of nuclear UNCLASSIFIED 4 capabilities is necessary to achieve "great power status," and potentially perceives its nuclear arsenal as a key deterrent to U.S. intervention in the region. While the PRC's long-term nuclear strategy and requirements remain unclear, the trajectory of its efforts points toward a large nuclear and more diverse force with a high degree of survivability, reliability, and effectiveness.

The PRC currently has a nuclear triad consisting of bombers, submarines, and land-based missiles. Its H-6N bomber is equipped to carry air-launched ballistic and cruise missiles, and the PRC is actively developing a strategic stealth bomber, the H-20. The PRC also has six JIN-class ballistic missile submarines (SSBNs) equipped with new third-generation JL-3 submarine-launched ballistic missiles (SLBMs), capable of striking the continental United States from PRC littoral waters. Additionally, the PRC has approximately 1,000 medium and intermediate-range dual-capable conventional or nuclear ballistic missiles capable of inflicting significant damage to U.S., Allied, or partner forces and homelands in the Indo-Pacific.

As I reported to Congress in January 2023, the PRC's arsenal of land-based intercontinental ballistic missile (ICBM) launchers currently exceeds that of the United States. Today, the PRC likely has more than 500 operational nuclear warheads and, should it continue building weapons at its current pace, could have more than 1,000 nuclear warheads by 2030. In 2022, it built three new ICBM fields, with at least 300 missile silos, each capable of housing the solid-propellant CSS-10 Mod 2 ICBM. The PRC also maintains road mobile CSS-20 ICBMs, each armed with multiple independently targetable reentry vehicles (MIRV), and is developing a new generation of mobile ICBMs. These developments, combined with the PRC's increasing counter-space and cyber capabilities, pose a complex, but not insurmountable challenge to U.S. strategic deterrence.

RUSSIAN FEDERATION

The 2022 NDS identified Russia as an acute threat. Its unprovoked war against Ukraine has caused the largest conflict on the European continent since World War II and undermines the rules-based international system. The invasion has also highlighted Russia's willingness to employ nuclear coercion and attempt to influence decision making within the United States and our North Atlantic Treaty Organization (NATO) Allies. Russia's violation of specific obligations within the New Strategic Arms Reduction Treaty (New START) further exacerbates this issue.

Russia is currently in possession of the largest and most diverse nuclear arsenal of any nation. In September 2023, it proclaimed the RS-28 SARMAT ICBM had been placed on combat duty. Additionally, Russia continues to field new SEVERODVINSK-class nuclear-

powered cruise missile submarines, as well as DOLGORUKIY-class SSBNs, armed with the SSN-32 Bulava SLBM.

Beyond Russia's traditional strategic triad, it is expanding and modernizing its nuclear options. These include nuclear-capable hypersonic systems such as the Tsirkon land attack cruise missile and the Kinzhal air-launched ballistic missile, the last of which Russia has employed frequently against Ukraine in a conventional role. These hypersonic systems add diversity and flexibility to Russia's nuclear arsenal and complement its stockpile of approximately 2,000 theater nuclear weapons that do not fall under New START limits.

DEMOCRATIC PEOPLE'S REPUBLIC OF KOREA

The DPRK views its nuclear arsenal as a means to ensure regime survival and influence Republic of Korea and U.S. forces in the area. The DPRK is developing and fielding mobile short-, intermediate-, and intercontinental-range nuclear capabilities that place the United States homeland and regional Allies and partners at risk. DPRK leadership recently declared that the country's status as a nuclear weapons state "has now become irreversible," and it is possible the DPRK will resume nuclear testing in order to demonstrate its capabilities.

ISLAMIC REPUBLIC OF IRAN

The Islamic Republic of Iran continues to expand its nuclear program by increasing its stockpile of highly enriched uranium and deploying additional advanced centrifuges, which has shortened the time Iran would need to acquire enough fissile material for a nuclear weapon. Iran already possesses the region's largest arsenal of conventional ballistic missiles, which threaten U.S. regional bases and are capable of reaching as far as Southern Europe. Iran also continues to proliferate advanced conventional weapons to non-state militia groups across the Middle East—which have been used in countless attacks against U.S. and partner personnel and interests across the region, undermining regional stability.

Document No. 2. Statement of General Gregory M. Guillot, United States Air Force, Commander, United States Northern Command and North American Aerospace Defense Command, before the United States Senate Committee on Armed Services, March 14, 2024, Select Excerpts

[Introduction]

Chairman Reed, Ranking Member Wicker, and distinguished members of the Committee: thank you for the opportunity to testify today and for the honor of representing the men and women of United States Northern Command (USNORTHCOM) and North American

Aerospace Defense Command (NORAD). Since assuming command in early February, my initial actions and priorities have included maintaining our vital homeland defense mission throughout a seamless leadership transition; strengthening USNORTHCOM and NORAD's vital network of Department of Defense (DoD), international, private sector, and interagency mission partners; and conducting a thorough assessment of the Commands' personnel, missions, and resourcing. I look forward to establishing personal relationships with leaders throughout the commands' area of responsibility and across the U.S. Government as those ties are critical to the successful execution of USNORTHCOM and NORAD's no-fail missions.

It is already apparent that the strategic environment facing the United States and Canada – and our allies and partners – presents significant risks to our homeland, our citizens, and our vital national interests. Across all domains and avenues, competitors are exploiting conflicts and crises around the world to undermine U.S. global leadership and our democratic institutions. Our competitors continue to develop and deploy highly advanced kinetic and non-kinetic weapons systems capable of disrupting or defeating military and civilian targets in North America. These threats are difficult to detect and can strike with limited warning, which reduces the time and response options available to our national leaders and increases the risk of miscalculation and escalation during periods of heightened tension, crisis, and conflict.

As recent events have made clear, overseas crises increasingly carry significant implications for homeland defense. Regional conflicts routinely have the potential to expand into broader crises that directly impact U.S. and allied interests. Russia's unprovoked war against Ukraine and the horrific October 7th Hamas terrorist attacks against Israel demonstrate how seemingly isolated events, regardless of whether the United States and our allies are directly involved, have the potential to reach our own shores. Those ripple effects can include competitor information operations directed against the American public and civil unrest and violence within the United States, or attacks directly targeting the United States and our interests.

Competitors like the People's Republic of China (PRC) and Russia are well aware that the U.S. military is the strongest in the world and highly capable of deploying forces anywhere on the planet to deter aggression and de-escalate potential crises. Accordingly, those competitors have sought to hold defense critical infrastructure in the United States at risk with kinetic and non-kinetic systems intended to impede our ability to flow forces overseas. That strategy must be taken into account in planning for the forward deployment of U.S. forces and resources, as moving assets overseas has the potential to affect the availability of assets assigned to homeland defense or force mobilization missions.

The realities of the 21st Century strategic environment require a flexible, adaptive global approach that recognizes the fact that our competitors can hold the U.S. homeland – and the homelands of our allies and partners – at risk with conventional, nuclear, and non-kinetic capabilities as part of a broad effort to force the United States to accept increased risk when deploying forces in support of overseas operations. Preserving the full range of options for defending U.S. national interests requires homeland defense to remain a fundamental consideration at every stage of DOD planning, policy, and budgeting.

A globally integrated approach to planning and actions must also extend beyond the Department of Defense and should be embraced by the whole of the U.S. Government. Success in competition, crisis, or conflict continues to rely on a ready, modern, and capable joint force reinforcing the other core elements of our national power. Our diplomatic corps is essential to shaping the strategic environment and cultivating the network of alliances and partnerships that provide the most significant U.S. advantage against isolated and authoritarian competitors seeking to expand their territory and influence at the expense of their sovereign neighbors. The successful execution of USNORTHCOM and NORAD's missions relies on cohesive strategies, integrated planning, and collaboration across the whole of government, and I look forward to working closely with the members of this Committee as we work together to meet the formidable challenges facing our nation.

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USNORTHCOM and NORAD PRIORITIES

Against the backdrop of expanding and expansive threats, USNORTHCOM and NORAD remain dedicated to defending the U.S. and Canadian homelands today and well into the future. My key priority remains improved domain awareness in the approaches to North America and around the globe. The ability to detect, classify, and track potential threats to the homeland from the seafloor to space and in the cyber domain is a critical need for USNORTHCOM and NORAD – and for my fellow combatant commanders and international partners. Our core missions, to include defending critical defense infrastructure, require USNORTHCOM and NORAD to see and respond to threats through a globally integrated layered defense extending as far from our shores as possible. That capability is needed to ensure national leaders have as much time as possible to decide the best course of action for deterring, de-escalating, or defeating potential hostile acts.

Investments in capabilities such as Over-the-Horizon Radar (OTHR) and the Integrated Undersea Surveillance System (IUSS) will significantly enhance domain awareness in the air and maritime domains while limiting competitors' ability to approach North America undetected. Likewise, USNORTHCOM and NORAD's ability to track and defeat inbound DPRK long-range ballistic missiles will be significantly enhanced with the Long-Range Discrimination Radar (LRDR), currently planned for integration into the United States' ballistic missile defense architecture in the near future. I remain grateful to this Committee for your support of these important initiatives, and I urge continued emphasis on improving our nation's ability to find and monitor potential aggressors well before they could target our homeland.

The rapid pace of change in the strategic environment, to include advancing kinetic and non-kinetic threats and the increasing exploitation of the information space, give reason to believe that successful defense of the homeland tomorrow requires new approaches, technologies, and perspectives. As competitors increasingly focus on holding the homeland at risk in an effort to influence U.S. and allied decision-making and limit our options for

intervention in overseas crises, USNORTHCOM and NORAD are taking active measures today to ensure the ability of the commands to defend the homelands in the future.

The United States retains the world's most powerful military and a global network of immensely capable allies and partners. However, information flow between organizations and commands remains stifled by technological and institutional barriers, which too often results in delayed delivery and processing of critical information. Improving global domain awareness is absolutely necessary, but the Department must also expedite the processing and sharing of information between combatant commands, allies, partners, and the interagency community. The Department's prioritization of the Joint All-Domain Command and Control concept highlights the increasing importance of quickly sharing information between sensors, decision makers, and effectors. For USNORTHCOM and NORAD, the ability to detect potential threats, make well-informed recommendations to leaders, and take appropriate defensive measures is vital, and I will work closely with the Department and the Services to develop this critical capability.

Our nation must also continue to invest wisely in the military and civilian personnel responsible for planning and executing every one of USNORTHCOM and NORAD's no-fail missions. The demands of defending the homeland are significant and require an experienced and innovative professional workforce from a broad range of experiences and backgrounds. Our commands continue to prioritize recruiting and retaining exceptional talent from a broad and deep talent pool. Just as our nation makes substantial investments in cutting-edge technology to outpace our competitors, we must also invest in the dedicated service members and public servants who stand watch over our nation.

HOMELAND DEFENSE DESIGN NEXT

In recognition of the multi-domain threats to North America, USNORTHCOM and NORAD have prioritized operationalizing the commands and institutionalizing active campaigning in the homeland. Homeland defense begins well beyond our shores and relies on a layered, integrated defense conducted in full cooperation with our fellow combatant commands and our allies and partners. Rather than simply reacting to the actions of our competitors, USNORTHCOM and NORAD are taking active measures to assess the emerging threats and associated requirements of the near future in to ensure our ability to defend critical assets and safeguard the nation's ability to project forces forward.

The actions and ambitions of our competitors require the United States and Canada to demonstrate the capability to fight in and from North America, and the commands' homeland defense design will ensure our ability to defend the homeland in the coming decades. USNORTHCOM and NORAD's focus on campaigning and operationalizing the commands reflects competitors' growing capability and capacity to hold targets throughout North America at risk and to force U.S. and Canadian leaders to defend the continent while projecting forces overseas.

It is a near certainty that homeland defense in the coming years will rely less on point defense and traditional kinetic defeat mechanisms in favor of area defense and left-of-launch

effects that take full advantage of multi-domain capabilities. While the future of homeland defense may look vastly different than the current architecture, it will continue to depend on the pillars USNORTHCOM and NORAD use today – all-domain awareness; information dominance; decision superiority; and global integration. I look forward to working with the Department and Congress on these pillars.

The necessity of campaigning in and from North America has been made clear in recent years as competitors have repeatedly demonstrated the capability, capacity, and intent to hold the homeland at risk. USNORTHCOM and NORAD will continue to advance the commands' ability to conduct globally integrated joint operations in defense of the homeland. The commands will also benefit from the recent transition from the legacy USNORTHCOM and NORAD Command and Control Center (N2C2) to a Joint Operations Center (JOC) that mirrors the capabilities of fellow geographic combatant commands and allows for real-time, all-domain communications and coordination with the commands' DOD and interagency partners.

Finally, the success of homeland and continental defense requires capability and capacity to conduct sustained multi-domain operations in the Arctic. The challenges associated with communicating, operating, and surviving in the Arctic are well documented, and investment by the U.S. Government, the Department, and the military Services reflect the need to compete in the region now and well into the future. I am encouraged by national-level commitments to improving the Port of Nome and building the U.S. Coast Guard's icebreaker fleet; both efforts are visible signs of the U.S. commitment in the region that will support the economic and national security interests of the United States. The DoD and Services have readily acknowledged the importance of operating in far north in their respective Arctic strategies, and further emphasis and investment is necessary to field the Arctic-capable platforms, properly trained and equipped forces, and infrastructure necessary to succeed in a region of enormous strategic consequence. USNORTHCOM's Special Operations Command-North (SOCNORTH), has demonstrated both the value and challenges associated with Arctic operations through Combined and Joint Operations, activities, and investments in the High North. Most recently, SOCNORTH executed Exercise ARCTIC EDGE 24, readily integrating over 600 USSOF, Partner Nation SOF, and LEAs across the entire North American Arctic.

Documents No. 3. Delivering the UK's Nuclear Deterrent as a National Endeavour Presented to Parliament by the Secretary of State for Defence by Command of His Majesty, March 2024, Selected Excerpts

[...]

The UK's nuclear deterrence policy

The purpose of nuclear deterrence is to preserve peace, prevent coercion and deter aggression. A credible, independent nuclear deterrent remains essential to guarantee our security.

The view of successive UK governments is that an independent, minimum, credible nuclear deterrent, declared to the defence of NATO [North Atlantic Treaty Organization], is essential to our security and that of our NATO Allies. It is a critical part of our insurance against the risk and uncertainties of the future.

The UK maintains a Continuous-At-Sea Deterrent (CASD), delivered by the Royal Navy, since April 1969 under Operation RELENTLESS. It consists of at least one nuclear-powered submarine on patrol at all times, armed with the Trident missile system and UK sovereign nuclear warheads.

Our Vanguard Class SSBNs (Ship Submersible Ballistic Nuclear), which carry our nuclear weapons, are supported by a range of Royal Navy capabilities including our Astute Class SSNs (Ship Submersible Nuclear). These are conventionally armed, nuclear powered attack submarines that protect CASD as well as being capable of undertaking multiple defence and intelligence tasks.

We are deliberately ambiguous about precisely when, how and at what scale we would use our weapons. Alongside our decision to no longer publicise figures for our operational stockpile or deployed warheads, this posture enhances our deterrent effect by complicating the calculations of potential aggressors, thereby reducing the risk of deliberate nuclear use by those seeking a first-strike advantage.

The credibility of our deterrent is enhanced by ensuring it remains operationally independent. Only the Prime Minister can authorise the use of our nuclear weapons, even if deployed as part of a NATO response.

Potential aggressors know that the costs of attacking the UK, or our NATO allies, would far outweigh any benefit they could hope to achieve. This deters states from using their nuclear weapons against us or carrying out the most extreme threats to our national security.

The deterrent protects us every hour of every day. By providing a credible and effective response to extreme aggression, our nuclear deterrent reduces the likelihood of such an attack taking place.

This deters the most extreme threats to our national security and way of life, helping to guarantee our security and that of our NATO allies. It ensures that potential adversaries are dissuaded from using their capabilities to threaten or coerce the UK or our NATO allies, or to

deter us from taking the action required to maintain regional and global security and stability.

We are now in a period of heightened risk and volatility that is likely to last beyond the 2030s. We are therefore reaffirming our commitment to a credible nuclear deterrent and investing to sustain and renew our capabilities for as long as required, as this document sets out. We will keep our nuclear posture under review in light of the international security environment and the actions of potential adversaries.

At the same time, we remain committed to the ultimate goal of a world without nuclear weapons and support full implementation of the Treaty on the Non-Proliferation of Nuclear Weapons (NPT). There is no credible alternative route to disarmament. The UK continues to support the entry into force of the Comprehensive Nuclear-Test-Ban Treaty (CTBT) and will continue to press for key steps towards multilateral disarmament through the NPT.

It is the firm view of this government that a world where the UK's potential adversaries have nuclear weapons and the UK (and NATO) does not, is not a safer world.

Our security is enhanced by our partnerships with our allies. We have a strong relationship and engagement with the US. Our standing as a responsible nuclear power remains an important part of our long history of defence cooperation, enhancing Euro-Atlantic security.

The UK works closely with the US on all nuclear matters, including nuclear policy, operations and technology. Our close relationship with France, our European nuclear ally, plays a critical role, including through our collaboration under the Lancaster House Treaties. This includes co-operation under the 2010 TEUTATES Treaty, through which we share research facilities and co-operate on technology. The UK and France are increasing co-operation on nuclear deterrence issues. The UK is also committed to building understanding and expertise on nuclear issues in NATO. This includes ensuring coherence between the Alliance's nuclear and conventional policies and developing the capabilities needed for the future.

Introduction: A National Endeavour

Delivering the UK Nuclear Deterrent: A National Endeavour

Day in, day out, right across the country and beyond, thousands of people in the public sector, military and industry are working together to achieve our shared mission: to deliver capabilities, deter the threat and protect the nation.

To sustain the deterrent for as long as it is needed, we are making the following commitments:

- we are investing £31 billion (with a £10 billion contingency) in the new **Dreadnought Class SSBNs** with the first boat due on patrol in the early 2030s;
- we are developing a **replacement UK sovereign warhead**, while maintaining our existing stockpile;

- we are recapitalising critical elements of our **infrastructure** to modernise our naval bases and manufacturing processes, supporting growth as we anticipate future fleet needs and weapons requirements;
- we are nearing completion of the UK's fleet of conventionally armed, nuclear powered **Astute Class SSNs** and have begun designing the **next generation of attack submarine, SSN-AUKUS**;
- we are enabling industry to plan for the future by working with the Department for Energy Security and Net Zero (DESNZ) to coordinate our defence activity with investment in the **civil nuclear sector**, itself critical to our energy security;
- we are enhancing nuclear power generation over the long term by investing in **nuclear technology**, with many parallels to the investments needed to support the UK's Energy Security Plan;
- we are working with industry partners to **safeguard our supply chains for the future**; and
- we are investing in **Barrow-in-Furness** as the home of nuclear submarine building in the UK, in recognition of its criticality to the nation's security.

These are some of the largest and most complex programmes ever seen. They require unique cutting-edge technology and world-leading expertise in science, engineering and manufacturing.

In order to deliver all of this:

- we continue to have a **close partnership with our most important ally, the US**, facilitated by the longstanding 1963 Polaris Sales Agreement and the 1958 Mutual Defense Agreement for broader cooperation and exchange;
- we continue our important **relationship with France**, our European nuclear ally, cooperating on technology and nuclear deterrence challenges. This includes our collaboration under the 2010 TEUTATES Treaty, through which we share research facilities;
- we are **strengthening our partnerships with industry**, particularly our prime suppliers Babcock International, BAE Systems and Rolls-Royce Submarines Ltd, with a focus on delivery to schedule;
- we have brought **AWE** [Atomic Weapons Establishment], which designs, manufactures and ensures the safety and efficacy of our warheads, back into the Ministry of Defence as a wholly owned arm's length body and have acquired **Sheffield Forgemasters**, who provide specialised steel, into public ownership, enabling closer alignment with our requirements;
- together with DESNZ, we launched the **Nuclear Skills Taskforce (NSTF)** to work with industry, academia and the education sector to increase the numbers of apprentices, graduates, and PhDs across the sector – this will ensure we can access the right skills for nuclear, providing new economic opportunities for thousands of people across the country;

- we will maintain the **scientific and engineering expertise** that ensures UK defence nuclear programmes fully comply with our international obligations and develop our ability to counter nuclear proliferation, prevent nuclear terrorism, identify and deter nuclear test explosions and verify future arms control regimes; and
- we will enable industry to plan for the future by working with DESNZ to coordinate our defence activity with investment in the **civil nuclear sector**, critical to our energy security.

Alongside investment in civil nuclear for our energy security needs, this breadth of activity amounts to a new era for the nuclear sector in the UK.

All these measures represent a significant undertaking and investment by the UK government and industry, with an enduring commitment for the decades ahead. This will generate economic opportunity across our UK supply chain, including submarine construction at BAE Systems in Barrow-in-Furness, submarine maintenance at the Babcock International site in Devonport, nuclear reactor development at Rolls-Royce Submarines Ltd in Derby and warhead design and manufacture at AWE in Berkshire.

This Command Paper sets out, for the first time, what it takes to deliver the nuclear deterrent.

It reaffirms our commitment to maintaining global stability, working with our allies including NATO, and reminds potential adversaries that we are ready to prevent coercion and deter aggression.

It represents a commitment to enhance our industrial base, working in closer partnership with academia and business, and a promise that we will maximise economic opportunity and invest in our communities.

It is also a call to action to everyone who contributes to safeguarding the security and prosperity of our nation by supporting the nuclear deterrent.

The Defence Nuclear Enterprise (DNE) is the partnership of organisations that operate, maintain, renew and sustain the UK's nuclear deterrent.

The nuclear deterrent is the Ministry of Defence's number one priority. In order to deliver our mission in the years ahead, the DNE is making several changes:

- we are strengthening its leadership, now headed by the newly appointed civilian Chief of Defence Nuclear and the First Sea Lord of the Royal Navy, enhancing coherence, senior focus and accountability;
- we are bringing together its core elements to work more closely than ever before: the Defence Nuclear Organisation (DNO), the Royal Navy, the Submarine Delivery Agency and AWE;
- we are operating a new ring-fenced budget and greater delegated spending authority, as well as more streamlined, robust governance;
- we are working with our industry and training partners to develop the skilled workforce that we will depend on in the coming years.

[...]

AUKUS: The trilateral security and defence partnership between Australia, the UK and the US

Through the development of SSN-AUKUS and our trilateral advanced capabilities portfolio, AUKUS is supporting a free and open Indo-Pacific, as well as driving technological progress and improving interoperability with two of our closest partners.

The AUKUS partnership is one of the most strategically important capability collaborations in decades. For all three countries, it will help meet our shared commitment to supporting stability and security through a free and open IndoPacific by progressing towards more unified defence and industrial collaboration, better information and technology sharing, and greater resilience, helping develop joint capabilities.

Pillar One of the partnership will see the UK and US assist Australia by developing a conventionally armed, nuclear powered submarine capability. The culmination of this will be a new SSN-AUKUS Class, based on the world-leading UK design currently under development.

Pillar Two of AUKUS is accelerating the development and delivery of advanced conventional (non-nuclear) capabilities. It includes regulatory and legislative measures to ease the export and transfer of technology and expands ways of sharing sensitive information. This will enable better integration of security and defence related science and technology, allowing AUKUS states to develop cutting-edge capabilities at the pace and scale of relevance, bolstering our respective industrial bases and supply chains. Through the development of SSN-AUKUS and our trilateral advanced capabilities portfolio, AUKUS is supporting a free and open Indo-Pacific, as well as driving technological progress and improving interoperability with two of our closest partners.

The partnership will enhance the UK's ability to operate in the Indo-Pacific. Future exercises will improve each nations' ability to work together and test the joint operation of advanced capabilities, radically improving a shared ability to tackle emerging threats. This sits alongside the UK and US establishing a rotational presence of SSNs in Australia to develop at-sea experience for Australian crews.

The government has allocated an initial £4 billion to BAE Systems, Rolls-Royce Submarines Ltd and Babcock International for the design phase and procurement of long-lead items for the UK's fleet. Australia has also committed to make a significant investment into the UK's submarine industrial base. BAE Systems, working with Australia's ASC Pty Ltd, will build Australia's SSN-AUKUS fleet. At its peak, over 21,000 people in the UK will be working on the SSN-AUKUS programme. The AUKUS partnership allows Australia to draw on over 60 years of British expertise in the design, build, and operation of nuclear submarines as they develop their own capabilities. All three AUKUS partners are committed to meeting their respective nuclear non-proliferation obligations.

[...]

Part One: Our people

Our advantage over our potential adversaries depends upon the ingenuity and dedication of our people. They are our most important asset.

The UK will significantly expand its nuclear workforce to meet the growing demand of the DNE and our future civil energy requirements. This will deliver economic opportunities and growth at nuclear locations across the country.

Driven by its involvement in cutting-edge scientific advancements, the UK has a growing demand for nuclear skills in both defence and civilian sectors. We need deep nuclear subject matter expertise, such as in science and engineering, with specialists in fuels, materials, warhead design and reactor physics.

The DNE is also highly dependent on many trades, such as welders, electricians, mechanical fitters, warhead component manufacturers and assemblers, who complement the thousands of employees in specialist functions such as project management, legal and commercial.

[...]

Part Two: Submarines

At least one nuclear-armed, nuclear-powered submarine has been covertly patrolling the world's oceans for over 50 years, carrying the UK's sovereign warheads. This is the Royal Navy's Operation RELENTLESS, the longest sustained military operation ever undertaken by the UK.

They are supported by maritime patrol aircraft which provide a seamless and world-leading anti-submarine warfare capability, while the Fleet Ready Escort is held at readiness to monitor, track and intercept adversary vessels approaching and transiting UK waters, deterring any attempts to intercept and disrupt our submarine operations. They are also supported by the wider UK defence and intelligence community.

[...]

SSBNs: Nuclear armed, nuclear powered

Invulnerable and undetected, our SSBNs guarantee our nuclear deterrent by patrolling the seas at all times, ready to respond to the most extreme threats to the UK.

Vanguard

Our four nuclear-powered Vanguard Class submarines are equipped with the Trident II D5 missile system and carry the UK's sovereign nuclear warheads. The Royal Navy has been operating CASD patrols in the Vanguard Class since 1993. Babcock International maintains our Vanguard Class fleet, including elements of the nuclear propulsion system, and Rolls-

Royce Submarines Ltd supports the nuclear propulsion system while in service. This extends the fleet's operational availability to deliver CASD operations and will continue until the fleet is replaced by the Dreadnought Class.

Dreadnought

The four Dreadnought Class submarines will begin to replace the Vanguard Class in the early 2030s. They will be the largest, most technically advanced SSBNs ever operated by the Royal Navy, equipped with a new generation of nuclear reactors to provide power and propulsion, designed and manufactured by Rolls-Royce Submarines Ltd. The design will incorporate a range of scientifically advanced electronic systems, sensors and tactical weapons, as well as housing the Trident II D5 missile system. They are designed and built in Barrow and represent a substantial investment into British industry. At its peak, industry estimate the Dreadnought programme will support around 30,000 jobs and it is reliant upon a supply chain of hundreds of companies based in the UK.

SSNs: Conventionally armed, nuclear powered

Protecting the UK's deterrent from hostile activity and detection, whilst supporting global operations.

Astute

The Astute Class was first introduced in 2014. They are nuclear powered but conventionally armed. They contribute to protecting the nuclear deterrent and maritime task groups, providing global strategic intelligence. They are fitted with advanced sonar, carry Spearfish torpedoes and can deliver a Tomahawk Land Attack Missile strike capability. They are the most powerful SSNs the Royal Navy has operated to date.

Astute is at the forefront of underwater warfare, combining the qualities of stealth, endurance, reach, speed, autonomy, flexibility and strike capability. These characteristics give the Astute Class unparalleled freedom of worldwide operations, including deep under ice, to support UK, NATO and coalition operations. Astute reflects the UK's investments in conventional forces that underpin the effective operation of the deterrent, support to carrier task group operations, anti-surface warfare, strategic intelligence collection and long-range precision strike. The UK's anti-submarine warfare and secure communications capabilities contribute to NATO's overall deterrence and defence posture.

The UK has four Astute Class submarines in service. The fifth, HMS Anson, is currently undertaking sea trials with the Royal Navy before joining operations. Completing the fleet, an additional two Astute Class submarines are under construction at the BAE Systems facility in Barrow-in-Furness.

SSN-AUKUS

SSN-AUKUS is a new class of nuclear-powered, conventionally armed attack submarine being developed in partnership with the US and Australia for the Royal Navy and Royal Australian Navy.

[...]

We are investing a share of the ring-fenced £3 billion funding announced in the 2023 Integrated Review Refresh into new facilities with advanced manufacturing capabilities in Barrow and Raynesway. SSN-AUKUS will enable deeper information and technology sharing and closer integration of security and defence-related science and technology, including propulsion plant systems, common vertical launch systems and conventional weapons from the US. They will be operational from the late 2030s, replacing the current Astute Class.

[...]

Part Three: Missiles and warheads

One of the DNE's core responsibilities is to ensure the UK maintains a safe, secure and reliable warhead stockpile.

Alongside this, our close partnership with the US provides the UK with access to the Trident II D5 missile stockpile. The missiles are fitted with a sovereign UK nuclear warhead. The UK and the US work together on nuclear matters through the Mutual Defense Agreement and the Polaris Sales Agreement.

Our capability is maintained by AWE's 7,000 strong workforce, with a cohort of 3,500 scientists and engineers working with industrial, government and academic partners.

In 2023, the UK completed an update of its warhead, transitioning from the Mk4 to the Mk4A by replacing non-nuclear components. The Mk4 warheads are being disassembled and their component elements reused, recycled or safely disposed of.

AWE has commenced work on a sovereign replacement warhead, as part of an evolutionary cycle that ensures we have an in-service warhead that can be safely assured from design to disposal. The design needs to be developed to meet future threats, taking advantage of new technology and manufacturing processes.

Trident missile system

Fitted with the UK's sovereign warhead, the Trident missile has a range of thousands of miles, ensuring the credibility and effectiveness of our deterrent.

The Trident II D5 Strategic Weapon System is manufactured in the US. It comprises the missiles and supporting systems fitted on the submarine as well as training and shore support equipment.

Under the 1963 Polaris Sales Agreement, the UK accesses a shared missile pool. Missiles are loaded into our submarines in Kings Bay, Georgia, US. The UK-manufactured warheads are mated to the missiles at HMNB Clyde.

The Trident system is operated by both the Royal Navy and US Navy. This enables mutual assurance of performance and safety. It remains one of the most enduring and effective examples of a strategic partnership between the two nations.

[...]

Transforming AWE

Modernising our infrastructure is fundamental to providing the UK with a safe and secure warhead capability.

AWE manages some of the most sensitive materials and advanced technologies in nuclear. It has already undertaken some of the biggest projects in defence to upgrade its unique facilities. These include the High Explosive Fabrication Facility for explosives manufacture, the Leo small components manufacturing facility and the Phoenix conventional manufacturing facility for the production of advanced material components, driving innovation in both construction and science fields.

These new facilities provide modern, safe and secure manufacturing capability to support our warhead stockpile. They form part of the critical transformation of AWE's infrastructure that will deliver the current and next generation warheads, supporting the UK to become a world-leader in new nuclear technologies.

There will be significant investment in AWE's infrastructure in Aldermaston, including the Future Materials Campus (FMC). This programme will renew existing facilities for the manufacture and storage of nuclear materials, improve science and analysis capabilities, and invest in renewed capability for material recovery.

The multi-billion-pound programme of investment requires significant engagement of the wider industrial base to address specific manufacturing, delivery and assurance capability needs. The FMC will contribute to the UK's skills development, creating jobs in the local area and across the UK supply chain. This will drive innovation in both construction and science.

Replacement warhead

Replacing the UK's warhead will ensure the UK's deterrent remains cutting-edge, safe and effective.

The UK committed to replacing our sovereign warhead in parliament in February 2021. Using modern and innovative developments in science, engineering, manufacturing and production at AWE, we will ensure the UK maintains an effective deterrent for as long as required.

The Replacement Warhead Programme has been designated the A21/Mk7 (also known as Astraea). It is being delivered in parallel with the US W93/Mk7 warhead and each nation is developing a sovereign design.

This will be the first UK warhead developed in an era where we no longer test our weapons underground, upholding our voluntary moratorium on nuclear weapon test

explosions. This is possible because of the long history of technical expertise and extensive investment in UK modelling and simulation, supercomputing, materials science, shock and laser physics at AWE.

Replacing the UK warhead is a long-term programme, driving modernisation and construction at AWE, HMNB Clyde and the hydrodynamics facility at EPURE, in France.

Testing

In line with our commitment not to conduct nuclear weapon test explosions, the UK has developed capabilities in modelling and non-nuclear testing to ensure safety and efficacy are maintained.

We have developed unique and world-leading technology to validate the UK's warhead stockpile. The Orion laser helps our physicists and scientists research the physics of those extreme temperatures and pressures found in a nuclear explosion to better understand the safety, reliability and performance of nuclear warheads. Orion is used collaboratively with UK academia and US teams in their National Laboratories.

Supercomputing is also a crucial capability, enabling simulations that allow us to develop a safe, assured warhead without detonation. AWE has recently commissioned a supercomputer named Valiant, one of the most powerful computers in the UK, to validate the design, performance and reliability of our nuclear warhead.

These facilities will be used to bring our next warhead into service, upholding our voluntary moratorium on nuclear weapons test explosions.

[...]

Part Four: Safety and security

The DNE's responsibilities span beyond the design, construction, and maintenance of our capabilities and cover the entirety of the nuclear lifecycle, encompassing our liabilities and the safe management and disposal of our assets.

We work with industry, our arm's length bodies, and regulators to uphold the highest levels of safety and security for our people, capabilities, technology (including nuclear materials), facilities and information.

Our extensive threat reduction programmes protect the environment and maintain our international commitments to the safe management of our nuclear materials.

Our engagement with our international partners underpins our ability to guarantee nuclear security. Our responsibilities extend to joint programmes with the US, France and Australia, and our nuclear deterrence commitments with NATO sit alongside our international commitments on nuclear security and non-proliferation.

These agreements and obligations are essential to ensuring our national security while guaranteeing the security and cooperation of our allies.

[...]