



Ministry
of Defence

The UK's nuclear deterrent:

A National Endeavour



The UK's nuclear deterrent: **A National Endeavour**

Contents

Our mission.....	4
The UK's Nuclear Deterrent.....	6
A new era of threat.....	8
The UK's nuclear deterrence policy.....	10
Our nuclear deterrent triple-lock.....	11
Our work.....	12
DNE: Scale and economic impact.....	16
DNE: Key sites.....	17
Our people.....	18
Our international partnerships.....	20
A world without nuclear weapons.....	22

Our mission



As the 2025 Strategic Defence Review (SDR) made clear, a modernised nuclear deterrent will remain **the cornerstone of the UK's defence**, and our commitment to NATO and global security – deterring the most extreme threats we and our NATO Allies face. Our nuclear deterrent '**triple-lock**' (see page 11) will safeguard our nation for generations to come, keeping Britain **secure at home and strong abroad**, its credibility underpinned by continued strong levels of public and cross-parliamentary support.

Through this new guide, the government wishes to support Parliamentarians and other interested parties to obtain a general understanding of **the UK's approach to nuclear deterrence** and the work of our Defence Nuclear Enterprise (DNE). ▶



Defence Nuclear
Organisation

- For over 50 years, the UK's fleet of nuclear-armed ballistic missile submarines (SSBNs) have covertly patrolled the seas, keeping us and our Allies safe. Since April 1969, **generations of Royal Navy submariners** have upheld this crucial mission.

The work required to maintain and renew our nuclear deterrent is a truly national endeavour of unprecedented scale. The Defence Nuclear Enterprise **supports an estimated 47,600 jobs across the UK** with an anticipated workforce demand of **around 65,000 by 2030**. It has a supply chain of around 3,000 companies – all working to deliver complex and technologically advanced programmes. The DNE plays a key role as **a generator of growth, jobs and skills** in all parts of the country.

We are meeting the SDR's call for **sustained investment** across the DNE and in the UK's alliances, skills, and industrial base. We are **unequivocal in our resolve** to deliver the next generation of defence nuclear capabilities needed to protect our people, our Allies, and our way of life.

Deliver nuclear capabilities, deter the threat, protect the nation.



The UK's Nuclear Deterrent ▶

The UK's nuclear weapons programme originated **during WW2**, and in 1956 the UK's first operational nuclear weapon – the Blue Danube – was carried by RAF V-bombers. Our last air-launched nuclear weapon – the WE177 – entered service in 1966 and was withdrawn in 1998.

Since then, our submarine-launched Trident missiles, armed with UK sovereign-designed warheads, have been our **single nuclear delivery system**.

Resolution 1968-1996



The Resolution Class commenced operational patrol in 1968, taking over provision of the UK's nuclear deterrent from RAF V Bombers.

It was 130m in length, carrying a crew of 150.

Vanguard

1994-present



The current platform for the UK nuclear deterrent, the Vanguard Class entered service in 1994.

With a maximum submerged speed of over 25 knots, and armed with Trident II D5 missiles, this class is 150m in length and carries a crew of 135.

Dreadnought

2030s



The Dreadnought Class will enter service in the 2030s, replacing Vanguard as our nuclear deterrent platform.

The largest ever Royal Navy submarines at over 150m long, they will be capable of launching Trident II D5 missiles, and will carry a crew of 130.

A new era of threat ►

As the SDR made clear, the threats that the UK and our NATO Allies face are increasing in scale, complexity, and diversity. In an evolving, and deteriorating, global security environment our nuclear deterrent has **never been more important**.

Other nuclear-armed states continue to modernise, increase, and diversify their arsenals. They are investing heavily in the development of new nuclear technologies and capabilities. The UK must show **it can and will defend itself and its Allies** in all circumstances, even the most extreme.

In response to this new era of threat, the UK is undergoing a **major renewal programme**. In doing so, we are re-prioritising the UK's defence nuclear enterprise in a way not seen since the end of the Cold War. The decisions that we are taking, and the investments that we are making, to sustain our nuclear deterrent are necessary and in response to the evolving global security environment and the actions of others.

We do not face these challenges alone. Government works in **close partnership** with UK industry, academia and our Allies to tackle the scale of activity required together. Our engagement with our international partners, including joint programmes with the US, France and Australia, underpin our ability to guarantee security and uphold our international commitments.

P5 Nuclear Weapon States



Russia has become increasingly aggressive, undermining international standards of cooperation and using irresponsible nuclear rhetoric. It is investing heavily in modernising its nuclear forces and expanding its novel and disruptive dual-capable weapon systems – meaning these can be armed with both conventional and nuclear warheads – and has used these systems in Ukraine. Russia currently has over 4,000 nuclear warheads available for use. It can deliver nuclear weapons to long ranges from its strategic ‘nuclear triad’, and to shorter ranges from a range of land, sea and air-based platforms.



China has continued to take a more assertive role on the international stage, notably with its dangerous and destabilising activity in the South China Sea and the Taiwan Strait. China currently has land, air and sea-based delivery systems and around 600 nuclear warheads. It is undergoing an unprecedented programme of rapid nuclear expansion, investing in new delivery systems and significantly increasing its nuclear arsenal. It is anticipated that China will more than double the number of nuclear warheads it possesses by 2035.

Other States



Iran’s escalatory nuclear programme brought them closer to the production of weapons grade material.



DPRK continues to develop its nuclear weapons programme, particularly longer-range missiles. It is the only state to have detonated nuclear weapons in the 21st century.



The UK's nuclear deterrence policy ▶

An **independent, minimum, credible nuclear deterrent**, assigned to the defence of NATO, is essential to guarantee our security. In an uncertain and contested world, the purpose of the UK's nuclear deterrent remains constant: to preserve peace, prevent coercion, and deter aggression.

By providing a **credible and effective** response to extreme aggression, potential adversaries know that the costs of attacking the UK would far outweigh any benefit that they could hope to achieve.

To achieve this, the UK maintains maintains a **fleet of four SSBNs**, stationed at HMNB Clyde. Deterrence patrols are conducted by elite crews of submariners, who undergo extensive training for the unique demands of their role.

They are supported by a range of **Royal Navy Capabilities**, such as our Astute Class submarines. These nuclear-powered conventionally-armed attack submarines protect our SSBNs while also carrying out a variety of defence and intelligence tasks.

The UK's nuclear weapons **deter and prevent** the most extreme acts of aggression and coercion that cannot be countered by other means.

The UK will only maintain the **minimum amount of destructive power** needed to guarantee that our deterrent remains credible and effective to deter the full range of state nuclear threats.

We maintain **deliberate ambiguity** about precisely when, how, and at what scale we would contemplate the use of our nuclear weapons. We do state clearly that we would only consider using our nuclear weapons in extreme circumstances of self-defence, including the defence of our NATO Allies. ▶



► Since 1962 the UK has declared our nuclear capability **to the defence of NATO**. Nuclear deterrence is at the core of NATO's defensive posture, and for as long as nuclear weapons exist, NATO will remain a nuclear alliance. The UK deterrent plays a key part in Alliance security alongside the strategic nuclear forces of the US and France, but remains **fully operationally independent**. Only the Prime Minister can authorise the use of our nuclear weapons.

NATO's nuclear posture is supported by dual-capable aircraft (DCA) capability contributed by several member countries. In June 2025, the UK announced a decision to purchase at least 12 F-35A jets and **commit these to NATO's Nuclear Mission**, delivering on the SDR's recommendation (see page 21).

Our nuclear deterrent **triple-lock** ►

We are **unwavering in our commitment** to our nuclear deterrent and modernising the UK's nuclear forces. The government's 'triple-lock' will see us:

1 Build four new nuclear submarines in Barrow-in-Furness

2 Maintain Continuous At Sea Deterrence (CASD)

3 Deliver all future upgrades needed



Defence Nuclear
Organisation

Our work

Headed by the civilian Chief of Defence Nuclear (CDN) and the First Sea Lord of the Royal Navy (1SL), the UK's Defence Nuclear Enterprise (DNE) is the partnership of organisations that **operate, maintain, renew and sustain** the UK's nuclear deterrent.

The DNE is responsible for hundreds of projects of differing scope, scale and specialism. This includes two **submarine build programmes** (with a further one in design), the **replacement warhead programme**, and a new **nuclear fuels programme**. We are supporting all this with major advanced manufacturing, capability and infrastructure upgrades across our sites and Naval bases. ▶



- ▶ Central to the overall programme to renew the UK's nuclear deterrent is the work to replace our Vanguard Class submarines with four new **Dreadnought Class** submarines from the early 2030s. Designed and built in the UK, these will be some of the **most advanced machines ever built**, employing world-leading and cutting-edge technology to deliver a formidable capability.

The DNE's activity incorporates submarine construction at **BAE Systems** in Barrow-in-Furness, submarine maintenance at **Babcock** in Devonport, and nuclear reactor development at **Rolls-Royce** in Derby. Warhead design and manufacture is carried out at **AWE Nuclear Security Technologies** in Berkshire. **Sheffield Forgemasters** produces specialist steels for our defence nuclear programmes.



The SDR made clear the need for **sustained investment** across the DNE. As part of the renewal programme, we are:

Investing **£15bn** this Parliament in our sovereign warhead programme, supporting over 9,000 jobs. This includes delivering our replacement warhead programme: **Astraea**.

Completing the Astute Class programme of nuclear-powered, conventionally-armed attack submarines (SSN), and working on the next generation successor capability – **SSN-AUKUS** – growing our SSN fleet to up to 12.

On track for final disposal of **HMS SWIFTSURE** in 2026, using a world-first approach to the complete dismantling of a nuclear-powered submarine, enabling **around 90%** of its structure and components to be reused or recycled.

Delivering the next generation of UK SSBNs through the **Dreadnought Class programme**.

Recapitalising critical elements of our infrastructure, **modernising** our naval bases and manufacturing processes, and **expanding** our capabilities in order to deliver the increase in submarine production rate announced in the SDR.

Helping to secure **UK energy security and resilience**, by working across government to co-ordinate investment and more closely collaborate with the **civil nuclear sector**.

SSBN – Dreadnought

Our next generation of nuclear deterrence patrol submarines



Delivered through the **Dreadnought Alliance** – a partnership between MoD, BAE Systems and Rolls-Royce



Will support **over 30,000 UK jobs** at its peak



The **largest** engineering project in the UK



Replacement Warhead – Astraea

Ensuring that the UK maintains a safe, secure, and reliable warhead stockpile



Innovative capabilities in modelling and **non-nuclear testing** enable us to uphold our commitment not to conduct nuclear weapon test detonations



Will **replace the Mk4a**, retaining compatibility with Trident II D5 missiles



Around **£1bn** of projected spend on R&D over the next decade



SSN-AUKUS

The replacement class for Astute: nuclear-powered and conventionally armed attack submarines



Developed in partnership with the US and Australia through **AUKUS**



Will support **21,000 jobs** across the UK



Operational by the **late 2030s**





The Defence Nuclear Enterprise:

Scale and economic impact ▶

The scale and complexity of the DNE portfolio is unique across government. Delivering this **unprecedented National Endeavour** is vital to our long-term security and prosperity, and requires the combined efforts of tens of thousands of people right across the country.

It is an engine for jobs and growth, and through its essential programmes the DNE generates **significant economic benefit** and **opportunity** for the UK economy. It drives growth by expanding investment and jobs in key locations, particularly the North West and South West of England, and West of Scotland.

On average, an individual working in the defence nuclear sector earns **a wage premium of approximately 20% above the national average wage**.^{*} This DNE wage premium reflects the often **highly specialist and in-demand** nature of the work.

Regional and local investment such as the £200m Barrow Transformation Fund provides support for **regeneration** and **sustainability**, bringing

benefits to the wider communities based around key DNE sites, many of which are located in areas of relative deprivation.

The footprint of the DNE spans all regions of Great Britain and supports **a supply chain of over 3,000 small, medium and large businesses**. Our industrial base not only plays a vital role in our national security, but highlights the prowess of **British industry, innovation, science** and **engineering**.

We also work in close partnership with academia. With **multi-billion-pound spending on Research and Development** planned over the next decade, the DNE will remain at the forefront of emerging and advanced technology.

These investments will have synergies with the **civil nuclear sector**, supporting the Clean Power Mission, and where appropriate we will look for opportunities for additional alignment – particularly on skills and the supply chain.

DNE: Key sites



700



Sheffield Forgemasters

Produces large scale high-integrity castings and forgings from specialist steels used for submarine reactor cores

4,000



Rolls-Royce Submarines

Main construction and development site for our submarines' nuclear reactor cores

2,500



Submarine Delivery Group

Management of our submarine programmes



Navy Command HQ

The strategic command HQ of the Royal Navy

8,000



HMNB Devonport

Submarine maintenance, refuelling and overhaul site, including storage and disposal of our out-of-service fleet

Vulcan Nuclear Test Establishment

Test facility for Pressurised Water Reactors
Site being decommissioned

250



Rosyth Dockyard - Babcock Intl.

Alongside Devonport, Rosyth dismantles and decommissions out-of-service submarines

850



HMNB Clyde

Home to the Submarine Service, including the SSBN operational base, and MOD's Submarine Centre of Excellence

5,000



BAE Systems

The build site for all the UK's nuclear-powered submarines, including the future SSN-A build

13,500



Northwood

Maritime operational command



Ministry of Defence Main Building

Home of the Defence Nuclear Organisation, overseeing the Defence Nuclear Enterprise

500



AWE Nuclear Security Technologies

Designs, manufactures, maintains, and disposes of nuclear warheads

7,000



Epure (Valduc, France)

A joint UK-France hydrodynamics facility through TEUTATES

50



Our people ▶



Our people are our **most important asset**, and our continued advantage over potential adversaries depends on their dedication, skill and ingenuity. The DNE offers high quality, specialist, skilled employment – supporting an estimated **47,600 jobs** with an anticipated workforce demand of around **65,000 by 2030**.

As well as the deep nuclear subject matter expertise of our scientists and engineers, the DNE is highly dependant on **skilled trades**, such as welders, electricians, and mechanical fitters.

To ensure that we have the **nuclear skills** necessary to support national security and the demand for energy resilience, the DNE and industry partners, in collaboration with the civil nuclear sector and education providers, is rapidly expanding **training and development** opportunities. Through the National Nuclear Strategic Plan for Skills, we are aiming to double defence nuclear apprentice and graduate intakes, creating **22,000 apprenticeships** and **9,000 graduate roles** over the next ten years. ▶

► **Submariners** are some of the Royal Navy's most exceptional personnel; responsible for highly classified, stealthy and elite operational and deterrent patrols. Roles range from engineers, who maintain and operate the naval reactor plant and weapons systems, to those that command and operate the submarine, to those focused on logistics, medical and catering. These roles are complemented by the security capability provided by the **Royal Marines**.

Life onboard is **unique and demanding**. There is no internet access or natural light, and submariners can only receive a very short message each week from loved ones, with no facility to reply.

We are investing significantly in **developing our submarine force**, providing state-of-the-art facilities, the most up-to-date and realistic simulators, and upgrading work and living spaces. We are also making changes to improve **support for submariners and their families**: increasing healthcare resources, access to respite, and working with stakeholders to reduce time spent in maintenance periods and the length of patrols.

The Royal Navy offers a range of **in-service qualifications**, alongside opportunities to develop technical, leadership and command skills. Opportunities are also available for submariners to work with DNE organisations and industry in non-operational roles, opening up possibilities to further their **careers in nuclear outside of Service**.



Our international partnerships ►

Our security is enhanced by our partnerships with our Allies.



The **US** is our closest Ally, and we maintain a strong and long-lasting relationship on nuclear issues, underpinned by the 1958 Mutual Defense Agreement (MDA) and the 1963 Polaris Sales Agreement. The MDA enables cooperation between the US and UK on atomic energy for mutual defence purposes, including the exchange of nuclear materials, technology and information as well as the transfer of non-nuclear components.



We maintain a high level of nuclear cooperation with **France**. Building on the 1995 Chequers Declaration and the 2010 Lancaster House Treaties, the 2025 Northwood Declaration set out proposals to deepen our commitment, stating: “our nuclear forces are independent, but can be coordinated.” This greater cooperation across nuclear policy, capabilities and operations will enhance mutual understanding of our nuclear deterrence policies, strengthen our ability to make coordinated decisions, and expand our research collaboration.



The AUKUS partnership between the UK, US and **Australia** is supporting more unified defence and industrial collaboration, better information technology sharing, and greater resilience. It will develop joint capabilities, including the nuclear-powered and conventionally-armed SSN-AUKUS attack submarines to be deployed by UK and Australia, and help develop Australia's industrial base while generating multi-billion pound investment into UK industry.



The UK is committed to building understanding and expertise on nuclear issues within **NATO**.

NATO's Nuclear Mission: DCA

1 A number of NATO countries contribute DCA to the Alliance.

2 In their nuclear role, DCA are equipped to carry nuclear weapons in a conflict.

3 UK F-35A jets will be flown by UK pilots. In a crisis, these could carry US nuclear weapons, which would remain under US control.



We will work with Allies to ensure that NATO's nuclear deterrent capabilities remain safe, secure and effective. This includes ensuring coherence between the Alliance's nuclear and conventional policies and developing the capabilities needed for the future.

In addition to the strategic nuclear forces of the US and the UK that are declared to NATO, and those of France, NATO's nuclear deterrence also relies on US nuclear weapons deployed in Europe and supporting capabilities and infrastructure provided by Allies. To further strengthen our commitment and contribution to NATO, as recommended by the SDR, the UK is purchasing at least 12 F-35A dual-capable aircraft (DCA). The new jets, based at RAF Marham, will be available to fly NATO's Nuclear Mission.

The UK has always supported NATO's Nuclear Mission through the provision of conventional capabilities and resources. This decision reintroduces a nuclear role for the RAF for the first time since the UK retired its sovereign air-launched nuclear weapons after the Cold War. This commitment is an embodiment of the UK's 'NATO First' approach and **will complement – but is separate from – our independent nuclear deterrent.**

A world without nuclear weapons ►

We are committed to a world without nuclear weapons as soon as possible: **disarmament is a core part of our deterrence policy**. We take our responsibilities as a nuclear weapons state seriously, and are fully committed to our international treaty obligations under, and the full implementation of, the Treaty on the Non-Proliferation of Nuclear Weapons (NPT). ►

Maintaining and renewing our nuclear deterrent is fully consistent with, and does not diminish, the UK's commitment to **our long-term goal of a world without nuclear weapons**.

As a nuclear-weapon state (NWS) that supports the international rules-based system, the UK is working for the **preservation and strengthening of effective arms control**, disarmament, and non-proliferation measures – a position reinforced by the SDR.

However, the security environment is extremely challenging, and the UK will maintain our nuclear deterrent for as long as it is required.

The UK has taken a **consistent and leading approach** to disarmament, but the steps that we have taken in recent decades have not led others to follow suit. We are the only NWS to operate a single sovereign delivery system, and our stockpile remains the smallest of any NWS.

We will continue to work constructively towards eventual disarmament, and believe this will be best achieved through the framework of the NPT in a step-by-step, transparent, verifiable, and irreversible manner, with **undiminished security for all**.





Defence Nuclear Organisation

This booklet has been produced by the **Defence Nuclear Organisation** and is intended as a summary guide, not a comprehensive statement of all UK defence nuclear policy and programmes. All information and statements of policy are correct as at the date of publication (July 2025). The UK keeps its nuclear posture and policy under constant review in light of the international security environment and the actions of potential adversaries.