

Overcoming obstacles to changing Britain's nuclear posture

The Myth of invulnerability

Abstract concepts of deterrence theory can be somewhat different from the practical steps that are taken to prepare nuclear forces to attack specific targets. One example of this is the Soviet Union's development of road and rail mobile ICBMs and America's response. Initially the US encouraged the Soviet Union to build these new weapons because they would be less vulnerable and so promote stable deterrence. But for the warfighter in US Strategic Command (STRATCOM) these mobile missiles are targets that they want to be able to destroy.¹ Over the last two decades the capabilities of US and British nuclear forces have been transformed. In the past they were targeted by cumbersome inflexible plans. Today STRATCOM uses sophisticated computer systems to rapidly retarget Trident missiles and land-based ICBMs in minutes.² One of the prime drivers behind this upgrade has been the desire to be able to destroy Russian mobile ICBMs.

Another example of what the quest for invulnerability really means was the development of the Trident D5 with the W88 warhead. This missile/warhead combination was specifically designed to destroy "invulnerable" Soviet SS-18s in reinforced silos.³ A further case is the relationship between the deployment of nuclear-weapons on submarines and the growth of Anti Submarine Warfare. Polaris and its Russian counterparts were to a large extent responsible for the mushrooming of ASW capabilities on both sides in the Cold War. If Russian claims are correct then US submarines, and possibly British ones, are still patrolling the Barents Sea today - listening for any Russian submarine movements. The US Navy's desire to find out more about the latest Chinese submarines resulted in a confrontation on the high seas in early March 2009 between the US surveillance ship Impeccable and small boats from China.

What does this the issue of maintaining "stable deterrence" through invulnerability really mean for Britain? To the extent that British nuclear forces are a small annex to the US arsenal, it is of little significance whether or not the British element is vulnerable. And if we are considering other potential threats what are we really saying? Is it desirable that Iran and North Korea have invulnerable nuclear forces? Should Israel develop nuclear-armed submarines? Or is it rather a question of our forces must be invulnerable – but yours shouldn't be?

If we look to the dangerous balance between India and Pakistan, are we really saying that both sides should develop more sophisticated and invulnerable forces? If they were to go down this road it would become even more difficult for them to move towards disarmament. The journey to the abolition of nuclear weapons requires an acceptance of risk and vulnerability. While there may be some danger in disarming – there is an even greater danger if two sides remained armed to the teeth with nuclear weapons indefinitely.

¹ Minutes of Strategic Advisory Group Policy Subcommittee 11 January 1996 – "The group again agreed that mobile strategic system are inherently stable ... From the US perspective, we want the Russians to abandon their mobile ICBM programs because as warfighters we find them difficult (and expensive) to counter The group reached consensus that USSTRATCOM, as the warfighter, should continue to pursue methods of countering strategic mobiles". Obtained under FOIA by Hans Kristensen.

² The Rapid Execution and Combat Targetting (REACT) system for ICBMs entered service in 1995. The Trident SLBM Retargeting System (SRS) was completed in 2003. The new hardware and software has also been introduced into the British Trident system.

³ Joint DoD/DoE Trident Mk4/Mk5 Reentry Body Alternate Warhead Phase 2 Feasibility Study Report, January 1994 Page 9-24.

Gordon Brown has said that he wants Britain to play a leading role in promoting nuclear disarmament. I don't think this can be achieved by encouraging everyone else to have sophisticated long-range nuclear weapons deployed constantly at sea. On the contrary, if Britain is able to show that it is possible for a Nuclear Weapon State to accept the small risks involved in de-alerting then this will be an important example to others.

One of the basic arguments used to justify keeping submarines at sea is that re-alerting in a crisis could make matters worse. Does this then mean that Britain can never give up constant patrols? Are we trapped for ever on this roundabout of Continuous At Sea Deterrence – unable to step off because it is too risky?

Re-alerting in a crisis might be dangerous – but it could also defuse a precarious stand off by showing intent. In US nuclear planning there is a name for this. “Flexible Deterrent Options” are adjustments that are made to the nuclear posture to show intent, short of actually dropping bombs or launching missiles. A Flexible Deterrent Option is a show of force that is designed to demonstrate a credible and specific threat to an opponent.⁴ Moving additional US Trident submarines onto patrol is one form of Flexible Deterrent Option.

Policy, posture and facilities

In the United States there is currently a major review of the future of their nuclear weapons. There have been calls in Congress for the decisions to be made in a logical order. The new administration first has to establish their basic nuclear weapons policy – what the weapons are for – then what posture is needed to fulfil that policy – what type of weapons are needed and how they are deployed - and finally what facilities are needed to implement the posture.⁵ There is a great danger that the decision-making process, on both sides of the Atlantic, works the other way round. Plans are made for the factories that build nuclear weapons and the dockyards that assemble nuclear submarines – this determines the type of forces to be deployed – and then a suitable policy is drafted to rationalise this posture.

An example of this is the current plan to replace the Trident submarine, missile and warhead.⁶ The main driver behind the replacement the Vanguard class submarine is the need to maintain a steady production line at Barrow in Furness.⁷

The White Paper in December 2006 presented a rationale for keeping nuclear weapons until 2055 and a study of possible systems that might be deployed.⁸ But there was no attempt to link the rationale and the force options.

For example, if the concern is that a state might supply nuclear weapons to a terrorist group, is Trident the most suitable nuclear weapon system to deploy? If there is a long-term concern about

⁴ www.globalsecurity.org/military/ops/fdo.htm

⁵ A congressional review is due to be published in April 2009. The new White House Administration is due to carry out a nuclear policy review in 2009 and a nuclear posture review in 2010.

⁶ A speech made by David Gould, Chief Operating Officer at Defence Equipment and Support, at Abbey Wood in June 2007 revealed that the plan was to replace the whole system “including the missile and warhead”. This phrase had been redacted from the copy of the speech which was released to Scottish CND. It was disclosed following an internal review under the Freedom of Information Act.

⁷ A study by RAND into the future of the British nuclear submarine production infrastructure was critical for this.

⁸ The Future of the United Kingdom's Nuclear Deterrent, MoD and FCO, Cm 6994, December 2006.

Iran and South Korea, why do we need to keep Trident on patrol every day until we find out if this threat ever materialises ?

The published sections of the Duff-Mason report show that Trident was designed exclusively for dealing with a threat from the Soviet Union.⁹ The posture of having a large number of nuclear warheads on a submarine at sea was recommended with the Soviet Union specifically in mind. The 2006 White Paper did not present any detailed analysis of how this posture relates to the other potential threats which are suggested.

NATO nuclear aircraft

Today there are two types of nuclear weapons assigned to NATO. One is the British Trident force. The second is Dual Capable Aircraft deployed by several nations. These can use both conventional weapons and the B61 nuclear bomb. There are around 350 B61s deployed at 7 airbases across Europe. Some B61s are allocated to aircraft from 5 European airforces. All are kept under US control in peacetime.

Like Trident, these aircraft were deployed in order to respond to a potential Soviet threat. Unlike Trident, the alert status of the aircraft has been substantially reduced since the end of the Cold War. In 1984 around 5% of the aircraft were on minutes notice and the remainder on hours or days notice. In 1989 the entire force was reduced to hours and days notice. In 1999 half of the force was on weeks notice and the other half on months notice. In 2002 the whole force was reduced to months notice.¹⁰ If NATO's nuclear-armed aircraft can be reduced to an alert status measured in months – then why not Trident ?

~~US European Command are agnostic about whether nuclear weapons in Europe are needed.~~¹¹ The lowered alert state reflects the assessment that there is no identifiable military role for the B61s. A ~~recent US Defence Department report asserts that their role is political.~~ They are retained as a symbol of the US commitment to Europe and as possible bargaining chips in future negotiations to reduce the number of Russian tactical nuclear weapons.

An honest analysis of the role of British nuclear weapons might come to a similar conclusion. There is a political attachment to these weapons which makes them hard to relinquish, but the talk of future deterrence roles lacks any coherent military substance.

⁹ "Our existing strategic nuclear force has the unique purpose of deterring the Soviet Union the Soviet Union is the only state which may pose a threat to the United Kingdom" Factors Relating to Further Consideration of the United Kingdom Nuclear Deterrent, Part 1 the Politico-Military requirement, Annex The Politico-Strategic Background. December 1978. The National Archive DEFE 25-325

¹⁰ NATO's Nuclear Forces in the New Security Environment. NATO issues. 3 June 2004. www.nato.int

¹¹ A senior leader in USEUCOM said "We pay a king's ransom for these things ... and they have no military value". USEUCOM argue that nuclear weapons based in the US are just as credible and there is no need to deploy them in Europe. Report of the Secretary of Defence Task Force on DoD Nuclear Weapons Management, Phase II: Review of the DoD Nuclear Mission. December 2008.

Three alert options

Lord Guthrie of Craigiebank, who was Chief of Defence Staff from 1997 to 2001, said in the House of Lords on 26 March:

“Although I do not think the time is right to abandon nuclear weapons, we should seriously examine the number of submarines that we have and whether we always need to have one boat at sea”¹²

A submarine-based nuclear weapon system could be maintained at a wide range of possible alert states. There are three main options that can be considered:

1. Current Alert State

Today HMS Vengeance is on patrol, at an alert status of several days.¹³ The MoD can increase the alert state, either openly or covertly, to 15 minutes notice to fire. This 15-minute alert state could be maintained throughout an 11 week patrol.

2. End constant patrols

(a) It would be possible to stop continuous patrols and instead conduct occasional patrols. An example of this is the Russian practice since the end of the Cold War. SSBN in the Northern Fleet have conducted irregular rather than continuous patrols. In 2007 they sent several submarines on patrol at the same time for a short period. The number of Russian patrols increased in 2008, but it is not yet clear if they have restored continuous patrols.¹⁴

(b) The submarines could end all patrols, only sailing on training and exercises. In 1978, 28 Polaris missiles were allocated to NATO but normally only one submarine, with 16 missiles, was at sea. This second submarine was at 24 hours notice to fire missiles from its berth and 47 hours notice to take to sea. If continuous patrols were ended then they could be replaced by having a Trident submarine at 24 hours notice to launch from the berth and 47 hours notice to sail.

3. Not armed

It would be possible to take a step further and remove the missiles and warheads from all submarines. When the nuclear weapon store at Coulport was designed the MoD planned to arm each Trident submarine with around 96 warheads each.¹⁵ The magazine can probably hold over 100 warheads. It may be able to take the entire current operational stockpile of 160 warheads. If not then it would be necessary to either expand the store or to dismantle a few warheads.

Within Coulport there are 16 bunkers each of which can take one Trident missile. This is not enough to hold all the missiles currently deployed. But 16 bunkers would be sufficient to arm 2 submarines with 8 missiles each. These 8 missiles could carry the current total of up to 48 nuclear warheads per

¹² Hansard House of Lords 26 March 2009.

¹³ With HMS Vanguard under repair following its collision with Le Triomphant and HMS Victorious carrying out post-refit trials, HMS Vengeance was the only operationally available Trident submarine in March 2009.

¹⁴ Russian Strategic Submarine Patrols Rebound, Hans Kristensen, Federation of American Scientists, 17 February 2009. www.fas.org/blogs/ssp/

¹⁵ When it was under construction the Trident warhead storage facility at Coulport was called the Reentry Body Magazine (RBM).

submarine. If Trident was put back on alert then additional missiles could be uplifted from Kings Bay before a third submarine was operational.

Loading missiles and warheads takes place in the Explosives Handling Jetty at Coulport. It is a slow process. It would take several days to load 8 missiles then perhaps one week to load 48 warheads. In an emergency the operation could probably be carried out more quickly.

There are two possible forms of re-alerting – either putting one submarine to sea, possibly with a limited number of missiles and nuclear warheads, in response to a particular scenario, or alternatively restoring continuous patrols. The former would be far easier to achieve.

Implications of a reduced alert status

Safety

The collision between HMS Vanguard and Le Triomphant on 3/4 February illustrated one of the risks of keeping submarines on patrol. There are a range of accidents that can and do happen. Since 2000 four British nuclear submarines have ran aground.¹⁶ HMS Tireless suffered reactor damage in the Mediterranean in 2000, ran into an iceberg in 2003 and then two of its crew were killed in an explosion in 2007.

In 1989 cracks were found in the cooling circuit of the reactor of HMS Warspite during a refit. The Navy soon realised that this was a generic problem affecting all British nuclear submarines. The SSNs were all recalled to port until repairs were carried out. The defect also affected Polaris. Alan Clark's diaries revealed that the issue of keeping Polaris at sea was raised with Prime Minister Margaret Thatcher. The decision was made to keep one submarine on patrol. Faslane Peace Camp kept a close eye on submarine movements over the following year. Polaris and Trident patrols normally take 10 – 11 weeks.¹⁷ In 1990 and 1991 HMS Resolution was sent out on two long patrols, each of 16 weeks. In May 1991 HMS Revenge was sent out on a 16 day patrol, while the crew of HMS Resolution was changed over. There are strong grounds to suspect that HMS Revenge was not in a fit state to be sent out to sea.¹⁷

Removing the pressure to keep one submarine on patrol at all times should reduce the risk of a nuclear submarine accident.

In 1990 Dr Sidney Drell produced a report for Congress on the safety of US nuclear weapons. This pointed out that the Trident system was potentially dangerous because the nuclear warheads are arranged in a circle around the third stage of the missile. (Three years later a further report was written by John Harvey, now head of policy in the US nuclear weapons establishment, NNSA, and Stephan Michalowski, now senior scientist at OECD.¹⁸) They pointed out that fragments from the detonation of the third stage of a Trident could potentially cause a nuclear explosion. 15 years later

¹⁶ HMS Triumph hit the edge of the continental shelf on 19 November 2000. HMS Victorious ran aground on Skelmorlie Bank in the Clyde estuary on 29 November 2000. HMS Trafalgar ran aground on Fladda-Chuain, North of Skye, on 6 November 2002. HMS Superb hit an underwater rock in the Red Sea on 26 May 2008.

¹⁷ Cracking Under Pressure: the response to defects on British nuclear-powered submarines, Scottish CND and Faslane Peace Camp 1992.

¹⁸ Nuclear Weapons Safety: The Case of Trident. John R Harvey & Stefan Michalowski. Science & Global Security 1994, Volume 4 pp 261-337

keeping 1 sub on patrol can mean

Controlled patrols near base at least 2 op sent - who? there is risk only 1? not fully to

One control sub - do not send sub to sea unless not fully to

Michalowski said: "the explosion of a boatload of missiles in a port would be an unimaginable catastrophe. It is a very, very scary thought".¹⁹

Removing the missiles and warheads from the submarines would ~~remove~~ ^{eliminate} the possibility of this kind of accident in peacetime. The missile bunkers at Coulport are designed to contain the detonation of a missile and the warheads store is located at a safe distance from the missile bunkers.

Re-arming the submarine with missiles and warheads would reintroduce this hazard – and loading them in a hurry would be particularly dangerous. But presumably in a crisis the MoD would argue that the increased risk would be justified.

Personnel

The Navy argue that continuous patrols create an ethos and high morale. This is only partly true. Serving on Trident patrols brings particular problems for the men involved. Many service personnel in the Army, Air Force and Navy serve for months on end away from home. But for most there are good links from their bases to their families. When not on duty they are able to communicate with partners and children by phone or internet. This is not the case with Trident submariners on patrol. They cannot send messages to their families and they can only receive short censored messages. News which is likely to cause a problem, for example a close bereavement, is deliberately withheld until the submarine returns to port. Ending continuous patrols would change the lives of those working in the Trident fleet and in many ways it would be a change for the better.

Keeping one submarine at sea at all times creates a high target for the personnel involved. Achieving that target can bring a sense of achievement, but it also brings costs. It distorts the prioritisation of work within the Navy and particularly within Faslane. Where society recognises that this is the first priority then the extra effort may be considered worthwhile. But in Britain in 2009 most people do not think that the first priority for the armed services is to keep a Trident submarine at sea.

On 1 March 2009 there were just under 1,000 personnel assigned to Trident submarines. This is equivalent to 142 in each of 7 crews.²⁰ There are significant shortages in two skill areas: Trident missile operators and nuclear watchkeepers. With regard to these two positions the Navy are in breach of their own Harmony guidelines on how much time servicemen can spend on operations in any one year.²¹

If Trident were taken off patrol then the number of personnel deployed could be reduced. However there would be a need to increase this if continuous patrols were restarted.

If one submarine was kept in a fully functioning state as a training vessel, this could quickly be put to sea for a limited nuclear deployment. Restoring continuous patrols would mean having a second submarine fully operational within less than 3 months. Patrols could be maintained for a short period with one crew on each of two operational submarines, but sustaining this posture would mean restoring the double-crewing arrangement in due course.

¹⁹ Nuclear Bombs Could Explode Like Popcorn, Rob Edwards, New Scientist, 25 June 2008.

²⁰ 114 officers and 883 ratings. Written Answer March 2009. The Fleet Bridge Card shows that in February 2009 there were only 6 captains in charge of Trident crews.

²¹ Written Answer by Bob Ainsworth 11 February 2009

A key issue would be training. The Trident Training Facility at Faslane has a full scale Trident missile fire control system. In addition the US Navy has developed PC computer programmes for training submariners. Some of these have been supplied to the Royal Navy. One is the Ship Control Simulator. This allows sailors to practice how to keep a submarine in trim when launching missiles. There is also a Trident Launcher Simulator. This was described by its manufacturers as being like a computer game for missile technicians. These programmes can be used not only for individual training but also for team training, with a group of PCs networked together.

An important further level of training is when the whole crew working together. Many routines and emergency drills can be practiced with the submarine moored at Faslane. There would be a need for sea training, but a significant amount could be carried out with a single Trident submarine.

SSN fleet

If continuous patrols were restored after a break, there would be a surge in the demand for trained submariners. One way of providing the manpower for Trident would be to borrow or steal key personnel from SSNs.

If we consider the submarine fleet as a whole then there are some skills unique to Trident, some unique to SSN, and many that are common to both. It is normal for submariners to move between Trident and SSN during their careers. So long as there is a significant SSN fleet there will be a pool of trained submariners with many of the skills required for Trident.

One area where the skills for Trident are unique is the missile system, however much of the missile training is done on simulators. The occasional test firing of missiles off Cape Canaveral need not be affected by taking Trident off patrol.

If continuous patrols were restored from a low alert state then this would impose two pressures on the SSN fleet:

- There would be demands to shift key personnel, particularly senior staff, from the SSN fleet to Trident in order to reintroduce double crewing.
- Secondly the SSN themselves would be needed to provide protection to Trident.

This is a problem, but is not insurmountable. Currently the SSN fleet carries out several tasks – Strategic Intelligence, Support to the Strategic Deterrent, Integrity of UK, Op Telic and Op Calash (Gulf) and Falkland Islands Contingency.²² If Trident was taken off patrol and put on a low state of alert, then SSN would be freer to carry out other functions. However if it was felt that the top priority was to restore Trident patrols, then some of the other tasks which are currently undertaken by SSN would have to be sacrificed.

This illustrates the real nature of the question of whether to retain continuous patrols. It is not an issue that can be considered in isolation from other military tasks. There is a need to decide on priorities and to assign resources accordingly. It is hard to understand why Trident is given the priority that it is today. If Trident submarines were not required to be on patrol they could assist with other roles, such as the “Integrity of UK” role currently assigned to SSN. They would be better suited for other functions if they were not kept nuclear-armed.

²² Written Answer by Bob Ainsworth 17 November 2008, Hansard

Protecting forces

A range of military units from the army, navy and air force have been allocated to protecting Polaris and Trident. In 1978 the Chiefs of Staff produced a report on the UK's ability to withstand a conventional attack from the Soviet Union. This identified a number of major shortcomings in the countries defences. One of these was a shortage of minesweepers. The report said:

“The Royal Navy’s mine countermeasures vessels would have as their first priority keeping open the approaches to the nuclear submarine base at Faslane; after this, insufficient resources would remain to deal adequately with the tasks of clearing cross channel routes and providing safe access to our major ports”²³

Prime Minister Jim Callaghan noted:

“after securing the approaches to the nuclear submarine base at Faslane, we had insufficient resources to clear the cross-Channel routes and to provide safe access to our major ports”²⁴

The table below shows the forces allocated to protecting Trident in 1998 and the smaller number assigned to this role in 2007.²⁵

	1998		2007	
	Committed	Contingent	Committed	Contingent
Minewarfare vessels	1	3	1	3
Destroyers & Frigates	1	2	0	1
Attack Submarines	2	1	0	2
Survey vessels (c)			1	0
Royal Fleet Auxiliary Vessels	1		0	1
RM Commando	0.5			
Merlin ASW Helicopters (c)			0	5
Maritime & Reconnaissance Aircraft	4	8	0	8
Infantry battalions		5		
Air Defence Aircraft		2		

Hull Life and Trident Replacement

In December 2006 Adam Ingram, the Armed Forces Minister, said that 13 of the Royal Navy's 44 warships were in a state of reduced readiness and it was planned to increase this to 21 in mothballs.²⁶ In 2005 the aircraft carrier HMS Invincible was placed in a reduced state of readiness for 5 years. It would be possible to adopt a similar approach to Trident. One of the four submarines could be mothballed. Usage of the other three would be lower than at present. The overall effect

²³ TNA PREM 16-1563 Response to the Soviet Threat to Targets in the UK, Chiefs of Staff 16 January 1978

²⁴ TNA PREM 16-1563 20 February 1978 Defence against the Soviet threat to the United Kingdom

²⁵ Strategic Defence Review July 1998, Task MT27 Nuclear Forces and Written Answer by Des Browne 8 March 2007.

²⁶ Website of Julian Lewis MP http://www.julianlewis.net/cuttings_detail.php?id=125

would be to extend the life of the Vanguard class by several years. The lower the state of alert of Trident, the longer the system could remain in service. This would postpone the need for replacement.

Advantages of changing posture

Advantages of ending continuous patrols

Verifiable reduced state of alert

Less of a potential threat

Setting an example

Cheaper: Require fewer crews
 Longer submarine life
 Postpone decision on replacement submarine

Further advantages of removing missiles/warheads

Remove peacetime risk of missile/warhead accident

Verification easier

With alert state of months -

 No increase in alert status of protecting forces

 Further savings from crews, submarine life & postponing replacement submarine

 Postpone decision on warhead replacement.

In a talk in 2007 Rear Admiral Matthews, Director General Submarines, said that until then the Navy had completed 350 patrols. He added that their long term plan was to complete 750 patrols.

Computer replace the word

How much notes →

→ of change in today's system to

→ threat when the new system has a credible attack

→ Whitehead & notes

Value of it →