

# **FORTRESS SCOTLAND**

**SCOTTISH CND**

**Published by Scottish CND, 15 Barrland Street Glasgow, G41 1QH  
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*www.banthebomb.org*  
September 2004**

## **ACKNOWLEDGEMENTS**

This report would not exist without the work of several people. James N. started the project in the summer of 2003 before leaving to begin postgraduate studies. The bulk of the report has been produced by Paul C. who spent many long hours searching the World Wide Web to track down information whilst patiently putting up with the pedantry of other Scottish CND activists.

Paul deserves the thanks of anybody who finds something of interest in this report as well as from everyone interested in promoting the cause of Peace in Scotland. Without his tremendous contribution, this report would not exist.

Carol A. designed the front cover whilst Lucy A. helped put together the maps. Allison H. painstakingly proof-read the final draft and the report was printed with the help of staff and volunteers in Scottish CND's office.

## **FORWARD**

The stag at bay. Glens and bens. Castles and ceilidhs. The familiar shortbread-tin images of Scotland are clichéd but effective symbols for a country where tourism is a major earner.

The bonnie, bonnie, banks of Loch Lomond are famed in song. But few who take the high road towards the "steep steep slopes of Ben Lomond", realise that among the traffic hazards they may face en route are convoys carrying nuclear bombs, which regularly share the same road. Or that they are a few miles from the biggest arsenal of nuclear bombs in Europe – Coulport, a short hike away over the moors to Loch Long.

Westering home through the heather-covered hills, our unsuspecting tourist will go through Glen Fruin, passing hills hollowed out to accommodate a huge NATO arsenal of what are laughingly called conventional weapons. Arriving at Gareloch, he or she will be struck by the horrendous sight of Faslane stretched out along the shore of the loch. This is Britain's nuclear submarine base. From here Trident boats sail out threatening unimaginable slaughter to vast numbers, maintaining a continuous round-the-clock patrol seven days a week, year in, year out.

All this can be seen on just one brief trip. But all of Scotland is in fact enmeshed with military bases and facilities. From Thurso in the north, to Dundrennan in the south, this beautiful land is marred and scarred by the works of the military. Ultra-low flying aircraft, live shelling, radioactive pollution, and environmental damage take their toll. The price Scotland pays for our Faustian bargain with the MoD is a degraded and abused land, polluted waters, and an economy heavily biased towards the military to the detriment of socially productive activities.

Perhaps the Scottish Tourist Board should take a more positive attitude towards the bases, and promote these as attractions. Bus tours round our nuclear arsenal; sailing "doon the watter" on a Trident submarine; bouncy castles in the bases – all that sort of thing. With miles and miles of weld-mesh fences and razor wire, armed guards and watch dogs Faslane and Coulport are not exactly "Granny's Hielan' Hame", more Brigadoom than Brigadoon, but what the heck.

Most Scots are blissfully unaware of the extent to which their land is occupied and abused by the military, and there has long been a great need for public education on this matter. This pamphlet, *Fortress Scotland 2004*, published by Scottish CND will provide much needed information on bases. It is valuable to all who are concerned about this land, and is a vital tool for peace campaigners.

Meanwhile the tourist standing in dismay in front of the monstrous carbuncle on the Gareloch can turn round and see opposite it, Faslane Peace Camp, an ever present witness of unyielding opposition to Britain's illegal nuclear WMD.

Our visitor can take comfort from the knowledge that here, and all over Scotland, there are folk working towards that happy day when the bases are gone, and the land and waters are healed; when this book will be an item of historical interest, a museum piece.

Till then, it is essential that folk read it, and are moved to action by it.

***Brian Quail***

***Scottish CND  
28<sup>th</sup> June 2004***



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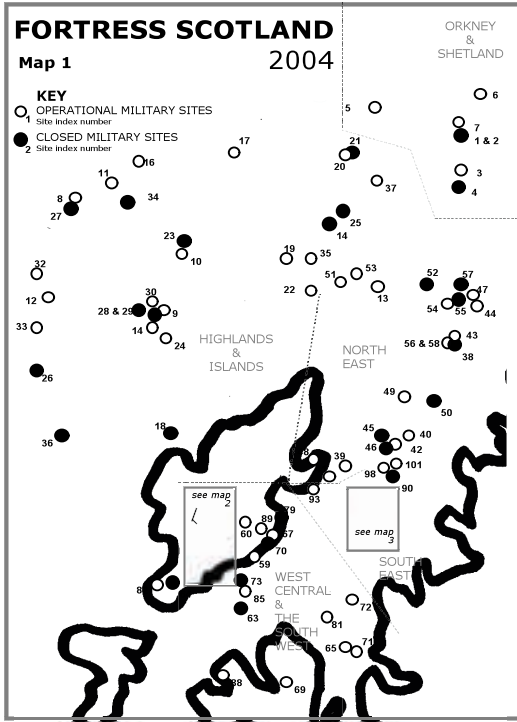
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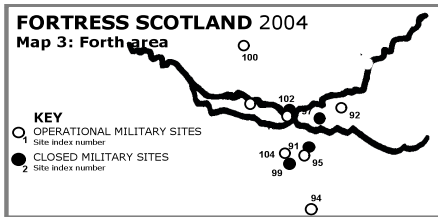
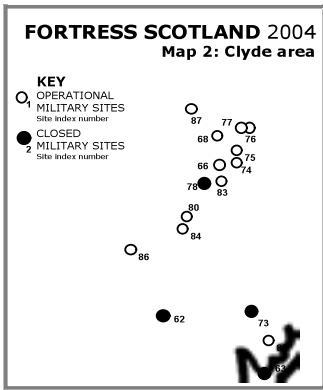
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## **INTRODUCTION**

The Ministry of Defence has 374 sites in Scotland and owns land covering almost 25,000 hectares, an estate thought to be worth £1.3 billion. 25,000 people are employed directly by the MoD in Scotland, at least 15,000 of whom are serving either in the Army, Navy or RAF. Approximately £1.5bn of defence expenditure is spent directly in Scotland. Manning levels in Scottish regiments are among the highest in the British army and the army's 2nd Division, which covers Scotland and the north of England has 13,500 regular troops, nearly 16,000 territorials and more than 20,000 cadets. The RAF employs about 6,300 service personnel and 1,300 civilians across the country. A total of 2,000 service personnel, 450 civilian staff and 50 aircraft are based at RAF Leuchars. The Royal Navy has its Scottish headquarters at Faslane, which is also home to the Trident nuclear submarines. 7,000 navy and civilian staff work at Faslane for the Royal Navy and defence company Babcock Naval Services - the largest number employed on a single site in the country.

It is nearly fifteen years since the Cold War ended but many of the military installations and facilities built in Scotland to oppose the Soviet Union are still operational. During the 1990s, downsizing and closure of many facilities used by the British and American Armed Forces did happen but not anywhere near to the extent some may have expected. Instead, a multitude of facilities have remained in operation and some have had their operational status enhanced as Britain continues to spend billions of pounds on defence. Over 24,000 members of the Ministry of Defence and Armed Forces work at military sites in Scotland, over 15,000 military personnel and nearly 9,000 civil servants. Whilst the public perception of the end of the Cold War in Scotland was of symbolic closures such as at the communications station at Edzell in Angus and of the US Navy submarine base on the Holy Loch, it also allowed significant reorganisation, refurbishment and reinvestment in key military facilities. This perhaps being one reason why the widely hoped for post-Cold War 'Peace Dividend' did not eventually materialise.

Many facilities continue to play a notable role in the operation of British and American defence departments. This is especially so in the current political and international climate. Military installations in Scotland play an active part in the 'war on terror', by providing intelligence and communications as well as military personnel and equipment. One clear trend is that advances in technology have allowed increased automation of the many military observation and communication facilities dotted about the Highlands and Islands as they have become remote controlled from bases in England.

What is also clear is that a considerable effort is still going into monitoring the threat from the 'Northern Waters' of the North Atlantic. In his book 'Fortress Scotland' (1983) Malcolm Spaven described the crucial strategic role played by Scotland during the Cold War. Due to its' geographical location Scotland would act as the 'cork' for the bottleneck of the North Atlantic 'Greenland-Iceland-UK Gap' through which NATO and Soviet naval and air forces would move and clash during periods of tension and in the build-up to war. As a consequence Scotland became host to a wide range of military establishments acting as a vital monitoring station, launching point and supply base for NATO forces. Whilst many would think that tension between East and West was a thing of the past, this, relatively brief, study suggests significant effort is still going into preparing

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for similar eventualities, Russia still being regarded with a great deal of suspicion by the military. One Trident submarine from Faslane, for example, still lurks, 24 hours a day, seven days a week, somewhere in the North Atlantic (at a cost of £1.5 thousand million a year) preparing to fire its intercontinental ballistic missiles tipped with 100 kiloton nuclear warheads in the event of Russia (the only country that could manage it) firing a sneak attack on mainland Britain.

But it is true to say that the scale and scope of military activity in Scotland is still much reduced from the peak of the Cold War. One glaring difference between the 1980's and today, is the almost complete disappearance of the American military presence from Scotland. Apart from a few NATO communication stations there are no major US bases in Scotland at all, although there are still US nuclear weapons in the UK, at Lakenheath in Suffolk, England. The ending of the Cold War was a major reason for this but other factors are also important. The increased range of the US's Trident system meant that there was no longer a need for a forward base for US submarine launched intercontinental ballistic missiles at the Holy Loch, for example. Technological advances, improved satellite systems and automation of monitoring stations (as mentioned above) have also allowed the US to drastically scale down their military presence in Scotland. But there are other, perhaps more insidious, reasons for the apparent disappearance of US forces. The trend over the last 15 years or so in the organisation of NATO has been for greater integration between the military forces of the different member nations. One reason for the absence of the US in Scotland is simply that UK forces have become more integrated into NATO and are doing the job for them. Warfare has also changed, and so has US thinking. Technological advances now allow smaller, lighter armies that can flexibly respond to a wider range of conflicts using more precise weapons and greatly improved communication systems. Whilst this military doctrine is currently being tested, perhaps to its limits, in Iraq, US military thinking is that they no longer need a massive military presence in the UK.<sup>1</sup> But they haven't gone completely, instead preferring to 'visit' Scotland during exercises, for training and to use UK facilities as staging posts for launching attacks on other countries.

Despite the strategic nuclear weapons based at Faslane and Coulport, and the large RAF bases on the east coast of Scotland, the main conclusion drawn from this pamphlet would be that Scotland has become increasingly important as a training ground for the troops, sailors and air-crews of both Britain's and NATO's military forces and as a testing ground for their new weapons. With Cape Wrath in the north and Dundrennan in the south, over the last decade the air, waters and land of Scotland have become increasingly used for major exercises and weapons testing. At Dundrennan the US are testing their 'super-gun'; at Cape Wrath, the US Navy come to test their crew's live-firing skills before becoming operationally ready. The Highlands is covered by the largest and most often used low flying exercise area in Europe. The Joint Maritime Course, held three times a year off the North and West coast of Scotland, is the largest combined forces exercise held regularly by NATO countries. Increasingly, as the strategic importance of Scotland's position declines, its relatively low population density, its distance from Westminster (and, as importantly, the voters of Middle England) and its large MoD estate has made Scotland one of the most important military play-grounds in the Northern hemisphere.

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<sup>1</sup> For more information about the US's current military thinking see Alan Mackinnon's chapter on 'Star Wars and US Strategic Objectives' in Scottish CND's pamphlet "Star Wars; Space - the next target for US invasion"

To accommodate the training and testing going on in Scotland, the MoD has significantly increased the amount of land it has access to in Scotland by retaining a number of sites around the country. In fact, the amount of land the MoD currently controls in Scotland in 2004 is four times greater than at any point during the Cold War. In 1980, the MoD owned or leased 24.8 thousand hectares (54.6 thousand acres) in Scotland. But by 2003, land available to the MoD had risen over four times to 115.2 thousand hectares (or 253.4 thousand acres) largely due to the massive amount of land the MoD has acquired limited rights to (see a list of some of these areas in the tables below). This massive amount of land acquired, largely after the end of the Cold War, is equivalent to a two mile wide corridor running from Glasgow to the town of Wick in the north of Scotland, 227 miles away.

In stark contrast, land controlled by the MoD in England and Wales remained the same over the same period, or in the case of military land in England, decreased.

The MoD has continued to increase the size of its' estate in Scotland in recent years, acquiring for example, in 2001, the 14,877 acre Cape Wrath training area and bombing range, land that they had previously used on a leasehold basis. As a result of acquiring land in this way the MoD is currently one of the largest landowners in the country, owning or having rights to nearly 1.5% of Scotland.

**List of current land over which MOD has limited rights**

<b>Location</b>			<b>Date</b>
DERA Hebrides Range	South Uist	Restrictions and access	1 November 1968
DERA Hebrides Range	South Uist	Compensation payment for restrictive rights over areas of land known as danger areas	19 May 1973
Galloway Trg. Area	Galloway Forest	Training area	1 January 1987
Cultybraggan Trg. Camp	Cultybraggan	Land for dry training	23 September 1989
Tighnablaair Trg. Area	Cultybraggan	Land for Army training	1 June 1990
Barry Buddon	Barry Buddon	Lightkeepers House	1 September 1990
Lossie Forest Trg. Area	Lossie Forest	Land for training	1 January 1992
Tighnablaair Trg. Area	Cultybraggan	Land for Army training	16 May 1992
Castle Kennedy Trg. Area	Castle Kennedy Airfield	Army training	1 January 1993
Ardgarten Trg. Area	Ardgarten Forest	Training land	1 July 1993
Glutt Field	Glutt Field	Firing range	16 February 1994
Ardgarten Training Area	Glencroe Hill	Training land	1 June 1994
Loch Ewe Trg. Area	Gairloch Estate	Army training area	1 October 1995
Loch Ewe Trg. Area	Inveran Estate	Army training area	1 October 1995
Loch Ewe Trg. Area	Big Sands Estate	Army training area	1 October 1995
Cultybraggan Trg. Camp	Lochearn	Training rights	1 April 1996
Cultybraggan Trg. Camp	Bennybeg Crags	Climbing Training	1 April 1996
Charterhall	Charterhall	Training Area	12 August 1996
Wyvis Estate	Evanton	Training area	21 October 1996
Grantown-on-Spey	RAF OAC Grantown-on-Spey	Area of land for training	1 April 1997
Grantown-on-Spey	RAF OAC Grantown-on-Spey	Area of land for training	1 April 1997
Inverness	Leiterchuillin Crags	Lease of training rights	1 April 1998
Wolfhopelee Forest	Wolfhopelee Forest	Training area	1 January 1999

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Grandtully	Aberfeldy	Training rights	1 July 1999
Dalbeattie	Edingham Fibua Site	Training rights	15 January 2000
Loch Fyne	Noise Trials Range	Lease of land	20 March 2000
Loch Ewe Trg. Area	Tournaig Estate	Training rights	1 April 2000
Galloway	Galloway	Access track to training area	1 April 2001
Loch Ewe Trg. Area	Aultbea Estate	Training rights	1 April 2002
Machrihanish	Machrihanish Trg. Area	Land for military training	1 April 2002
South Kintyre	South Kintyre Trg. Area	Land for training	1 April 2002
South Kintyre Trg. Area	South Kintyre	Land for military training	1 April 2002
South Kintyre	South Kintyre Trg. Area	Land for military training	1 April 2002
Balduff Training Area	Balduff	Lease of land for military training	1 May 2002
Balduff Training Area	Balduff	Lease of land for military training	1 May 2002
Balduff Training Area	Balduff	Lease of land for military training	1 May 2002
Balduff Training Area	Balduff	Lease of land for military Training	1 May 2002
Huntleys Cave	Grantown-on-Spey	Rock climbing	1 April 2003

**Location****Start date**

(no particular establishment overseeing)

(A right in Perpetuity is usually associated with a facility owned by the MOD and restricts the landowner in undertaking certain types of activity or development. The Terminable rights are in association with leased with leased land and usually terminate at the same time as the lease expires)

Southqueensferry	Restrictive rights in Perpetuity	July 1863
Milltown	Restrictive rights in Perpetuity	February 1955
Saxa Vord	Restrictive rights in Perpetuity	March 1960
Rona and Raasay Isles	Restrictive rights Terminable	April 1961
Craigowl Hill	Restrictive rights Terminable	February 1962
Skipness	Restrictive rights Terminable	February 1963
Aultbea	Restrictive rights Terminable	October 1963
Blackdog	Restrictive rights in Perpetuity	February 1964
Cultybraggan	Restrictive rights in Perpetuity	November 1966
Benbecula	Restrictive rights Terminable	September 1967
Burntisland	Restrictive rights Terminable	December 1967
South Uist	Restrictive rights in Perpetuity	November 1968
Covesea	Restrictive rights Terminable	December 1968
Uig	Restrictive rights in Perpetuity	June 1969
Wick	Restrictive rights Terminable	November 1969
Machrihanish	Restrictive rights Terminable	December 1971
Eskdalemuir	Restrictive rights Terminable	September 1972
Crimond	Restrictive rights in Perpetuity	June 1973
Clyinder	Restrictive rights in Perpetuity	October 1973
Applecross	Restrictive rights in Perpetuity	October 1974
Rosneath	Restrictive rights in Perpetuity	November 1975
St. Kilda	Restrictive rights Terminable	April 1976
Castlelaw	Restrictive rights Terminable	September 1977
Barry Buddon	Restrictive rights in Perpetuity	March 1978
Perth	Restrictive rights Terminable	April 1981
North Uist	Restrictive rights in Perpetuity	May 1981
Aviemore	Restrictive rights Terminable	November 1982
Charterhall	Restrictive rights Terminable	May 1985
Strathallen	Restrictive rights Terminable	August 1986
Drymen	Restrictive rights in Perpetuity	March 1987

## SCOTLAND'S ROLE IN MODERN CONFLICT

A number of military facilities in Scotland played a direct role in the recent conflicts in Afghanistan and Iraq. Troops, air and naval forces based in Scotland took part in the invasion of Iraq. In the run up to the war, facilities in Scotland also played an important part. The munitions depot at **Glen Douglas** in Argyll is used for stocking up munitions, shells and weapons prior to conflict. In January 2003, two of the Royal Navy's aircraft carriers berthed at the adjacent Glen Mallan jetty to stock up on armaments before heading to war. Glen Douglas is a huge munitions depot, covers an area of 650 acres, employs 150 people and stores an unknown amount of 'conventional weapons'.

In February 2003, just prior to the invasion of Iraq, almost 200 DU shells were fired at **Dundrennan** by British Challenger II tanks before departing for Iraq. The Kirkcudbright range near Dundrennan, in south-west Scotland, is the only open air testing area for depleted uranium munitions in the UK. The range covers 4,500 acres and has a danger area extending over 120 square miles of the Solway Firth. Since 1982, over 6,000 depleted uranium munitions, mainly anti-tank shells have been fired on the range into the Solway without any having been recovered. British Challenger II tanks almost exclusively fire DU shells. As a chemically toxic substance, depleted uranium dust contaminates land and causes ill health and cancers to many, including the soldiers who deploy them, the armies they target, and civilians caught in the middle.

Just over 50 miles west of the range at Dundrennan, is the QinetiQ owned bombing range and weapons facility at **West Freugh** in Luce Bay. Activities that take place at the range include a number of bombing activities and short-range weapons trials including the testing of cluster bombs. Cluster bombs are a major armament of the RAF's Tornado GR4 attack aircraft, 64 of which are based at **RAF Lossiemouth**, on the east coast of Scotland, making Lossiemouth the largest Tornado base in the UK. Cluster Bombs are munitions that on explosion hurl hundreds of pieces of metal fragments and shrapnel in all directions. Civilian casualties and injuries are a common occurrence when they are used. On the 22<sup>nd</sup> March 2003 at least 50 Iraqi civilians in Basra were killed as a result of an aerial bombardment that included the use of cluster bombs.

Luce bay is also used for NATO training exercises. In September 2003, the RAF contributed to a NATO training exercise called Northern Light, that was a huge mock amphibious landing involving nearly 50 ships and submarines and 34 aircraft from UK and foreign forces.

And, also in Scotland there are a number of important NATO communications and intelligence stations. At **Aird Uig** on Lewis, the radar station there forms part of NATO's monitoring of the North Atlantic. The station had been expected to close, but work was completed in 2003 to reactivate it, a decision partially connected to the prospect of terrorist attacks on Britain.

In Kinross, the 'Golf Ball' radar station at **Balado Bridge** is a satellite ground station for the NATO-IV communication satellite, providing long distance secure communications between NATO forces. Next door to the 'T-in-The-Park' music festival site, Balado Bridge had been linked to the Scottish command centre at Pitreavie in Fife by microwave transmitter. When Pitreavie was closed in the mid-

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1990s, its functions were transferred to Faslane. A microwave link between Balado Bridge and Faslane could be in operation today.

Scotland was exploited by the military during the Cold War and that situation remains. **Cape Wrath** is the only ship-to-shore bombardment range in Europe and since the United States Navy was forced to withdraw from a similar range in Puerto Rico in 2003, Cape Wrath can unwittingly claim to be the most important area for naval training in the world, or at least in the Northern Hemisphere. The range also contains the only place in Europe where aircraft can release live one thousand pound bombs. For a country as small as Scotland, it is staggering that it contains:

- All of Britain's nuclear weapons at **Coulport** and the strategic nuclear submarine fleet at **Faslane**
- Britain's biggest Tornado base at **Lossiemouth**
- The largest and most frequently used low flying area in Britain in the **north west Highlands**
- The only open air live depleted uranium weapons test range in Britain at **Dundrennan**

The utilisation of Scottish based troops, aircraft and equipment in the 'War on Terror' in Afghanistan and Iraq, highlights that Scotland still has an active role in present world conflict. Scotland's Cold War legacy is still being felt today, and without concerted effort by those who believe Scotland should play more of a role as a force for peace in the world, this situation is unlikely to change in the near future.

## THIS REPORT

In the run-up to the UK and US invasion of Iraq in 2003 it became increasingly clear that, even amongst those who believed they were well informed about the activities of the military in Scotland, there was a shortage of up-to-date information about what happened where. With a significant majority of Scots opposing an invasion of Iraq without a UN mandate it was clear that such information was crucial to allow an informed debate. With the continuing (and possibly never-ending?) "War on Terror" such information continues to be of vital public interest. If Britain does face the possibility of major terrorist attack then all Scots have the right to know both what the potential targets are as well as what steps are being taken to defend us.

The list that follows not only contains details of current, operational military installations, but also includes those that performed important functions during the Cold War but which are now closed. Whilst it is clear that soldiers from Scottish regiments have played (and continue to play) a major role in both Iraq and Afghanistan conflicts, this report does not look at their organisation in any great detail. All information contained in this report has been drawn from publicly available sources – primarily newspaper cuttings and the Internet. We have not used any information that was not already in the public domain. It is not intended to be either comprehensive or complete. Only a selection of military establishments in Scotland has been included.

***We would welcome any corrections, amendments and any additional information. We hope to produce further revised and updated versions of this report at regular intervals.***

The list has been sorted and arranged from North to South and into the following regions: Orkney and Shetland, the Highlands and Islands, the North East, West Central and the South West, and finally South East Scotland. This report is intended to be a modern appraisal of the important military facilities outlined in Malcolm Spaven's book *Fortress Scotland*, published in 1983 by Pluto Press. The report highlights changes in military facilities in Scotland since the end of the Cold War and emphasises that the 'War on Terror' means that Scotland still has a critical role in present world conflict, and could continue to do so in the future.

Ordnance Survey grid reference co-ordinates for each location are listed beside each entry. Maps and aerial photographs can be viewed online by typing the co-ordinates at: [www.getamap.ordnancesurvey.co.uk](http://www.getamap.ordnancesurvey.co.uk)

Entries with the symbol ○ were still operational at the time of going to press. The symbol ● beside an entry indicates that the site is no longer used for military operations.





# 1. ORKNEY AND SHETLAND



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The radome at Saxa Vord

The isles of Orkney and Shetland provided critical services to the British and American governments during the Cold War. Strategically, the bases and installations on the Orkney and Shetland Islands were essential for the surveillance of the North Atlantic, and the perceived threat from Soviet submarines and aircraft. They were also of great importance in the communication link from Washington to London.

● **1. Collafirth Hill, Shetland.** (HU 437 686)

The relay station at Collafirth Hill was part of the NATO Ace High communications system network built in the early 1960s. The main characteristics of the relay station were the huge dish antennas that were used for high-band telecommunications. The network's name was abbreviated from Allied Command Europe, and the High was to signify the high bandwidth of the frequency, UHF, which is used for mobile phone communications today. The ACE High network comprised of nearly 50 transmitters all over Europe that stretched all the way from Shetland to Turkey and was designed, according to Duncan Campbell "to link NATO heads of state in crisis." The RAF originally operated the transmitter before it was passed to NATO control. The station was closed in the mid 1980s to make way for mobile phone communications.

● **2. Dales Voe, Shetland.** (HU 412 690)

Former location of a nuclear submarine Z-berth that was situated north west of Collafirth Hill. *For more information on Z-berths, see Appendix A.*

○ **3. Lerwick, Shetland.** (HU 475 414)

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The major weather station operated by the Meteorological Office in Lerwick provides the necessary information about environmental conditions required to operate radar and sonar equipment.

There was also a submarine z-berth located in Lerwick Harbour but which is no longer used.

### ● **4. Mossy Hill, Shetland.** (HU 425 606)

Like the relay station at Collafirth Hill, Mossy Hill was part of the NATO Ace High network and provided the link between the British Isles and Norway. It was closed along with the other Ace High stations in the mid 80s.

### ○ **5. Ramsdale, Orkney.** (HY 336 068)

Small arms live firing range.

### ○ **6. RAF Saxa Vord, Shetland.** (HP 645 133)

There has been a radar station at Saxa Vord since 1957, and since then it has been continually upgraded to meet Britain's defence requirements. The most northerly defence site in the UK Saxa Vord is a reporting post of the United Kingdom Air Surveillance and Control System (UKASACS), it is designed to detect any aircraft approaching Britain from the North. UKASACS is comprised of a number of individual static and mobile units providing minute-to-minute information on air activity. UKASACS is a highly sophisticated computer-based system that gathers and disseminates information on all aircraft flying in and around the UK Air Defence Region. The UKASACS has 2 operational Control and Reporting Centres (CRCs) based at RAF Buchan<sup>[44]</sup> north of Aberdeen and at RAF Neatishead northeast of Norwich. As well as Saxa Vord there are reporting posts at RAF Benbecula<sup>[12]</sup> in the Hebrides, RAF Staxton Wold near Scarborough and RP Portreath which is a satellite of RAF St. Mawgan on the north coast of Cornwall. Information gathered at Saxa Vord is fed back via RAF Buchan<sup>[44]</sup> to the United Kingdom Air Operations Centre (UKCAOC) situated at RAF High Wycombe.

There is also a NATO satellite ground station at Saxa Vord. There are only three NATO satellite stations in the whole of Britain, and two of them are in Scotland at Saxa Vord and Balado Bridge<sup>[41]</sup>.



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Saxa Vord

**○ 7. Scatsta, Shetland. (HU 388 725)**

The US Coast Guard established a monitoring station using a Loran-C transmitter in 1967 on the south shore of Sullom Voe. The Loran-C transmitter was an important component of US Cold War marine surveillance and tracking. As well as providing maritime navigation to civilian vessels, Loran-C transmitters support the navigational equipment onboard US Navy and Royal Navy nuclear powered attack submarines, and SSBNs. The Scatsta transmitters can still be seen above Sullom Voe, although they are now thought to be fully automated. They may also provide navigational assistance for the tankers that dock at the Sullom Voe oil terminal. Further information about the area, and a picture of the Scatsta transmitters above Sullom Voe can be found at [www.undiscoveredscotland.co.uk](http://www.undiscoveredscotland.co.uk)



## 2. HIGHLANDS AND ISLANDS



USS Iowa firing its guns in the North Atlantic off Cape Wrath 1986

The sparsely populated glens and lochs of the Highlands and Islands provide a secluded shelter and hiding place for the various military establishments that are located there. The region is a hive of military activity, offering training areas for the low flying aircraft from the RAF bases at Kinloss and Lossiemouth, bombing ranges at Cape Wrath and Tain, and numerous defence research facilities. Nearly two thirds of major facilities operational in 1980 are still in use.

### ○ **8. Aird Uig, Lewis.** (NB 048 388)

The radar station at Gallen Head, Aird Uig, had been expected to close after the end of the Cold War, but NATO has reactivated the station and its operations. Through the 1990's it was home to 81 Signals Unit, the RAF's high frequency communications specialists. At the same time, the station also housed a low frequency transmitter providing RAF maritime low frequency communications. Following the transfer of this service to the Defence Communications Services Agency (DCSA) facility at Crimond<sup>[47]</sup>, near Fraserburgh in 2000, the 81 Signals Unit detachment returned to their base at RAF Kinloss<sup>[51]</sup>. Following their departure the 618 foot low frequency radio mast was dismantled.

Work was underway throughout 2003 to build a series of masts that today form part of NATO's radar monitoring of the Atlantic. There are 14 masts in all - two groups of six and two larger structures. It is believed that the decision to reactivate the station is connected to the prospect of terrorist attacks on Britain. Prior to the decision to re-open the station, plans had been made to establish a wind farm at the MoD owned site.

### ○ **9. Applecross, Wester Ross.** (NG 714 444)

Located in the Inner Sound to the east of the Isle of Skye, the British Underwater Test and Evaluation Centre (BUTEC) was designated in the 1970s as a range for testing torpedoes and other equipment such as sonar. It is operated on behalf of the Royal Navy and the Ministry of Defence by QinetiQ, the defence contractor created through privatisation of parts of the Defence Evaluation and Research Agency (DERA) in 2001.

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The testing range is administered by BUTEC at the Kyle of Lochalsh<sup>[24]</sup>. The control centre for the torpedo range at Rhu-na-Lachan in Applecross is connected to the hydrophones on the range via underwater cable. The hydrophones are used to listen to the sound characteristics of submarines based at Faslane<sup>[74]</sup> and at Devonport in Plymouth and also surface ships. The facility is often a bane to local fisherman as they are frequently restricted from fishing in the area when tests are being carried out and from areas where their nets may snag underwater cables. The movement of both the vessels on trials and support craft is controlled by radio from the control centre. Controversy also struck in 2002 when a high-powered sonar device was tested on the range, which was banned in the USA having been blamed for mass-deaths of whales and dolphins. *For more information about QinetiQ see Appendix B.*

### ○ **10. Aultbea, Loch Ewe, Wester Ross.** (NG 872 876)

NATO Z-berth nuclear submarine oil and refuelling station, and mooring buoy. In 1995, there were 17 Z-berths in Scotland, which according to the Royal Navy, are used for operational and recreational visits by nuclear powered submarines. (*For further information on Z-berths, see appendix A.*) Nevertheless, the proximity of some civilian dwellings to the berths is potentially hazardous. The fuelling station jetty in Aultbea is less than two kilometres away from the houses of 507 people and as a result the Royal Navy distribute potassium iodate tablets to the inhabitants to combat the possible effects of radiation poisoning. In 2004 Highland Council announced that stable iodine tablets would be pre-distributed, a decision that caused a lot of concern locally.



Aultbea POL jetty<sup>i</sup>

The Z-berth is also a potential site for the Interim Storage of Laid Up Submarines (ISOLUS).

### ○ **11. Barvas, Lewis.** (NB 345 510)

Live firing range on the west coast of Lewis, with a danger area that includes over 2 square miles of the Atlantic Ocean.

### ○ **12. Benbecula, Western Isles.** (NF 786 564)

The Isle of Benbecula is home to the RAF and the QinetiQ group, both at the village of Balivanich. The village has expanded to accommodate the military, QinetiQ, and Benbecula airport which is nearby.

RAF Benbecula, like Saxa Vord<sup>[6]</sup>, is a Reporting Post of the United Kingdom Air Surveillance and Control System (UKASACS). The station's radar provides long-range observation of the northwest Atlantic and the data received is processed through the UK's Integrated Command and Control system. The station was established in 1972 to protect Scotland and the rest of Britain from 'back door' attacks from Soviet bombers. Information gathered at Benbecula is fed back via the Control and Reporting Centre at RAF Buchan<sup>[44]</sup> and RAF Neatishead in Norfolk to the United Kingdom Air Operations Centre (UKCAOC) situated at RAF High Wycombe. Benbecula became a remote operated radar in 1999.

The QinetiQ facility, known as QinetiQ Hebrides is the control centre for the Hebrides missile range that lies on the neighbouring island of South Uist. The airport on Benbecula was upgraded during 2001 and early 2002 in preparation for the Eurofighter Typhoon test programme. During the tests in April 2002, the £16 billion aircraft fired an Advanced Medium-Range Air-to-Air Missile (AMRAAM) on the Hebrides test range, the first of this type of missile to be fired from a Eurofighter. In 2002 the Highlands Council received an application for the establishment of an explosives factory at the QinetiQ Hebrides Range, Isle of South Uist.

Recently, Defence Estates, who oversee MoD owned land, decided to sell off part of the RAF base at Balivanich. The East Camp section of the base that is for sale includes a modern complex of offices, operations rooms, a social club and a squash court on 7.5 acres of land adjacent to Benbecula airport. QinetiQ has advertised the property as an ideal location for companies wishing to protect data from terrorist attack. It is believed that there has been interest from over 50 international companies about the base, including Visa international.

*For more on QinetiQ, see Appendix B.*

○ **13. Binn Hill, Moray.** (NJ 314 661)

Live firing range located on the south bank of the Moray Firth, just over 5 miles east of the town of Lossiemouth. The ten-lane range is leased by the Ministry of Defence from Forest Enterprise, an agency of the Forestry Commission, and is used as an alternative to the range at Fort George<sup>[22]</sup>.

○ **14. Broadford Bay, Skye.** (NG 654 246)

Nuclear Submarine Z-berth established in 1963. The berth consists of a mooring buoy in Broadford Bay, on the South West of Skye. Like the berth in Loch Ewe<sup>[10]</sup>, the mooring in Broadford Bay is within two kilometres of civilian houses, and nearly 1200 people are affected by its presence. Should a nuclear accident take place, the inhabitants would have to take a potassium iodate tablet, as the radioactive iodine released could cause thyroid cancer. Highland Council released details of their safety scheme to deal with nuclear emergencies in January 2004, and conducted public meetings in Aultbea<sup>[10]</sup> and Broadford to explain the health and safety reasons for the decision to pre-distribute stable iodine tablets to occupied premises within a two kilometre radius of the Z-berths in the same month. Details of the safety scheme, 'Highsafe' can be found at [www.highland.gov.uk](http://www.highland.gov.uk).

● **15. Brora, Sutherland.** (NC 903 041)

The Government Communications Headquarters station (GCHQ) at Brora was closed in 1984. GCHQ is an intelligence and security organisation within the British security services and was officially secret until 1983. Its two main

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purposes are signals intelligence (sigint) and information assistance. Having previously been kept secret for over 40 years between 1939 and 1983, you can visit the GCHQ website at [www.gchq.gov.uk](http://www.gchq.gov.uk). GCHQ has attracted some unwanted publicity in recent years as the organisation has moved into new custom built headquarters in Cheltenham. The building, shaped like a doughnut, was funded by PFI and public money and cost £337 million.

### ○ **16. Butt of Lewis Lighthouse, Western Isles.** (NB 519 661)

The lighthouse at the northern point of Lewis, operated by the Northern Lighthouse Board, is one of a number of lighthouses in the Western Isles to provide services to the military and to civilians. The lighthouse has Differential Global Positioning System equipment, which is used for satellite-based navigation. The DGPS at the Butt of Lewis monitors the integrity of the US Navstar Global Positioning Satellites, which not only benefits vessels in the area but also allows the US to ensure that their Navstar satellites are positioned and working correctly. Navstar satellites play an essential role in modern warfare as receivers for their signals have been built into planes, ships, cars and tanks to allow commanders to know where their troops are on the battlefield. Nuclear submarines also navigate using the Navstar satellites, and the system can be used for the accurate targeting of missiles and other weapons. Navstar was an important component of British and American military operations during the two Iraq wars



Butt of Lewis Lighthouse <sup>ii</sup>

### ○ **17. Cape Wrath, Sutherland.** (NC 260 747)

The most north-westerly point on the British mainland is also an 8,400 acre Ministry of Defence weapons range and army exercise area. Cape Wrath was first used as a weapons range in the 1930s but the Ministry of Defence only bought the ranges in 2001. Norse for 'turning point', Cape Wrath has the highest sea-cliffs on mainland Britain which acted as a land-mark for sailors navigating around the coast of Scotland.

There are four main ranges in the Cape Wrath vicinity:

There is a Naval Gunfire Support Range of around 3,400 hectares, covering the whole Cape Wrath area used for ship-to-shore bombardment. Royal Navy and other NATO vessels use the range for the practice firing of their 4.5 inch and 5 inch guns. The cliffs, which are an important nesting ground for birds, rise to almost 1,000ft vertically are used as ranging marks for the guns. The naval range is usually used between four and eight times a year. In 2003, three American warships from the Eisenhower Battle-group, the 9,600-ton cruisers USS Anzio and Cape St George, and destroyer USS Mahan used the range whilst



they were en-route to the Mediterranean. The use of Cape Wrath by US forces has generated controversy because the US Government was forced to withdraw from using a similar range at Vieques in Puerto Rico in May 2003 after accidentally killing security guards on the range there and the discovery that Depleted Uranium munitions had been test-fired there despite repeated assurances that they wouldn't be.

The naval gunfire support range is used three times a year by the navies from many NATO members and plays a central part in the Joint Maritime Course (JMC),. Joint Maritime Courses are one of the largest military exercises to occur regularly in the Northern Hemisphere. Taking place three times a year, all three military services, air-force, navy and army, are involved jointly (hence 'Joint' Maritime Course.) The JMC is central to training of new recruits to the Royal Navy. All RN recruits undergo their 'Tier 2' Operational Sea Training during the Joint Maritime Course exercises, which take place off the whole length of the West Coast of Scotland and ran out of Faslane<sup>[74]</sup>. During the JMC, the Cape Wrath firing range is used extensively for Naval Gunfire Support. The JMC exercises can include up to 50 ships, 5 submarines and well over 100 aircraft and as a result are bigger than most NATO exercises.

The final JMC of 2003 involved 27 naval vessels from 13 different countries including Germany, France, Spain, Turkey, Portugal, the UK and the US. The first JMC of 2004 took place between February 23<sup>rd</sup> and March 4<sup>th</sup>. The majority of ships taking part in the final JMC of 2003 came from the British and American navies, with the destroyer HMS Glasgow, and the mine hunter HMS Inverness amongst those involved. The JMC involved a number of exercises at sea and in the air with over 50 different scenarios practiced, including submarine manoeuvres. The exercise encompassed every aspect of warfare training, which meant that live firing not only took place on the naval range, but also on Garvie Island, where the RAF and the air forces of America, Canada, France, Italy, the Netherlands, Germany and Belgium flew over 800 sorties and dropped up to 1,000lb bombs.



The sea cliffs at Cape Wrath

The Garvie Island Bombing Range is the only location in Europe where live one thousand pound bombs may be dropped. When this range is active for live

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bombing the Naval Gunfire Support range is also activated because of the safety circle for live bombs includes part of the mainland. This range is the most used of all the ranges at Cape Wrath but it may only be used up to fourteen days in any month. In addition to the RAF, a multitude of different air forces use this range, including many NATO member nation air forces. According to the MoD, the means of approach for aircraft to the range provide pilots with as realistic training as possible in a controlled environment. It takes four years training for a combat ready pilot to drop one thousand pound bombs on Garvie. It is possible that the range is used by Army's new Apache Longbow attack helicopters, which entered service in 2000.

Divers from the Northern Diving Group, who are based at Faslane, are needed to clear the ordnance fired at Garvie Island, as some of the live 1,000-pound bombs lie unexploded on the seabed.

In addition to the two main ranges are the Close Air Support Range and a Torpedo Range. The Close Air Support Range uses target plots on the mainland close to the shore and live bombing is not allowed. It is normally used three or four times a year for air to ground cannon and rocket firing and inert bombing. The range control for the Cape Wrath ranges is at Faraid Head and is administered by the Office of the Flag Officer for Scotland, Northern England and Northern Ireland at Faslane<sup>[74]</sup>.

The MoD claim that they keep interference with the normal everyday activities of local residents in the area to a minimum, by only activating the ranges on days when noise and vibration levels around the range will be low. These levels are ascertained with seismic, geological and noise reverberation level research commissions and with meteorological reports on the day predictions are made as to the likely disturbance. Nevertheless, local people are greatly affected by disturbances caused by the ranges. There have been a number of incidents in the last few years. In July 2002 a shell fired from an offshore vessel landed about a mile from houses in Durness. In the same month, a jet from Benbecula<sup>[12]</sup> was ordered to change course or be shot down by an unidentified US warship. On the 25th June 2003, two incidents occurred on the same day. A live shell, believed to be French, was found on Oldshoremore beach by two children, and an unidentified item was taken away by the Faslane Bomb disposal team after it was caught in trawler's nets off Kinlochbirbie.

A third of the Cape Wrath area was designated a Site of Special Scientific Interest (SSSI) in 1971. The MoD has an ongoing conservation programme through Cape Wrath Conservation Group, with the aim of monitoring the effect of bombing on seabirds that nest in the area. The use of the location as a live firing range has a detrimental effect on the ecology, as military use will almost invariably result in damage. The Ministry of Defence claim that damage, in the form of shell holes, can have a positive effect as they provide new habitats for small aquatic life, plants and animals. During tugging and lambing seasons, the use of the range is kept to a minimum and for long periods each year there is a total ban on all live firing to coincide with particularly delicate natural cycles. This is supposed to not affect and disrupt tourism, which is of major economic importance to the area. According to the MoD, intensive bombardment has not appreciably affected the different wildlife colonies despite the fact that live firing undoubtedly causes damage and the death of some wildlife and local shepherds have reported U.S. helicopters strafing birds on the cliffs.

● **18. Connel, Oban.** (NM 905 347)

Built in the early 1960s as headquarters of the 27 Group Royal Observer Corps (ROC), the HQ controlled 40 ROC monitoring posts between Mallaig and the Clyde. The role of the ROC was to collect and record nuclear blasts and fall-out information to allow the military to move to safe areas and continue fighting a nuclear war. In 1973, 27 Group was disbanded and the functions of the base were transferred elsewhere. However, Connel remained in operation until 1992 as a communications centre, linked by landline to a similar ROC centre in Inverness. Further information and photographs of Connel are at [www.subbrit.org.uk/rsg/sites/o/oban](http://www.subbrit.org.uk/rsg/sites/o/oban).

○ **19. Dingwall, Ross-shire.** (NH 559 586)

Live firing rifle range on the banks of the Cromarty Firth.

○ **20. Dounreay, Caithness.** (NC 982 667)

The Vulcan Naval Reactor Test Establishment has taken part in nuclear submarine reactor tests since 1957. HMS Vulcan is operated by Rolls Royce for the MoD with a small Naval staff (currently five), who head up the organisation, and around 300 Rolls-Royce workers. Although commonly referred to as a civilian nuclear research plant, much the work carried out at Dounreay is done in conjunction with the military test establishment alongside it.



Dounreay with HMS Vulcan in foreground <sup>iii</sup>

Nuclear reactors are tested at Vulcan before they are used in submarines, so that in theory, any problems that may have arisen in a particular design would have arisen at Vulcan long before they became a problem in an operational boat. The first reactor, designated Dounreay Submarine Prototype 1, or DSMP, also served as a full-scale training rig, allowing Royal Navy nuclear plant operators to gain hands-on experience. The 3rd DSMP core installed in 1974 and labeled Core Z, is fitted to the Royal Navy's current fleet of Trafalgar and Swiftsure "hunter-killer" class submarines.

Now designated PWR1, the first reactor plant for the British nuclear submarine programme was for Britain's Valiant and Resolution classes of nuclear submarines. It produced power for the first time in January 1965 at Vulcan. The final core designed for the PWR1 reactor was first manufactured during 1973 and

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commenced testing the following year. It is fitted in the current Swiftsure and Trafalgar class submarines.

PWR2 was manufactured in 1985 with testing at Dounreay commencing in August 1987. It is fitted to the current Vanguard class submarines and is the power plant for the new Astute class submarines due to replace the Swiftsure and Trafalgar class submarines.

Improvements in reactor design has culminated in the 'long-life core'. The first was manufactured in 1997/8 and began testing at Vulcan in 2002. Rolls Royce claim it has over six times the energy output and over four times the service life of the original PWR1 core. Long-life cores will be standard fit in the latest Astute class submarines, and back-fitted to the Vanguard class.

In 1987, LAIRD (Loss of coolant Accident Investigation Rig Dounreay) was commissioned at Vulcan which ran for five years and completed over 250 tests to reproduce the conditions in a nuclear reactor at the point of emergency shut-down. In recent years, LAIRD has been used to test the pumps from the nuclear reactors of HMS Spartan and HMS Trenchant whilst they were in refit.

Dounreay is also a possible site for the storage of low-level radioactive waste from the Interim Storage of Laid-Up Submarines (ISOLUS). Project ISOLUS was carried out by Lancaster University on behalf of the MoD. Final recommendations on ISOLUS will be made to the MoD in February 2004, and the results will be posted at [www.isolus.org.uk/](http://www.isolus.org.uk/)

### ● **21. Forss and West Murkle, Caithness.** (ND 1569)

Forss and West Murkle were both US Navy NAVCOMMSTAUk (Naval Communications Station UK) radio stations. West Murkle was opened in 1963, during a period of major US military expansion in Europe and Scotland. Its purpose was to provide the facilities for the relaying of command and control messages between US Naval Command and vessels at sea, notably SSBNs in the north-east Atlantic and Norwegian Sea. Forss operated a similar function from 1975. West Murkle had 12 masts and a communication system housed within a green 'golf ball' style radome, whilst Forss had over 20 masts in total, the tallest being a 610ft VLF aerial. During the peak times of their operation, West Murkle and Forss employed just over 200 on site personnel. Both bases were closed in 1992.

The base at Forss has undergone some recent redevelopment, including the construction of a wind farm. It is also the subject of a £6 million project to convert the base into a hi-tech business and technology park. This is being done by a Scottish firm called New Park, in order to meet the requirements of the UKAEA and the private contractors participating in the decommissioning of the Dounreay nuclear power plant.

### ○ **22. Fort George, Inverness.** (NH 762 567)

Built to suppress the natives after the 1745 Jacobite Rebellion, Fort George took 21 years to complete and at a cost of £92,673 (comparable to £1 billion today). It is owned by Historic Scotland but manned by soldiers of the Queen's Own Highlanders, whose headquarters are at the nearby Cameron barracks. The Cameron Barracks was built in 1877, 130 years after Fort George.

Fort George is also the location of an Army Training Estate exercise area. The army carries out "march and shoot" operations in the hills and links land surrounding the Fort and also carries out echelon training in a nearby wooded area.

● **23. Gruinard Island, Wester Ross.** (NG 943 940)

In 1941, the 520-acre Gruinard Island in Wester Ross was poisoned with anthrax as a testing ground for chemical and biological warfare. The anthrax released by the explosions on the island was tested on a flock of sheep to test the possibility of using, as a last resort, chemical warfare on German cities. The sheep began to die three days after being subjected to the poison and although the government believed the tests to be successful, anthrax was never used against German cities in the Second World War.

In 1986 the government made the decision to clean up the island and after prolonged treatment it was declared safe in 1990.

Amongst the scientists who took part in the de-contamination of the island was Dr. David Kelly, whose suicide in July 2003 forced an inquiry into allegations that the government altered an intelligence report to advance the case for war in Iraq. In 1986, Dr. Kelly was the head of microbiology at the Chemical Defence Establishment, Porton Down, and was heavily involved in the clean up of Gruinard Island. The de-contamination process involved removing a large quantity of topsoil of the island which was then incinerated. This attempt to make the island safe was followed by 280 tons of formaldehyde and seawater solution disinfectant being poured on the island. A flock of sheep were put on the island and monitored for any possible sign of anthrax poisoning.

Despite no further cases of contamination occurring, the island is still potentially dangerous, as any remaining trace of anthrax spores could make it hazardous for generations.

○ **24. Kyle of Lochalsh, Wester Ross.** (ND 765 270)

The British Underwater Test and Evaluation Centre (BUTEC) is operated on behalf of the Royal Navy and the Ministry of Defence by QinetiQ, the defence contractor created through privatisation of parts of the Defence Evaluation and Research Agency (DERA) in 2001.

The centre at the Kyle of Lochalsh is the main jetty and storage facility for the testing ranges around Skye such as in the Inner Sound with facilities at Applecross<sup>[9]</sup> and the Sounds of Raasay<sup>[29]</sup>. BUTEC is used for torpedo and sonar trials. (See *Appendix D on submarine exercise areas.*)

In November 2002, QinetiQ was criticised for testing a high-powered, low frequency sonar that can cause internal bleeding and disorientation to whales, from the Kyle of Lochalsh. US courts had banned the low frequency sonar following the deaths of a number of whales after American and NATO exercises using the equipment. Scottish Natural Heritage was also unaware that the tests were being carried out. An application to build an explosives factory at the site was granted planning permission in October 2002.

The QinetiQ organisation is involved in many areas of marine technology, some of which may be tested at BUTEC. The sonar ranges operated by BUTEC may be the testing sites for new developments and technology in sonar operations. To

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meet legislation that comes into force in July 2004 regarding port and harbour security, QinetiQ has developed a sonar system called Cerberus that monitors ship approaches to harbours. Cerberus was developed to prevent and suppress acts of terrorism against shipping, like the attack in 2002 on a French oil tanker, the Limburg, in Yemen.

### ● **25. Latheron, Caithness.** (ND 206 337)

A microwave relay station as part of the UK microwave system, Latheron acted as a link between West Murkle and Mormond Hill. It was closed in October 1992.

### ● **26. Ledaig, Barra.** (NL 669 979)

The Racal-Decca transmitter station on Barra was the Master Station of the Racal-Decca Hebridean system chain that was opened in 1976. The two Scottish "slave" stations of the network were in Kentra Moss (Loch Shiel), and on the Butt of Lewis. The chain performed a dual-purpose role, airborne and submarine surveillance. The station was closed in 2000, and the 330ft mast was dismantled later that year, the Decca system having been superseded by Global Positioning technology. Photographs of the Barra station are at [www.webhome.idirect.com/~jproc/hyperbolic/decca\\_hebridean.html](http://www.webhome.idirect.com/~jproc/hyperbolic/decca_hebridean.html).

### ● **27. Mangersta, Lewis.** (NB 005 310)

The radio transmitter at Mangersta was a slave station in the North-East Atlantic Loran-A chain, which provided voice radio coverage to civil and military aircraft west of the Outer Hebrides. The master station in the chain was on the Faroe Islands. The Loran-A chains were gradually replaced by the Loran-C system, with the station at Mangersta closed by 1985.

### ● **28. Portree, Skye.** (NG 484 432)

Location of a submarine z-berth, the moorings have not been used since the early 1990s.

### ● **29. Raasay.** (NG 596 445)

The submarine z-berth off the coast of Raasay is no longer operational.

### ○ **30. Rona, Inner Sound.** (NG 660 604)

QinetiQ underwater noise range between mainland Scotland and the Isle of Skye, with a terminal complex on the Island of Rona. The range area is approximately 12 km long and 4 km wide with an average depth of 235 m. The Hebridean Islands and the mainland of Scotland shelter the range on three sides, except to the north. This screens the range from distant shipping noise usually found in the open ocean.

The function of the range at Rona is to measure the radiated acoustic signature of surface ships, submarines and underwater vehicles by using 8 noise measurement hydrophones and 9 underwater tracking hydrophones. It is the only range in the UK where submarines may exercise at full speed. Information from tests is cabled back to the terminal complex on Rona where on-shore data recording and analysis equipment allows measurements in the frequency range 1–100 kHz on vehicles travelling at speeds of 0–80 knots.

The Rona range was created in the 1950s, and was considerably extended when the nearby BUTEC facility<sup>[24]</sup> was established at the end of the 1970s.

### ○ **31. St. Kilda (Hirta).** (NF 0999)

The Ministry of Defence site on Hirta was established in 1957 as a radar tracking station for the missile range on South Uist. The site is now operated by QinetiQ for the MoD, and is staffed by civilian workers. Although the last remaining inhabitants of Hirta were evacuated in the 1930s, the QinetiQ station is manned throughout the year. St. Kilda was designated a World Heritage Site in 1986, and visitors to the island are limited to about 2,500 a year. To learn more about the island visit [www.kilda.org.uk](http://www.kilda.org.uk). The MoD recently renewed their lease at St. Kilda and are due to pay the owners of the island, Scottish Natural Heritage, £100,000 a year for the next 25 years.



iv



v

Above, photographs of the QinetiQ facility on St. Kilda.



vi

The radar of the missile tracking system at St Kilda

- **32. South Clettraval, North Uist.** (NF 748 717)  
Missile tracking radar for the South Uist Missile range. The radar is likely to be similar to the one shown above, on St. Kilda<sup>[31]</sup>.
- **33. South Uist.** (NF 752 429), (NF 777 406)

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The major military facility on South Uist is the missile range, which is controlled by QinetiQ at RAF Benbecula<sup>[12]</sup>. There are a number of sites throughout the island, including the rangehead, complete with missile launch areas, at West Geirinis. The range control is situated at Ruabhal, and the summit of the hill has been tagged "where religion meets radar" as the control centre was built alongside a 30ft statue of the Madonna and Child called 'Our Lady of the Isles'. The hill top site encompasses a number of buildings and domes.

In March 2004, it was revealed that in a declassified 1981 report, the Naval Radiation Protection Services discovered that the rangehead and its surrounding area had been contaminated between 1967 and 1980 by high amounts of Cobalt-60, a radioisotope used to track missiles. In this thirteen year period, the Cobalt-60 was leaked onto the launch pad over one hundred times, a dangerous situation that may have caused harm to a large number of people. The report concluded that "both the ammunition technicians at RA Range Hebrides and possibly the general public were being placed at unnecessary radiological risk by the inadvertent consequences of Radio Mist Distance Indicators operations." In addition, the report noted that the land and sand dunes outside the base may have been contaminated but because no evidence of the isotopes was found, the land was not included in the decontamination process. An earlier investigation by the West Highland Free Press in 2002 had found that the 352 drums of waste from the decontamination process were buried at the range.

Also on South Uist are a sea watch radar station at Sheaval and a patrol boat mooring at Lochboisdale.

### ● **34. Stornoway, Lewis.** (NB 462 330)

The RAF base at Stornoway was closed in March 1998. It had operated as a Forward Operating Base for UK and NATO forces and had undergone massive refurbishment and expansion during the 1970s. This expansion saw the runway extended by 1,600ft, and the building of nine hardened aircraft hangers, new radar and navigational aids and a new control tower. RAF Stornoway acted as an air defence Forward Operating Base for the Tornado and for NATO maritime patrol aircraft. Due to the size and area of the base, Western Isles Council (Comhairle nan Eilean Siar) introduced a new planning programme to deal with redevelopment of the site when it was closed on the 31<sup>st</sup> March 1998. The base was adjacent to the civilian airport at Stornoway operated by Highlands and Island Airports Limited, who bought 550 acres of the former base for £1million.

### ○ **35. RAF Tain, Easter Ross.** (NH 832 837)

RAF Tain is a bombing range on the Moray Firth where the RAF and the USAF practice their low-level flying and drop bombs on simulated targets such as buildings and military vehicles. Warplanes frequently skim the ground below radar on their way to and from the bombing range. RAF Tain is one of the most heavily used air weapons ranges in the United Kingdom, mainly due to its close proximity to Lossiemouth airfield and low flying areas. In 2001-2002 its operating costs was £930,000. Training here can involve both low level bombing from heights from anything between 150 feet to 15,000 feet as well as ground strafing using the Tornado's 27mm Mauser guns. The range was used by both air forces prior to and after the conflict in Iraq in 2003. Tornado GR4s from nearby Lossiemouth<sup>[53]</sup>, as well as other RAF and USAF aircraft, took part in an exercise at Tain in August 2003 using "flash and charge" ammunition, before a planned exercise at Cape Wrath using live munitions.



In April 2004, the Secretary of State for Defence published the number of passes made by RAF and non-RAF planes (from other NATO countries) over RAF Tain:

	Number of RAF aircraft passes	Number of non-RAF aircraft passes
<b>1999</b>	23,479	213
<b>2000</b>	20,709	484
<b>2001</b>	13,651	1,026
<b>2002</b>	21,743	755
<b>2003</b>	22,875	1,302

In 2003, UK and NATO warplanes made a staggering 24,177 low-flying passes over the range, an average of 66 per day.

*See Appendix C on Low Flying Areas*

● **36. Tiree.** (NL 969 401)

The RAF established a base on Tiree during the Second World War, and the ROTOR radar station at Scarinish was built in 1953. It was closed when the ROTOR system became obsolete but the RAF maintained the site in case it was required to reopen. Pictures and further information about RAF Scarinish can be found at [www.subbrit.org.uk/rsg/sites/s/scarinish\\_rotor/index.html](http://www.subbrit.org.uk/rsg/sites/s/scarinish_rotor/index.html). Also on Tiree is a 'golf ball' style National Air Traffic Services radar on Ben Hynish, pictured below, which was built between 1983 and 1986. The radar provides air coverage for civilian air traffic approaching from the Atlantic but like all NATS radars built in the early 1980s, the radar on Tiree is compatible with military radars and can be linked to the UK Air Defence Ground Environment.



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NATS radar 'golfball' at Tiree

○ **37. Wick, Caithness.** (ND 366 489)

Firing range located south of the town of Wick and adjacent to the Old Castle of Wick used by the Territorial Army and local cadet groups.



### 3. THE NORTH EAST



A pair of Tornado GR4s taking off from Lossiemouth

The North East of Scotland provides a number of important military facilities for 21<sup>st</sup> century warfare, including the RAF bases of Kinloss<sup>[51]</sup> and Lossiemouth<sup>[53]</sup>, but was arguably more vital during the Cold War. The North East region was the hub of US naval and radio telecommunications in Scotland, and whilst there are still a few important communications sites in the area, they represent a small section of the sites that were operational twenty years ago. Nevertheless, the North East remains an important asset to the British government and NATO. Just over a third of major facilities have been closed in the last 15 years.

● **38. Aberdeen (Northfield).** (NJ 9008)

The HQ of 29 Group Royal Observer Corps, which controlled over 30 ROC posts in the Aberdeenshire area. It was linked to the Northern Sector control at Cragiebarns<sup>[46]</sup>, Dundee and the four other ROC Group controls in Scotland. The site was closed in 1992 and demolished. However, there is a photograph available by following this link to [www.subbrit.org.uk/rsg/sites/n/northfield](http://www.subbrit.org.uk/rsg/sites/n/northfield).

○ **39. Almondbank, Perth.** (NO 513 324)

Defence Aviation Repair Agency (DARA) centre specialising in components for helicopters. Almondbank is Perth and Kinross' largest single engineering employer, and work done at the centre in the past few years has included the inspection and repair of all Chinook CH-47 helicopters in Europe.

In July 2003, the future of the centre looked uncertain when the RAF announced it was discussing the possibility of their repair work being done in-house and on-site at RAF stations, instead of at DARA facilities. Since then, local MSPs and MPs have lobbied the MoD and parliament to secure the future of the site, and the jobs associated with it.

○ **40. Arbroath, Angus.** (ND 611 438)

'Condor' Base, home to the Royal Marines 45 Commando. The unit provides men and equipment to 3 Commando Brigade Royal Marines, who saw active service in the Iraq war in 2003. According to the Royal Navy, 45 Commando is trained and

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equipped for a range of varying operational tasks, from tropical rain forest to arid desert.

3 Commando Brigade was formed during the Second World War and is part of the UK's Joint Rapid Reaction Force. The brigade is made up of 3,500 troops from three different Commando groups, including 45 Group in Arbroath. Service men and women from Arbroath have taken part in a number of military operations over the decades as part of the 3 Commando Brigade. This includes the final assault on Port Stanley during the Falklands War in 1982, and peacekeeping missions in Bosnia, Kosovo, the Congo and Sierra Leone. They also saw action during the 1991 Iraq war and 45 Commando were also deployed during the 'War on Terror' in Afghanistan.

In Iraq in 2003, the 3 Commando Brigade was instrumental in the attack and occupation of Basra. On the 6<sup>th</sup> April, as the 7<sup>th</sup> Armoured Brigade pushed into the centre of Basra, the Commandos attacked from the south, towards the old part of the city. After successfully completing their mission, it was announced 2 weeks later, that 3 Commando Group would be returning from Iraq.



45 Commando and howitzer

45 Commando is made up of three companies of Marines, 7 (Sphinx) Battery, 29 Commando Light Regiment Royal Artillery and a troop of engineers from 59 Independent Commando squadron. During Operation Veritas in Afghanistan, 45 Commando were part of the task group onboard HMS Ocean, a helicopter carrier. 7 (Sphinx) Battery were armed with the 105mm howitzer artillery, pictured above.

### ○ **41. Balado Bridge, Kinross.** (NO 094 028)

A NATO "golf ball" style satellite communications installation, on the site of a former naval airfield. The satellite communications system in Balado enables long-distance secure broadcasts between NATO forces using the NATO IV satellite system. This function is also an integral element of the US Air Force's Defence Satellite Communications System, which can provide the means necessary for the effective implementation of worldwide military communications. The NATO IV satellite is the same design as the Ministry of Defence's Skynet IV satellite, the next generation of which is being constructed by Paradigm Secure Communications. Skynet 5 will provide military satellite communications services to all three Services of the UK Armed Forces and is expected to come into service in 2005. In 2002 there were more than 5 Ministry of Defence Police officers stationed at Balado Bridge.



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The Balado Bridge installation was linked to the command centre at Pitreavie by microwave transmitter. The functions at Pitreavie were transferred to Faslane<sup>[74]</sup> in the mid-1990s and it is possible that a microwave link between Balado and Faslane is in operation. 242 Signal Squadron from Edinburgh provide host nation support to the NATO installation, which is manned by soldiers from the Royal Corps of Signals.

Balado Bridge is probably better known to a generation of young Scots as the venue for the 'T-in-the-Park' music festivals.

○ **42. Barry Budden, Angus.** (NO 513 324)

Army training camp and weapons ranges near the town of Monifieth on the Angus coast. Barry Budden is the UK's busiest light weaponry live firing range and covers 930 hectares of land and foreshore. There is also a sea danger area of comparable size to the east of the links.

Because of problems with coastal erosion, the army was forced to spend hundreds of thousands of pounds on a rock-armoured wall in 1993. Up to 150 metres of land had been lost over the previous twenty years.



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Marines from 45 Commando training at Barry Budden prior to action in Afghanistan in 2002.

The War Office acquired the range for military training purposes in 1897. According to the MoD, there are 20 different ranges at Barry Budden, and although it is mainly an infantry training area, infantry weapons, light and medium mortars and anti-tank weapons are fired on the ranges. In addition, amphibious and parachute training takes place, as well as helicopter training. Accommodation for 500 troops was built in the early 1980s and Barry Budden is

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regularly used for training purposes. 45 Commando from the nearby Condor Base in Arbroath are frequent visitors to the range.

### ○ **43. Blackdog, Aberdeenshire.** (NJ 965 152)

Live firing rifle range on the Blackdog Links. The range comprises of three live firing areas and a dry training area, which may be used day or night for activities up to platoon level tactical training.

### ○ **44. RAF Buchan, Peterhead.** (NK 113 408)

RAF Buchan is a station of the UK Air Surveillance and Control System (UKASACS) and until 2004 acted as the Control and Reporting Centre for the radar sites at Benbecula<sup>[12]</sup> in the Outer Hebrides and at Saxa Vord<sup>[6]</sup> in Shetland until the station was automated and most of its operations passed on to the Control Reporting Centre at RAF Neatishead in Norfolk. For the year 2001-2002 it had an operating cost of £19.9 million. The facility has Recognised Air Picture and Weapons Control capabilities and is responsible for coordinating radar surveillance with NATO forces in the North Sea and also with other radar stations in Scandinavia. Control Reporting Centres receive and process information provided round-the-clock by military and civilian radars. In addition to this radar data, they also exchange information using digital data-links with neighbouring NATO partners, Airbourne Early Warning aircraft and ships.

The second UKASACS function is the control of air defence aircraft. Fighter Controllers at Buchan and Neatishead (in Norfolk) provide the tactical control required for Air Defence aircraft such as the Tornado F3 jets of 43 Squadron and 111 Squadron based at RAF Leuchars<sup>[101]</sup> to police the UK airspace in peace and war.

Information gathered at Benbecula<sup>[12]</sup> and Saxa Vord<sup>[6]</sup> is passed via Buchan to the United Kingdom Air Operations Centre (UKCAOC) situated at RAF High Wycombe.



xxx RAF Buchan



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RAF Buchan is currently in the process of being automated, and much of the base went on sale in March 2004. It now operates as a remote radar head, employment at the base being scaled down from a current staff of 357 service personnel, 74 civilian workers, 80 contract staff to 71 service personnel and 14 civilian workers by 2005 when the main RAF Buchan base closes whilst the radar station on the hill will be retained.

● **45. Craigowl Hill, Dundee.** (NO 377 400)

The British Telecom microwave relay station on top of Craigowl Hill provided intelligence-gathering facilities for the US National Security Agency from 1963 onwards and may still do. The activities of the NSA at Craigowl were secret until 1980 and despite a public outcry were not denied. Craigowl was linked to the NSA's electronic monitoring station at Menwith Hill in Yorkshire.



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● **46. Craigiebarns, Dundee.** (NO 439 314)

Headquarters of the Caledonian Sector of the UKWMO, controlling both 28 Group ROC and the five ROC groups in Scotland. In the event of a nuclear attack, Craigiebarns House was to collect information on blast and fall-out levels throughout Scotland. It was closed in 1992, and further information about the site is available on the [www.subbrit.org.uk/rsg/sites/c/craigiebarns/index.html](http://www.subbrit.org.uk/rsg/sites/c/craigiebarns/index.html) website.

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### ○ **47. Crimond, Aberdeenshire.** (NK 069 580)

Communications station opened in 1978 to provide naval communications for the North Atlantic and the North Sea. Crimond is the location of a High Frequency transmitter allowing voice communication between Army units, RAF aircraft, Royal Navy warships and UK headquarters. The transmitter at Crimond is operated by 81 Signals Unit, based at RAF Kinloss<sup>[51]</sup>, and the Defence Communication Services Agency (DCSA) in a network that currently also includes a similar transmitter at Milltown<sup>[54]</sup> (due to close in 2006) and a receiver at Kinloss<sup>[51]</sup>. The system enables voice communication up to 1,500 nautical miles from the UK coastline between military units.

In March 2003, the Defence Procurement Agency announced that Crimond would be included as part of the upgrading of the long distance communications system for the British armed forces. The rationalisation and upgrading of the High Frequency communications system is being carried out by VT Merlin Communications under a 15 year, £220 million, Public Private Partnership programme and is due to be operational by 2008. VT Merlin will operate the HF Communications Services initially with current military personnel and management but then replace them with VT Merlin employees. Aberdeenshire council gave planning permission in 2003 for the erection of eight new antennas at Crimond.

### ○ **48. Cultybraggan, Perthshire.** (NN 768 200)

Cultybraggan Camp, near Comrie, was established during the Second World War as a POW camp for high-level German prisoners. The POW buildings are still standing, but today the camp is regularly used as a training centre for a number of groups, including the Territorial Army and the Cadets. The 8-acre camp can house 600 people whilst the dry training and live firing field ranges are south of the camp, near Tighnabhair. The 12,000 acres training area is leased from Drummond Estates and a multitude of activities take place, including helicopter operations, cross country driving and adventurous training. According to the Army Training Estate Cultybraggan Camp hosts over 80,000 man training days annually.

In the late 1980s it was decided that a new Regional Headquarters for Scotland to replace the site at Anstruther would be built at Cultybraggan. However, by the time the facility was completed in 1990, the Cold War had ended and the base was deemed surplus to requirements. It was then sold to the Army. The base would have been the modern Regional Government Headquarters for Scotland in the event of major conflict, and would have housed the Secretary of State for Scotland, as well as the BBC, BT and other important organisations. Pictures and further information about the Cultybraggan site can be found at the Subterranea Britannica website at [www.subbrit.org.uk/rsg/sites/c/cultybraggan](http://www.subbrit.org.uk/rsg/sites/c/cultybraggan)

### ● **49. Edzell, Angus.** (NO 631 687)

Edzell was one of the most important intelligence centres in Scotland, particularly between 1960 and 1997 when it operated as a US Naval Security Group Activity, a branch of the National Security Agency (NSA). Edzell performed a variety of functions for the US Navy, including the Naval Ocean Surveillance Satellite system, also known as White Cloud. It's main role however, was to monitor and track Soviet submarines in the North Sea. It was closed because as technology improved, it was no longer necessary to operate a base in Scotland like Edzell, as the functions could be performed from the United States. Some of Edzell's operations were also transferred to Menwith Hill in Yorkshire.



After the closure of the base, the domestic land, including the accommodation blocks were put up for commercial sale. However, a few buildings on the airfield have not been demolished and may become operational again in the future. A photograph of Edzell is available at [www.subbrit.org.uk/rsg/sites/e/edzell/](http://www.subbrit.org.uk/rsg/sites/e/edzell/).

● **50. Inverbervie, Angus.** (NO 841 734)

Centimetric Early Warning Radar Station built in 1952 and closed in 1993. The site was managed by the US Navy from 1960 to 1978, in conjunction with their operations at nearby Edzell. Five radar systems were used at Inverbervie, three type 13 and two type 14. These were designed to provide surveillance of the North Sea and the North coast of Britain to give the British and American military early warning of a possible Soviet attack. After the US Navy moved out in 1978, the bunker lay dormant for six years before it was designated the reserve headquarters for Craigiebarns<sup>[46]</sup> in Dundee. The station was closed in 1993 and sold in 1999. There are some excellent photographs of the interior of the station at the [www.subbrit.org.uk/rsg/sites/i/inverbervie/index.html](http://www.subbrit.org.uk/rsg/sites/i/inverbervie/index.html) website.

○ **51. RAF Kinloss.** (NJ 066 633)

RAF Kinloss, in Moray, is the UK base for the entire fleet of Nimrod MR2 aircraft, 21 in total. This figure is composed of 18 aircraft split equally between three active squadrons, 120, 201 and 206, and 3 aircraft of the 42 (Reserve) squadron. Like Crimond in Aberdeenshire, the communications facilities at Kinloss are currently in the process of being upgraded to provide the RAF with advanced strategic communications. In the financial year 2001-2002 RAF Kinloss had an operating cost of £112.4 million, the third largest operating costs of all RAF bases in the UK.

Whilst in Scotland, the Nimrods primary role is as a maritime patrol aircraft, engaging in Anti-Submarine Warfare and maritime surface surveillance. Their long range enables them to monitor maritime areas far to the north of Iceland and up to 4,000 km out into the Western Atlantic. The Nimrods protect Britain's Trident submarine fleet and were prominently used in the Cold War for surveillance purposes in spotting Soviet submarines that could threaten Trident. Armed with Sidewinder AIM-9 air-to-air missile, Harpoon anti-ship missile and nine Mark 46 or Stingray torpedoes, Nimrods from Kinloss have been based in the Gulf region since September 2001, and have been used in a variety of roles and operations, including Afghanistan.

Under a £2.2 billion contract awarded in July 1996 to BAE Systems, all Nimrods were to be replaced in 2004 by the Nimrod MRA4 but there has been a substantial programme cost escalation (estimated programme cost £2.8bn by 2002) and a five year delivery slippage. The first inaugural flight of the prototype Nimrod MRA4 did not take place until August 2004.

There has been speculation that Kinloss has been earmarked for closure. It is believed that the MoD has decided to base the next generation MRA4 Nimrods at RAF Waddington in Lincolnshire and that as part of the review of bases in 2004 they are currently costing RAF Kinloss' closure.

2 Nimrods from each squadron from RAF Kinloss saw active service in Iraq, initially to provide air support and surveillance for the coalition maritime forces in the region. As the conflict expanded, the Nimrods from RAF Kinloss flew

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reconnaissance missions over the Iraqi border and then the battlefield to provide information for the troops on the ground.

Although a number of Nimrods returned to RAF Kinloss in April 2003, aircraft from all three squadrons are still based in the Gulf region, and continue to provide air support for the operational activities that are ongoing in Iraq.



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Nimrods returning from the Gulf.

In addition to the airfield at Kinloss, the base operates as a link of the British Armed Forces' high frequency strategic communications system. The high frequency network, operated by the Northern detachment of the RAF's 81 Signals Unit based at Kinloss, provides voice communication up to 1,500 nautical miles from the UK's coastline for the Strike Command Integrated Communications System (STCICS) and the Maritime Air Telecommunications Organization (MATELO). The network is made up of the receiver at Kinloss and two transmitters at Defence Communication Services Agency (DCSA) Crimond<sup>[47]</sup> and RAF Milltown<sup>[54]</sup>. Work is currently being done to update the communications system. The rationalisation and upgrading of the High Frequency communications system is being carried out by VT Merlin Communications under a 15 year, £220 million, Public Private Partnership programme. VT Merlin will operate the HF Communications Services initially with current military personnel and management but then replace them with VT Merlin employees.

### ● **52. Kinnaber, Angus.** (NO 726 615)

Microwave relay station used by the US and which was returned to British control in January 1993. The station was closed not long after.

### ○ **53. RAF Lossiemouth.** (NJ 207 694)

RAF Lossiemouth in Moray is home to three bomber squadrons, including the famous 617 "Dambusters" squadron and one training squadron. There are currently 64 Tornado GR4s in Lossiemouth making it the largest Tornado base in the United Kingdom. Lossiemouth is home to 3 operational squadrons of Tornado GR4s, the Tornado GR4 Operational Conversion Unit, a Sea King Search & Rescue Flight, an RAF Regiment Field Squadron and an RAF Regiment Auxiliary Squadron. It has 2,500 military and civilian personnel and in the financial year 2001-2002 it had operating costs of £96.5 million. However, a MoD armed forces review in September 2004 announced that 340 engineering and maintenance posts at the base would be transferred to RAF Marham in Norfolk and that a further 50 civilian posts would be lost in the next four years.

The Tornado GR4 is primarily a strike/attack aircraft and is used for low-level attacks against what the RAF considers "high-value targets." Its main function is ground attack (generally low- to medium-level bombing) using bombs, specifically targeting air defense systems or sometimes other sites such as runways and radar systems.

Squadron 12 during Operation Desert Fox in December 1998 flew a number of missions against active Iraqi defences including the first ever non-trial drop of the UK Paveway III laser guided bombs. The current role of 14 Squadron is precision attack using Laser Guided Bombs in conjunction with the Ferranti Thermal Imaging Airborne Laser Designation Pod.

Aircraft from two squadrons based at Lossiemouth, Squadrons 12 and 617, were involved in the Iraq conflict in 2003, contributing a significant proportion of the 30 Tornado warplanes from the UK that took part. The pilots and crew from Lossiemouth were based at Ali Al Salem in northern Kuwait. 617 Squadron flew nearly 100 missions in Iraq between 19<sup>th</sup> March and 17<sup>th</sup> April 2003 and was involved in heavy bombing on the first night of the war.

The squadron was also the first to deploy the RAF's new Storm Shadow cruise missile in battle, which can be used to destroy well-defended command and control centres and bridges. These missiles are fully independent after firing and it is believed that they were used to target a number of Saddam Hussein's key compounds in Baghdad. Storm Shadow missiles are stored and maintained at the DSDA facility at Beith<sup>[59]</sup>.



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BL755 Cluster Bombs

The Tornado GR4s based at Lossiemouth are also equipped with Cluster Bomb Units. In October 2003 Adam Ingram listed the RBL755 cluster bomb manufactured by the UK arms company "Hunting Engineering" (now INSYS - a management buy-out of Hunting Engineering formed in October 2001 jointly funded by the management, Fifth Causeway Development Capital Fund and

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Lloyds TSB), as amongst the 840 weapons fired by British aircraft on Iraq. Sixty-six RBL755 air-delivered cluster bombs, each containing 147 bomblets, were dropped with an estimated overall failure rate of 6 per cent. RBL755 bomblets are bright orange or yellow, soft-drink-can sized objects and children are particularly drawn to them. The Ministry of Defence said on April 3, 2003, that RAF Harrier jets had dropped RBL755 cluster bombs on unspecified locations in Iraq although BBC footage also showed RAF Tornado's taking part in bombing operations with cluster bombs. All stockpiles of the BL755 and the RBL755 cluster bomb are due to be withdrawn from RAF service before the end of the decade.

### ○ **54. RAF Milltown, Moray.** (NJ 264 657)

Three miles south east of Lossiemouth<sup>[53]</sup>, this is a transmitter station operated by the RAF's 81 Signals Unit as part of the High Frequency communication network providing voice communication up to 1,500 nautical miles from the coast-line of the UK. High Frequency communications operations will cease at Milltown by 2006 as part of the Ministry of Defence's policy of upgrading the high frequency strategic communications at Crimond<sup>[47]</sup> and Kinloss<sup>[51]</sup> by VT Merlin Communications.

### ● **55. Mormond Hill, Aberdeenshire.** (NJ 981 570)

The vast communications site on the eastern side of Mormond Hill near Fraserburgh was station 44 in the US North Atlantic Radio System, which ran from Iceland to Fylingdales in Yorkshire. The NARS was used as an early warning radar system between 1961 and 1992. The hill was home to a number of tropospheric scatter antennas, including those used by the USAF, the British Army and BT. The USAF left Mormond Hill in 1992, and the site was transferred to the Ministry of Defence in 1993. The site is now used for commercial operations by BT. Below is a photo of Mormond Hill, with the circular troposcatter antennas to the right.



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Mormond Hill.

### ○ **56. Perwinnes Hill, Dyce.** (NJ 922 132)

Civilian Air traffic control centre and radar, which is compatible with military air traffic systems.

### ● **57. Rosehearty, Aberdeenshire.** (NJ 927 674)

An RAF bombing range was established at Rosehearty in the early 1950s. It was closed in 2000 and sold by Defence Estates through Ryden Property Consultants.

The control tower, built in 1994 and complete with bombproof glass, was sold and converted to residential dwellings.

○ **58. Scotstownmoor, Dyce.** (NJ 935 119)

25 acre off road driver training area, predominantly used by the Aberdeen University Officer Training Corps.



## 4. WEST CENTRAL AND THE SOUTH WEST



The most significant military facility on the Western side of Scotland is undoubtedly the Nuclear Submarine base at Faslane on the Clyde. As a result, it has been the focus for anti-nuclear and anti-war protests for decades. However, in addition to this are a number of places of interest that have contributed to making Scotland a military fortress. This includes a number of weapons production and testing sites, as well as a few important NATO facilities.

### ○ **59. Beith, Ayrshire.** (NS 351 524)

Defence Munitions depot, which is part of the Defence Storage and Distribution Agency (DSDA). Established as a munitions depot in 1943, the depot covers an area of over 1,000 acres, has 21 miles of internal roads and 6.5 miles of perimeter fence. With a workforce of 500 civilians the main work of the depot is to store, produce, test, and issue a range of missiles and torpedoes for all three branches of the armed forces.

With a much larger workforce than the other Scottish Defence Munitions Centres at Glen Douglas<sup>[76]</sup> and Crombie<sup>[96]</sup>, Beith acts as the main armaments distribution, administration and maintenance centre in Scotland with an emphasis on 'sophisticated' weapon production. Sixty per cent of the work carried out at Beith comes from commercial contracts to assemble and maintain weapons from armaments companies such as BAe and MBDA. In other words, a situation where the government pays arms companies to build and maintain weapons who then sub-contract the government's own arms depots to do most of the work! (MBDA is a missile systems company owned jointly by BAe Systems, EADS and Finmeccanica; EADS, the second largest aerospace and defence company in the world, had revenues of £20.8 billion in 2003; Finmeccanica, an Italian defence aerospace company had profits of £146 million in 2001.)

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The depot has the capacity to store up to 18,000 cubic metres of high explosives and the buildings at the depot are specially designed to implode should there be an accident. An explosion inside a building would result in the roof being blown off and the walls collapsing inwards.

Amongst the munitions developed and produced at Beith are the Tomahawk, Storm Shadow and Brimstone missiles and Spearfish torpedoes.



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A tomahawk missile being fired from a Royal Navy submarine

Tomahawk cruise missiles are designed to fly at extremely low altitudes at high subsonic speeds, and are piloted over an evasive route by several mission tailored guidance systems. They have a range of 1,700 km and carry a conventional warhead. The Tomahawk Land Attack Missile (cruise missile) is now one of the key weapon systems for Royal Navy Fleet Submarines and the UK is the only country to have Tomahawk outside of the United States. The missile is launched underwater from a torpedo tube, allowing the submarine to remain undetected. Flying low-level at high subsonic speeds, with a low radar signature, the missile navigates to its target using the satellite Global Positioning System and the Digital Scene Matching Area Correlation system.



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Royal Navy cruise missile just before and after it hits a target during trials in 1999.

The first operational use of sea-launched Cruise missiles by the US was in Operation Desert Storm, 1991. In 1995 the United States and United Kingdom governments signed a Foreign Military Sales Agreement for the UK to buy 65 missiles at cost of £180 million, marking the only sale of Tomahawk to a foreign country. After a November 1998 launch and live warhead test, the U.K. declared operational capability and in 1999, 30 more missiles were sold to the UK, at an



additional cost of £56 million, to replace those fired at Kosovo by the Swiftsure submarine, HMS Splendid, the first RN submarine to be fitted with the missiles. MoD reports suggest that 17 out of the 20 cruise missiles fired by Splendid (out of a total of 238 fired during the war) were accurate.

On her return to Faslane<sup>[74]</sup> in 1999 Splendid flew the Jolly Roger (skull and crossbones) flag, supposedly a symbol of a successful war patrol. Her commanding officer later received an OBE.

By 2003, the RN aimed to have five Tomahawk capable boats fully operational at any one time. Two Faslane<sup>[74]</sup> based, Swiftsure class, submarines were modified for cruise missiles, HMS Splendid and HMS Spartan. In 1998 the Strategic Defence Review announced that seven Trafalgar Class and two Swiftsure Class submarines will be made cruise missile capable by 2006, with HMS Triumph, HMS Trafalgar, HMS Spartan and HMS Torbay fitted out by the end of 2001. The total cost of the cruise missile programme is believed to be £300 million.

In 2002, Splendid fired cruise missiles at Afghanistan along with Trafalgar class submarines, HMS Trafalgar and HMS Triumph.

In 2003 Splendid was also in the Gulf firing cruise missiles at Iraq along with HMS Turbulent. In July 2003 Splendid returned to Faslane<sup>[74]</sup>, again flying the Jolly Roger, and was decommissioned the following month.



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Jolly Roger being flown from HMS Splendid on its return from firing cruise missiles at Iraq

Turbulent, based in Plymouth, fired a total of 30 missiles during the war on Iraq at an estimated £700,000 a shot. Faslane<sup>[74]</sup> submarine HMS Spartan was also fitted to take cruise missiles during its refit at Rosyth dockyard<sup>[103]</sup> in 1999 but is due for decommissioning in 2006. Both Trafalgar and Swiftsure submarines are due to be replaced with Astute nuclear powered submarines which are also expected to carry cruise missiles and Beith will continue to maintain cruise missile supplies for submarines based at Faslane<sup>[74]</sup> for the continuing future.

Beith is also sub-contracted by BAe Systems to produce Spearfish torpedoes. Spearfish torpedoes are a heavyweight torpedo fired from submarines against surface vessels and other submarines. The torpedoes are tested at BUTEC ranges based at the Kyle of Lochalsh<sup>[24]</sup> and at the AUTEK ranges (the US Navy's Atlantic Undersea Test and Evaluation Center) in the Bahamas and teams from Beith assist in the test firings. Spearfish torpedoes are a particular problem on British

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submarines because of the large explosive power in the warheads and the toxic and explosive hazards of the Otto fuel that propels them. Whilst early experiments with the fuel were being carried out two workers at another munitions depot in England were killed. The torpedoes are carried by both the Trident and the hunter-killer submarines based at Faslane<sup>[74]</sup> and there is considerable road transport between Faslane<sup>[74]</sup> and Beith.



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An RAF Storm Shadow missile is unpacked in preparation for use on the first night of the Iraq war 2003

The Storm Shadow missile made its operational debut during the Iraq war of 2003, as the main component of the weapons arsenal of the Tornado GR4s based at RAF Lossiemouth<sup>[53]</sup>. Storm Shadow, developed by Matra BAe Dynamics, has two warheads, one to make an initial impact and another to create a blast. During the Iraq conflict, Storm Shadow was nicknamed a 'bunker buster' as it was deployed against heavily fortified bunkers and command centres. It can be launched by a bomber from any location up to up to 155 miles (250km) from the actual target. Technicians on the ground programme the missile with the target co-ordinates and locations of air defences in preparation for a sortie. When the pilot nears the target, but is still a substantial distance away, the missile is released.

At Beith adding explosives, testing and preparing one Storm Shadow missile for transport to RAF Lossiemouth<sup>[53]</sup> and other RAF bases, for the Tornado warplanes based there, takes two and a half days.

The RAF is believed to have purchased an initial batch of 500 Storm Shadow missiles. The programme cost is some £980m. 27 Storm Shadow Missiles were used in Iraq by the 'Dambuster' 617 Squadron based at Lossiemouth<sup>[53]</sup>.

The Brimstone missile is the latest anti-armour missile for Britain's attack aircraft like the Tornado, Harrier and Eurofighter. It is based on the US Hellfire missile and was first tested in 1999 in Arizona. They are produced at a rate of six a day in a new purpose-built assembly building at the armaments depot.

### ○ **60. Bishopton, Renfrewshire.** (NS 435 704)

The former Royal Ordnance factory with a 12 mile perimeter is now operated by QinetiQ and occupies a massive area of land near Glasgow Airport. The factory

was threatened with closure in 1999 with a loss of 283 jobs, and much of it closed in 2002 but a rescue package by the MoD resulted in QinetiQ taking over. Still partially owned by BAe the site is intended for development. The Glasgow and Clyde Valley Structure Plan, approved in 2002, identifies Bishopton as the best location for long-term expansion on the west side of the Glasgow conurbation.

Much of the ordnance produced at Bishopton was propellant for ammunition, from rifle bullets to missiles. In particular, the factory produced propellants for the Sea Wolf and Sea Skua missiles. Sea Wolf is a ship-launched surface-to-air missile that the Royal Navy can deploy against a number of targets including aircraft, missiles and even artillery rounds. It has a range of 7,000 metres. Sea Skua is a short-range anti-ship missile that has been in service for over twenty years. It is also the main missile system on the Lynx helicopter, which is carried on every Royal Navy destroyer and frigate. Two destroyers and three frigates were active in Iraq in 2003, and of that number, two frigates are still in operation.

○ **61. Blarbuie, Mull of Kintyre.** (NR 882 895)

A three lane live firing range mainly used by the territorial army and cadet forces. Formerly a stalkers' range.

● **62. Brodick Bay, Arran.** (NS 025 359)

Former site of Nuclear Submarine Z-berth.

● **63. Browncarrick Hill, Girvan, Ayrshire.** (NS 291 161)

Former Royal Navy and later US Navy microwave relay station. It is now used for commercial operations.

○ **64. Campbeltown Loch, Kintyre.** (NR 740 194)

NATO POL oil and refueling depot. A nuclear submarine z-berth at the same location is no longer operational. Regular maritime exercises take place in the deep waters of the Arran Trench and Kilbrannan Sound off the east coast of Kintyre. In November 1990, four crewmen on the Carradale fishing boat, Antares, were drowned after its nets were "snagged" by the submarine, HMS Trenchant, which was taking part in a six week 'Perisher' exercise training submarine commanders. Prior to this there had been over 100 fishing boat accidents in UK waters where submarine activity had been suspected, but this was the first time that the naval authorities admitted liability probably because local knowledge of submarine operations was too robust to discredit.

In the autumn of 2004, four 'Upholder' diesel powered submarines sold by the UK to the Canadian Navy took part in a six-week exercise in these waters. Later there was a fatal fire aboard HMCS Chicoutini 100 miles off the Donegal coast on route to Canada".



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Fuelling station at Campbeltown

● **65. Chapelcross, Annan, Dumfriesshire.** (NY 216 696)

While Chapelcross has never been involved in the assembly of nuclear weapons it has, throughout its life, played a key role in the British nuclear weapons programme. In the 1950s the UK decided to build up a large arsenal of nuclear bombs and missile warheads. The first batches of weapons grade plutonium in the 1950s had been produced at Windscale (now renamed Sellafield). However this facility was destroyed in Britain's worst nuclear accident in 1958. Two nuclear plants were constructed to provide the bulk of the plutonium required for Britain's bombs. The first was at Calder Hall, within Windscale/Sellafield. The second was at Chapelcross and became operational in February 1959. For many years Chapelcross was one of the main sites where plutonium was produced for atomic and hydrogen bombs. The Trident nuclear weapons which are at Faslane<sup>[74]</sup> today almost certainly contain plutonium from Chapelcross.

Because of its military role, the reprocessing of spent fuel from Chapelcross was kept outside of international regulation. However in 1998 the government announced that: "All re-processing from defence reactors at Chapelcross will in future be conducted under EURATOM safeguards and made liable to inspection by the IAEA". This signalled an end to military plutonium production.

However this did not end Chapelcross's role in bomb making. Modern nuclear weapons contain small quantities of tritium. Tritium is a radioactive material that plays a key role in the thermonuclear process of a hydrogen bomb as it is used to boost the yield of atomic bombs. It is used on British Trident warheads. Tritium is a radioactive material with a short half-life of 12 years. Because it decays so quickly it has to be replaced. The tritium in British nuclear weapons is replaced after 7 or 8 years. So the military demand a constant supply of tritium - and in Britain's case this has come from Chapelcross. Tritium has been produced in the reactors of the BNFL power station and has been processed in the adjacent Chapelcross Processing Plant which is operated by the MoD.

5,000 tonnes of Depleted Uranium are also stored at Chapelcross. This was part of a massive military stockpile of this material which has been controversially used in weapons. In 1998 Britain announced that the material at Chapelcross

would no longer be considered as military material and would be placed under EURATOM and IAEA safeguards.

On 19th December 2003, a RAF Hercules C130 plane breached the no-fly zone around Chapelcross. John Large an independent nuclear consultant stated that the plant was not designed with aircraft crashes in mind. According to the Ministry of Defence the no-fly zones over three other nuclear plants had been breached five times in the past three years. One breach was at the Torness nuclear power station in East Lothian, one at Dungeness in Kent and three at Berkeley in Gloucestershire. After the September 11th attacks in the United States, the UK Government doubled the restricted area for aircraft around nuclear installations to a radius of two nautical miles (2.3 miles) to reduce the risk of planes crashing into reactors and radioactive waste stores.

Chapelcross is about to be decommissioned. The decommissioning process will begin in 2005 when Chapelcross is transferred to the government's new Nuclear Decommissioning Authority in April. In its last year of operation the MoD are continuing to use Chapelcross to produce tritium for weapons, to boost their tritium reserves before production ends. They then plan to use those reserves to sustain Trident in the years ahead.

The closure of the nuclear facility, which ceased production in June 2004, means the loss of more than 400 jobs. But a new wood-burning electricity power station has been proposed for the site. Costing more than £30m, the new power station, burning wood from coppiced, fast-growing, willow trees, will create hundreds of construction jobs and about 70 full-time posts when operational.

○ **66. Coulport, Loch Long.** (NS 211 874), (NS 212 896)

Royal Navy armament depot where Britain's Trident missiles are stockpiled. Coulport is part of HMNB Clyde, being just six miles from Faslane<sup>[74]</sup>. Miles of heather-covered peninsula have been desecrated and turned into Britain's atomic bomb store. Coulport has the ability to store 36 Trident warheads.



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Entrances for the warhead storage bunkers at Coulport

The warheads are transported the length of Britain to Coulport by a convoy of lorries. The crates are then unloaded into underground magazines which can store more than 100 atom bombs in underground vaults behind airlock doors.

The warheads are then taken from there to a nearby jetty and loaded onto the Trident submarines from Faslane<sup>[74]</sup>. The jetty is pictured below.

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Explosives Handling Jetty at Coulport

In October 2004, a report in the Sunday Herald revealed there had been 10 fires and 72 false alarms at Coulport. "There are three or four events a year that have got the adrenaline going," said Tom Ward, the superintendent in charge of Coulport. "But the location is not here by accident. We can absorb the consequences of a reactor or weapons incident within Coulport."

For more information on Coulport visit [www.banthebomb.org/wire/](http://www.banthebomb.org/wire/)

### ○ **67. Dechmont Hill, Glasgow.** (NS 659 587)

Live firing range located west of Blantyre. The 150-acre range consists of two firing areas and is used by many Territorial Army and cadet groups from Glasgow.

### ○ **68. Douglas Pier, Loch Goil.** (NS 195 995)

The QinetiQ facility on Loch Goil is used for the trials of torpedoes and underwater test vehicles in the surrounding area, particularly on the noise range. 8 km long and 80m deep, the loch is used for static trials with ships or submarines moored to buoys. The range covers the northern half of the loch, and is used for measuring the acoustic signatures of surface and subsurface vessels. Static trials enable the measuring the acoustic contributions of particular machine systems on board the vessels as well as assessing active and passive sonar. The facilities at Douglas Pier, including Range control room, staff offices, conference facilities, workshops, stores and a jetty are operated all year round by a staff of 31 multi-disciplinary personnel. Sonar experiments have been undertaken in Loch Goil since the early 1940s.

Also on Loch Goil is a nuclear submarine Z-berth, consisting of two mooring buoys. It is one of the most frequently used in Scotland by nuclear submarines as submarines routinely go there to check for their mine signature.

### ○ **69. Dundrennan, Kircudbright.** (NX 716 447)

An armament testing range covering 4,500 acres and with a danger zone extending to cover 120 square miles of the Solway Firth. The range at Dundrennan is infamous for testing depleted uranium munitions. Since 1982, more than 6,000 depleted uranium shells, usually in the form of anti-tank munitions, have been fired from the range into the Solway Firth. The majority of the 20-tons of shells remain on the seabed after firing, except one that was

dredged up in a trawler's nets. All attempts to recover the shells have so far failed. The MoD claim that the range is subject to a number of strictly controlled conditions and there is a comprehensive monitoring programme to ensure that depleted uranium contamination is kept to a minimum.

Depleted uranium is a chemically toxic substance. It is an extremely dense, hard metal and is often used on the tips of munitions. It can cause chemical poisoning to the body in the same way as can lead or any other heavy metal. However, depleted uranium is also radiologically hazardous, as it spontaneously burns on impact, creating tiny aerosolised ceramic particles that are small enough to be inhaled. These uranium oxide particles emit all types of radiation, alpha, beta and gamma, and can be carried in the air over long distances. Depleted uranium has a half-life of 4.5 billion years, and the presence of depleted uranium ceramic aerosols can pose a long-term threat to human health and the environment. When in a solid form, DU is not very dangerous, the real hazard comes from dust that is produced when shells burn on impact with hard surfaces. At Dundrennan, the DU shells are fired through 'soft' targets – canvas or plastic targets suspended from gantries purpose built on the ranges – into the sea.

However, local residents of the range have complained that there have been misfirings and as a result, parts of the range have been contaminated with radioactive dust. In 1994, a tank containing DU munitions exploded during a 'large bomb test' scattering DU and shrapnel over a wide area. Despite advice from the MoD's own scientists that debris and contaminated soil should be cleared, the tank hulk and scattered remnants still remain. The MoD admit 93 misfirings at the range, for example, in 1989 a DU shell hit a wall causing radiation levels up to 24 times the MoD's own safety levels. The MoD's own surveys show that in places radiation levels in soil and grass from the range are "well above acceptable limits".

Prior to the Iraq war, in February 2003, Challenger tanks used the Dundrennan range to test-fire DU shells in order to become battle ready. Almost 200 DU shells were fired on that occasion. Challenger II tanks almost exclusively fire DU munitions.



Warning sign at the Kirkcudbright Range at Dundrennan (Scottish CND)

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Dundrennan is also due to be the site for controversial electro-magnetic 'super-gun' trials on behalf of the US military. The 'Super-Gun' is intended to be the main armament of the Marine Expeditionary Family of Fighting Vehicles (MEFFV), the replacement of the US Marine Corps' Light Armored Vehicle and the M1A1 Main Battle Tank that will reach their end of service lives in 2015 and 2020 respectively. The experimental electro-magnetic gun (EMG) will be able to launch a shell at 7500-mph, faster than 2,400 meters per second, and destroy a tank more than five miles away.

Under secret development by the US for almost 30 years, with the UK as a junior partner, the gun uses magnetic coils to create a pulse of energy to hurl a projectile at more than five times the top speed of Concorde, or more than two miles per second. The gun will be able to fire projectiles at more than double the speed of shells fired by British and American tanks in the Gulf whose shells travel at around 3000mph. Because of the projectile's speed it will tear through armour and buildings, even though each projectile will be only about a foot long and as narrow as a broom handle. The force at which the projectile hits its target will be so great, shattering ceramic plates, slicing through steel and melting carbon that it is unlikely to require any explosive warhead. Due to its small size, scientists believe tanks will be able to carry three times as many shells.



Roadsigns at Kirkcudbright Ranges, Dundrennan (Scottish CND)

The fact the electro-magnetic gun was to be tested in Scotland only leaked out when it was mentioned by the Pentagon's leading military scientist, Mike Andrews, to delegates at a defence conference in Washington in 2003. He told them the system was ready, but had not yet been used at full power, adding: "Probably the only place in the world we can do that is Kirkcudbright."

Low rate initial production of the MEFFV is expected to start sometime between 2018 and 2020.





Tank hulks on Kirkcudbright range (Scottish CND)

Also in the vicinity of Dundrennan is an Army Training Estate small arms firing range in the Galloway Forest and a factory complex in Dalbeattie which is used for Fighting in Built-up Areas training.

● **70. East Kilbride, Lanarkshire.** (NS 642 534)

Location of the Western Zone Control wartime government bunker. The site is situated at a technology park in Birniehill and would have been the centre of government for Western Scotland during a nuclear war. Photographs and further information is at [www.subbrit.org.uk/rsg/sites/e/east\\_kilbride/index.html](http://www.subbrit.org.uk/rsg/sites/e/east_kilbride/index.html)

○ **71. Eastriggs, Dumfries and Galloway.** (NY 247 659)

Ministry of Defence explosives storage depot. The depot, halfway between Annan and Gretna serves the range at Dundrennan<sup>[69]</sup>.

○ **72. Eskdalemuir.** (NT 241 054)

Seismological Recording Station operated by Guralp Systems Limited for Blacknest Seismological Group. This in turn, is part of the Atomic Weapons Establishment based at Aldermaston, which is operated by AWE Management Ltd under a contract from the Ministry of Defence.

The Station monitors, records and distinguishes the seismic signals generated underground by nuclear explosions from those created by earthquakes. There has been a seismological station at Eskdalemuir since 1962.

● **73. Fairlie, Ayrshire.** (NS 205 562)

Former NATO pier and moorings described as a salvage depot by the MoD, that was bought in June 2003 by Holt Leisure Limited and renamed Fairlie Quay.

○ **74. Faslane, Gare Loch.** (NS 246 883)

Royal Navy Clyde Submarine Base, official designation HMS Neptune. Faslane is home to Britain's strategic nuclear submarine fleet and is the headquarters of the Royal Navy in Scotland. All four of Britain's Trident operational strategic intercontinental missile submarines (Vanguard, Victorious, Vigilant, Vengeance) are based at Faslane. More than 7,000 navy and civilian staff work at Faslane for the Royal Navy and defence company Babcock Naval Services - the largest number employed on a single site in the country.

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In 2002 many of the operations at Faslane were handed over to Babcock Naval Services who also own Rosyth, in Fife, in a controversial privatisation with the loss of 500 jobs, in a move that was opposed by trade unionists within the base as well as anti-nuclear campaigners. As a result Babcock Naval Services manage all engineering work on Submarines and Minor Surface Warships including emergency and scheduled maintenance on both Royal Navy and foreign naval vessels; provide hotel accommodation on site at Faslane and run the three naval messes, accommodating up to 2500 sailors and producing over 3000 meals each day; BNS manages the stores facilities at both Faslane and Coulport and provides cleaning services and grounds maintenance as well as berthing services and radioactive waste processing. At Faslane BNS also operate the 25,000 DWT Ship-lift, which is capable of docking a Trident Class Submarine. Additionally, at Coulport, the unique floating berthing facility for loading and unloading Trident warheads (the Explosives Handling Jetty) is also operated by Babcocks.

The Trident fleet is currently in the process of being refitted at HMS Devonport in Plymouth. HMS Vanguard finished its refit at the end of 2004, and started six months trials before being handed back to the Navy. HMS Victorious will take its place in 2005, first off-loading its warheads at Coulport<sup>[66]</sup> and its missiles at King's Bay, Georgia in the USA.

HMS Vanguard is being fitted with a new design of nuclear reactor core at the Devonport dockyards in Plymouth. The reactor is the same design as those fitted to the new Astute class of nuclear hunter-killer submarines. The Astute programme has also encountered delays (see below.) Vanguard was scheduled to undergo sea trials in the Autumn 2004, but rumours circulating amongst the dockyard workforce, suggested overruns because of problems encountered with replacing the original reactor with the new reactor design. The delay is so serious the Ministry of Defence was reported considering sending HMS Victorious, next in line for the refit, to the navy submarine base in Kings Bay Georgia in the US to carry out the work. The government had admitted that Vanguard will not finish its refit until the second quarter of 2005, some eight or nine months late.

In addition to the nuclear powered and nuclear-armed Trident fleet, Faslane also houses five conventionally armed Swiftsure Class nuclear submarines (Sovereign, Sceptre, Spartan, Superb and Splendid), ships of the Third Mine Countermeasures Squadron, and the Northern Ireland Squadron. Also at Faslane are the Northern Diving Group, who clear explosives over a huge and often remote area including Cape Wrath and the FOST-MPV (Flag Officer Sea Training - Mine, Patrol and Survey Vessel) which provides sea training in Scottish exercise areas for all RN minor war vessels. The Base is also home to the NATO tri-service Joint Maritime Course three times a year, for which it provides berthing and Command and Control facilities. It also hosts visiting American and French submarines. In 2001, Commachio Company was transferred from Condor Base in Arbroath<sup>[40]</sup> to Faslane to protect the nuclear submarine fleet.



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Since the late 1990's, submarines berthed at Faslane have been plagued by problems with their nuclear propulsion systems and accidents. In 1995, HMS Sceptre returned suddenly to Faslane from sea with problems that at the time were reported as a radiation leak. It returned to sea but a defect in the reactor was discovered in 1998, early on during its' refit at Rosyth where the full seriousness of the problem was not recognised until the middle of 2000. During Sceptre's refit the submarine broke free from its' mooring and shot forward 30 feet inside the dock. Some Rosyth workers said that this was the most serious accident that had ever taken place in the yard. In January 2002, Defence Minister Adam Ingram admitted that the problem on Sceptre was due to "small original fabrication imperfections" in the Reactor Pressure Vessel. Despite a refit already extended by 18 months the Minister said that the MoD could not accurately say how long it would take to inspect and repair the problem. Sceptre eventually sailed from Rosyth in March or April 2003.

During the same period, HMS Sovereign, the oldest submarine in service, primarily used as a training boat, has had similar problems. Sovereign was in Rosyth dockyard for several years on a very long refit and finally being rededicated in January 1997. Shortly afterwards cracks were discovered in its tail shaft during post refit sea trials and it was sent back to Rosyth in June 1998 needing emergency repairs. In 2000 it was reported that Sovereign has been withdrawn from operational service because of a potential reactor fault and a statement made in January 2002 indicated that Sovereign had the same problem as Sceptre (i.e. "small original fabrication imperfections" in the Reactor Pressure Vessel.) The timescale for inspection and repair of this is not known.

In September 2000, HMS Splendid was the only operational Swiftsure class submarine allowed to continue to be operational until February 2001. However when the submarine sailed from Faslane on 16 October 2000, it was subsequently recalled to Faslane on 21 October to be removed from service until checks were carried out into its reactor. An earlier decision made in 1998 was that Splendid would not be given the refit it had been due in 2003 and the submarine is expected to be taken out of service and this may have happened already.

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In January 2002 it was revealed that there was concern that HMS Superb could have the same problem as Sceptre and Sovereign as it shared the same reactor design. However a safety case was made for it to return to duty, pending a further inspection later in 2002.

HMS Spartan arrived at Rosyth in January 1999 for a refit that would start in March 1999 but was not due to be completed until April 2003 – twice as long as the two years nuclear submarine refits normally take. After its refit Spartan will be cruise missile capable.

Also at the same time, Trafalgar class submarines (based at Devonport, but regular visitors to the Faslane base) faced just as many difficulties. On 19 November 2000, HMS Triumph hit the seabed when 3 miles off course during a 'Perisher' submarine commander training exercise off the west coast of Scotland. Two junior officers were subsequently court-martialled - neither of them taking the Perisher course. It was revealed during the court-martial that prior to the accident they had gone 12 days with only 4 hours sleep a night. Their defence lawyer said that one of the officers was suffering from extreme fatigue. Defence Minister Adam Ingram described the incident as " a glancing contact with soft sand and shells".

HMS Trafalgar hit the news on several occasions (and the sea-bed) as well, whilst in Scottish waters. In November 2002 the submarine hit rocks near the Isle of Skye during submarine captain's training resulting in damage to the hull. The vessel returned to Faslane for inspection and repairs costing £5m. Three sailors were injured after they had been violently thrown to the deck. Two officers were subsequently court-martialled for the collision and the Naval Enquiry found "lapses" from usual Navy standards including, unbelievably, 'Post-it notes' covering navigational display screens. As part of a training exercise, the yellow notes were covering the display screens of the navigational systems the officer in charge of the vessel normally relied on, and the navigation charts were allegedly difficult to read because of poor lighting.

If that wasn't enough, in April 2004, only a month after the court-martial for the collision with the Isle of Skye had finished, diesel fumes circulated through Trafalgar's ventilation system while it was in Devonport dockyard, triggering an alarm and forcing crew to breath through masks. Three of the crew had to be treated for gas inhalation. Shortly afterwards this was then followed by a freon gas leak, (used as a refrigerant gas) which escaped in another incident when the submarine arrived at Faslane to start sea trials. According to some reports there had been a total of 270 defects on the submarine before it sailed from Devonport. The Navy denied all allegations, except one. That was that there was a 'minor problem' with the nuclear reactor's control rods that are used to prevent a runaway nuclear reaction. On 28 April 2004, eleven of the crew refused to go to sea on Trafalgar from Faslane, in what was widely described in the media as 'mutiny'. A Ministry of Defence spokesman said however that, that was not the case. "They did not refuse orders. They expressed concerns and their commanding officer felt it prudent to land them,"

Concern has also been raised about the number of fires and false alarms in Faslane and Coulport. The sites are not licensed by the government's Nuclear Installations Inspectorate, so are only subject to limited independent inspection. Instead, safety at the two bases is overseen by the Royal Navy's own Naval

Nuclear Regulatory Panel, based in Bristol. In October 2004, The Sunday Herald revealed there had been 14 fires and 486 false alarms at the two sites over the previous year.

Previously unpublished reports from the Naval Nuclear Regulatory Panel criticised "weaknesses" and "shortfalls" in safety procedures. The panel's three latest reports, covering the period from November 1 2003 to July 31 2004, reveal the panel's misgivings about safety at the two bases. "The naval base has acknowledged that its arrangements and current safety justifications are not consistent with current standards," says one report. The base was planning a site-wide safety improvement programme "to address these shortfalls". Another report revealed the arrangements for managing the construction of a new radioactive waste processing facility at Faslane "were not considered adequate". An emergency exercise held in November 2003 identified the same "areas for improvement" highlighted in previous exercises. The panel notes "weaknesses in the arrangements for undertaking periodic safety reviews" and says the base did not have a formally agreed programme for such reviews. It also expresses concern about arrangements for the training, management and deployment of suitably qualified and experienced staff.

During the nine months covered by the report, 14 fires at Faslane and Coulport, (more than one a month) were caused by electrical components overheating, faulty wiring in engines, cigarettes in bins and welding equipment. They were all attended by Faslane's own fire service, and in seven serious cases Strathclyde Fire Brigade was also called in. Coulport's emergency control centre (where Coulport's Emergency Plan for dealing with major incidents involving the nuclear weapons stored at the depot would be implemented from) was "stood to" (or activated) on four separate occasions. These emergency procedures were started at a frequency of nearly once every two months during the nine months. Most of the 486 false alarms were reported as being caused by dust, insects, power fluctuations or smoke from cigarettes and bonfires. Many were due to faulty equipment, and a few to honest mistakes and malicious acts by workers.

Planning for new jetties at Faslane for the new generation of nuclear-powered Astute class submarines is under way. The first Astute class submarine was due to be launched late in 2004. However this programme has also run into major problems. BAe, the company building the submarines, has encountered serious delays increasing the cost to the government by at least an extra £430 million. The first submarine is now not due to enter service until 2008, four years late. Astute will use the latest reactor from Dounreay<sup>[20]</sup>, Core H. When she enters service, HMS Astute will be the biggest and most powerful attack submarine ever built for the Royal Navy. The weapons load of the Astute class will be 50% greater than the existing Trafalgar class submarine. HMS Astute will be followed by HMS Ambush and HMS Artful, but the Royal Navy is also considering commissioning another three boats. The new vessels will be based at Faslane and replace the Swifsure and Trafalgar class submarines.

The government has announced that the decision to replace Trident will take place during the next session of government. One alternative being suggested is that the Trident missiles could be replaced by nuclear-armed Cruise Missiles carried by Astute class submarines.

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The Scottish Campaign for Nuclear Disarmament website has a large section dealing with Faslane, Trident and the related safety issues. It can be found at [www.banthebomb.org/scotland/fasacc.shtml](http://www.banthebomb.org/scotland/fasacc.shtml)

### ○ **75. Garelochhead, Argyll.** (NS 268 925)

Army Training Estate training area that includes a number of exercise areas. The area comprises over 13 square miles of woodland and moorland and stretches northwards from Shandon, around Garelochhead, past the Glen Mallan<sup>[77]</sup> jetty and two thirds of the way towards Arrochar on the A814. There is also a small training area to the west of the village, between the Gareloch and Loch Long.

Activities that take place on the training area involve assault courses, water based activities, parachuting and live firing at Glen Fruin. Grenade and mortar firing is also permitted on the range. The Ministry of Defence uses the 8,820-acre site for 'Balkan style' training, as the moorland, forest and mountains are similar to terrain found in the former Yugoslavia. It is used by infantry and transport units for off-road and amphibious training. The Garelochhead camp can accommodate 500 personnel whilst a smaller camp at Strone 130. The training area at Strone is used for Fighting in Built-Up Areas (FIBUA) training.

### ○ **76. Glen Douglas, Loch Long** (NS 275 000)

A Defence Munitions Centre. Although a NATO asset, the Ministry of Defence is the sole user of the depot. The Glen Douglas facility is substantial, covering 650 acres of land and employing 120 people. There are 56 storerooms built into the hillside, and a number of processing and engineering workshops. The main function of the munitions centre is the storage of a high volume of bombs, ammunition, explosives and pyrotechnics, mainly conventional weapons not the sophisticated weapons such as stored and produced at Beith<sup>[59]</sup>. Glen Douglas has storage capacity for almost 40,000 cubic metres of explosives and munitions are transported there by rail and sea with Royal Fleet Auxiliaries docking at Glen Mallan<sup>[77]</sup> on Loch Long. Glen Douglas also has a large fleet of lorries that travel up to 400,000 miles a year transporting munitions to bases across the UK.



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HMS Ark Royal at Glen Mallan prior to the 2003 Iraq war

The Glen Douglas facility is used regularly by the British Armed Forces to stock up on munitions before the start of conflicts. In January 2003, the aircraft carrier HMS Ark Royal berthed at Glen Mallan<sup>[77]</sup> to collect munitions from Glen Douglas before heading for the Gulf and the war in Iraq. Two train drivers based in Motherwell refused to drive a freight train from Glasgow to Glen Douglas forcing the MoD to transport the cargo by road.

After the end of Operation Telic, Glen Douglas was used for returning unused munitions from Iraq. A total of 15,000 tonnes of munitions in 1,400 different shipping containers were channelled through the Glen Mallen jetty<sup>[77]</sup> and Glen Douglas Depot and then moved on to Defence Munitions depots at Longtown (near Carlisle) and Kineton in Warwickshire by road and rail.

○ **77. Glen Mallan, Loch Long** (NS 249 967)

The berth at Glen Mallan is connected to the munitions store at Glen Douglas<sup>[76]</sup> by an MoD owned road. Built in the late 1970s the primary task of the jetty is loading and unloading munitions as well as general stores to Royal Fleet Auxiliary ships and warships. The explosives handling licence for the jetty allows up to 440,000 kg of explosive to be handled at the jetty at any time, four times the amount that can be handled at Crombie<sup>[96]</sup>. Royal Fleet Auxiliaries are the main ships to be seen at Glen Mallen being loaded and unloaded prior to transporting munitions around the UK.

The z-berth at the same site is no longer operational.

● **78. Holy Loch.** (NS 163 806)

For thirty years, between 1961 and 1991, the Holy Loch was the location of a base for the U.S. Navy's 14<sup>th</sup> Submarine Squadron. It was handed back to the MoD in June 1992. During its time as an American base, a vast amount of waste, some of it toxic, was dumped into the loch, and which was left on the seabed when the Americans departed.

In 1992, due to concerns from local residents in Sandbank, a team of marine scientists undertook an underwater camera survey to examine the amount of waste on the seabed. The survey revealed that levels of some elements, including nickel, zinc, cadmium and selenium were well above the national averages and there were about 60 drums filled with an unknown substance. It was not until 1998, however, that work began to clean-up the waste as there were disagreements about whether the waste removed would pose a risk to local residents and marine life.

Tonnes of waste was slowly and systematically removed from the area of the former base between February 1998 and February 2001 at a cost of nearly £11million. The work was carried out by a contractor on behalf of the Ministry of Defence, and during the recovery process, an assortment of objects were found including propellers, cables scaffold towers, wire reels and gas cylinders of acetylene, oxygen, nitrogen and carbon dioxide. In total, over 2,700 tonnes of waste and debris was recovered from the site of the naval base and the MoD claimed that the vast majority of the site had been cleared.

Responsibility for the Holy Loch was handed to Clydeport Authority in April 2002.

However, in August 2002, a number of local people complained that their boats were losing anchors because they were being caught on debris on the seabed.

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The MoD admitted that some debris, including shipwrecks and other non-hazardous objects were not cleared, as doing so would cause more harm than good to the natural habitat.

In addition to the large U.S. presence at the loch, the Ministry of Defence operated a Z-berth in the Holy Loch until the late 1990s.

● **79. Kirk O' Shotts, Lanarkshire.** (NS 857 635)

Established in the early 1950s, the Kirk O' Shotts transmitter is a microwave signal station that was built as part of the Backbone series and which is used today for colour television signals. In times of emergency the transmitter could be employed for military and governmental functions.

○ **80. Loch Striven, Argyll.** (NS 094 711)

A NATO POL fuel depot and submarine z-berth, pictured below.

Also shown below is the Royal Fleet Auxiliary ship *Victoria* refuelling on Loch Striven. There is a limit on the amount of explosives or munitions that can be stored on board a vessel whilst the jetty is being used under the Dangerous Substances in Harbour Areas Regulations (1987). In 1999 the limit was raised to 110,000 kilograms.



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Loch Striven has also been used as a propulsion test range for submarines.

○ **81. Lowther Hill, Dumfriesshire.** (NS 890 107)

Golf Ball style radar transmitters, primarily used for civilian air traffic control services, but which can provide a military function if necessary.



○ **82. RAF Machrihanish.** (NR 666 221)

Currently under care and maintenance status, RAF Machrihanish is likely to close in the near future. The site was originally declared surplus to military requirements and transferred to Defence Estates for disposal on 1 April 2000, but a final decision has not been made. As of April 2004, it is listed as a forward operating base for operations in the Highlands and Western Isles for the Army Training Estate.

RAF Machrihanish has the third longest runway in Europe at 3,049 metres, and operated as a wartime and exercise forward operating base for NATO long range maritime patrol aircraft. Being 3 miles from Campbeltown, a section of the airfield remains open and operates as Campbeltown Airport. Tens of millions of pounds were spent upgrading RAF Machrihanish in the 1980s when it operated as a base of the US Air Force. A team of US Navy Seals, US Naval Special Warfare Unit 2, was based there from 1981 under the command of NATO. They regularly took part in training exercises in the surrounding area including parachute drops. The detachment of Navy Seals highlighted the importance of Machrihanish to NATO, and the base was seen as the most likely place for military expansion in Scotland in the late 1980s. In June 1995, the base was transferred to the Ministry of Defence. The base was also a nuclear weapons store, as nuclear depth bombs that could be launched from a helicopter were kept there. The depth bombs were kept in "igloo" storage bunkers at the end of the runway.

The base has been earmarked as a possible storage site for redundant nuclear submarine reactors under the ISOLUS programme.

Activities at the base were shrouded in secrecy and a legacy of this is that Machrihanish has become a focal point of conspiracy theories. Amongst the most popular is that the USAF uses the base as a refuelling station for a top-secret aircraft codenamed Aurora.

○ **83. Rosneath, Gare Loch.** (NS 276 805)

QinetiQ owned de-gaussing range. The range is used to de-magnetise the hulls and equipment of naval vessels to ensure that they do not set off magnetic mines. The de-gaussing range at Rosneath is positioned at the entrance to the Gare Loch for vessels entering Faslane<sup>[74]</sup>.

○ **84. Rothesay, Isle of Bute.** (NS 089 653)

Nuclear submarine Z-berth, one of six in Scotland that is still operational. The berth consists of a mooring buoy in Rothesay Harbour.

○ **85. Prestwick, Ayrshire.** (NS 367 279)

The Scottish Air Traffic Control Centre is under the control of Headquarters Military Air Traffic Operations (MATO) and is responsible for providing a radar service to military and civil aircraft. HMS Gannet is located adjacent to the civilian airport, where helicopters providing sonar cover for Trident submarines are sometimes based, but not as frequently as in previous decades. The airport is an important stopover site for US aircraft en-route to other destinations in Europe and the Middle East. Prestwick is famously the only place in Britain that Elvis Presley visited. In March 1960, on his return home after serving in Germany, his U.S. Army flight stopped at Prestwick.

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### ○ **86. Skipness, Loch Fyne.** (NR 920 589)

QinetiQ facility and calibration range. The site is believed to operate with vessels on exercises in the Clyde.

### ○ **87. St. Catherines, Loch Fyne.** (NN 121 075)

There is a control centre for an underwater noise range in Loch Fyne in St. Catherines. However, the precise operational arrangement of the facility is unknown. The Inter-Agency Committee on Marine Science and Technology lists it as being a Defence Evaluation And Research Agency (DERA) site, but this agency was split in 2001 to form QinetiQ and DSTL, and neither organisation registers St. Catherines as a location. The range itself is approximately 5km by 1km with a depth of 140m, and is configured with hydrophones covering each target aspect, DGPS and acoustic tracking and communications. It is able to accommodate surface vessels up to 20kts and submerged vessels up to 14kts. Dutch diesel-electric patrol submarines are regular visitors to the Loch Fyne range.

The picture below is of the Dutch Walrus class submarine Dolfijn on Loch Fyne.



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### ○ **88. West Freugh, Wigtownshire.** (NX 110 547)

The RAF airfield at West Freugh was taken over by QinetiQ in 2001. Work that takes place at the base includes a range of bombing activities and short-range weapons trials. The airfield itself was closed in 2001 when full-time airfield operations ceased at West Freugh. The base includes a weapons range to the southeast on Luce Bay comprising of an area of sea in Luce Bay, and an area of land at Torrs Warren. Bombs, rockets and missiles are fired over Luce Bay where most of the trials activities take place. In addition to this fixed and rotary wing machine guns of various calibres are also fired in the bay. Similarly, on land, bombs are released on the target area and fixed and rotary wing machine guns of various calibres fired. Missiles are fired from the land out into the bay at 'soft' target barges which are used for inert store releases. At Torrs Warren, the 'soft' targets are three large concrete areas on the land. Any live stores released on to either the concrete or the surrounding softer land are cleared by explosive ordnance demolition techniques by QinetiQ.

Cluster bombs have been tested in Luce Bay and as a result special mattresses have been manufactured to protect the sea bed. Twelve sections of the bay are covered these mattresses, which were installed in 2000.

Luce Bay is also used for NATO training exercises. In September 2003, the RAF contributed to a NATO training exercise called Northern Light, which involved a huge mock amphibious landing that included nearly 50 ships and submarines and also 34 aircraft from UK and foreign forces.

○ **89. Yorkhill Quay, Glasgow.** (NS 559 659)

Yorkhill Quay, on the north side of the river Clyde, provides storage and support facilities for naval vessels from the Royal Navy and from a number of other NATO member nations. Recent visitors to the quay have been ships from the Polish and Dutch navies and in October 2004, HMS Glasgow, which paid a final visit to the city before its decommissioning early next year. The quay also provides services for any visiting U.S. Navy vessel.

The Quay at Yorkhill has an area of 1,000 square metres that is used for visiting naval vessels. This allows a number of ships to dock at the quay at the same time. This happens frequently before major naval exercises such as the Joint Maritime Course held three times a year at Cape Wrath.

On occasions when more docking area is required, the King George V docks in Govan on the opposite side of the river are made available to naval vessels. In September 2003, prior to the Northern Light training exercise on the south west coast of Scotland, twenty warships from fourteen different nations were docked at Yorkhill and at the King George V dock. This included ships from Belgium, Canada, Denmark, France, Germany, the Netherlands, Norway, Poland, Spain, Sweden, Ukraine, the United States and Great Britain.



## 5. SOUTH EAST SCOTLAND



HMS Illustrious sails into Rosyth Dockyard for the start of refit in October 2002. In the background can be seen HMS Invincible and some of the decommissioned nuclear submarine hulks awaiting disposal.

South East Scotland contains a number of important military locations for each branch of the armed forces. During the Cold War it also provided facilities that would be employed to govern Scotland should nuclear war break out. Although some of the influential Cold War bases have been closed, there remains a considerable military presence in the area, not least at Rosyth and Leuchars.

● **90. Anstruther, Fife.** (NO 568 088)

An ex-RAF radar station, the bunker at Anstruther was Northern Zone Control from 1973 until the early 1990s. It is open to the public as a museum from March to October. You can visit the museum website at [www.secretbunker.co.uk](http://www.secretbunker.co.uk).

● **91. Barnton Quarry, Edinburgh.** (NT 203 748)

Barnton Quarry was the Scottish Central Control wartime bunker. Following the outbreak of nuclear war, it would have housed the Scottish Secretary and members of the Scottish Office, police, the BBC, BT and others to form wartime government in Scotland. Further details and photographs are available at the following website [www.subbrit.org.uk/rsg/sites/b/barnton\\_quarry](http://www.subbrit.org.uk/rsg/sites/b/barnton_quarry).

○ **92. Burntisland, Fife.** (NT 231 853)

Degaussing range operated by QinetiQ that is used to de-magnetise the hulls of naval vessels. The range was moved in 2003 to a new position of 56° 02.89'N 3°14.73'W in the Firth of Forth.

○ **93. Cambusbarron, Stirling.** (NS 772 919)

Army Training Estate driver training area

○ **94. Castlelaw and Dreghorn, Edinburgh.** (NT 225 640)

A 775-hectare Army Training Estate training area. It is part of the Pentland Hills Regional Park and also part of the Edinburgh Green Belt. The training area runs encompasses a zone from Dreghorn, on the southern outskirts of Edinburgh to Castlelaw, near the Glencorse Reservoir 3 miles away. The variety of terrain in

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the area, from woodland to open heather moorland, allows for a number of different activities to take place but live firing only takes place on Castlelaw Hill.

### ○ **95. Craigiehall, South Queensferry.** (NT 167 753)

Headquarters of the Army 2<sup>nd</sup> Division. 2<sup>nd</sup> Division is responsible for the management of the Army's resources and infrastructure in Scotland and the North of England. 2<sup>nd</sup> Division consists of four brigades. The Scottish brigades are 51 (Scottish) Brigade based at Forthside Stirling, and 52 Infantry Brigade based at Edinburgh Castle. For further information on the 51 and 52 Brigades visit [www.army.mod.uk/2div/Organisation/index.htm](http://www.army.mod.uk/2div/Organisation/index.htm)

Six infantry regiments form the Scottish Division, and each regiment consists of one battalion. The six Scottish regiments are:

**The Royal Highland Fusiliers**, currently based in Cyprus and who have seen active service in the Falklands and Iraq. (574 troops)

**The Royal Scots**, based at Dreghorn Barracks in Edinburgh. (461 troops)

**The Highlanders**, based in Fallingbommel in Northern Germany. (510 troops)

**The King's Own Scottish Borderers**, based in Omagh, Northern Ireland. (474 troops)

**The Argyll and Sutherland Highlanders**, who are based in Canterbury at present after returning from Iraq. (510 troops)

**The Black Watch** are currently deployed in Basra, Southern Iraq but are based in Warminster. (531 troops)

Under current MoD plans to reduce the number of infantry regiments in the UK, one Scottish regiment will be disbanded. It is believed that either the Black Watch or the Highlanders will be cut, with the remaining five regiments arranged into one or two "super-regiments" by 2008.

The **Scots Guards** and the **Royal Scots Dragoon Guards** are the other Scottish regiments and are both based in Germany.

Craigiehall House was built in the early 18<sup>th</sup> Century and has been the headquarters of the Black Watch Regiment. In addition to the Army, there are other branches of the military based at Craigiehall. This includes the HQ of the Army Training Estate in Scotland. The base employs 200 civilian personnel.

### ○ **96. Crombie, Fife.** (NT 043 842)

Defence Munitions centre that stores and tests munitions, mainly for the Royal Navy. Crombie encompasses 200 acres, and stretches for two miles southwards from the village of Crombie to the Firth of Forth. Crombie has a number of underground stores, arms workshops, testing facilities and a jetty. It was originally the main munitions depot for the naval base at Rosyth, but since it's closure, Crombie has been transformed from a conventional munitions depot into a sophisticated weapons processing plant. The base employs 200 people and like Beith<sup>[59]</sup>, the buildings at Crombie have been designed to implode if an explosion occurs.

Munitions housed at Crombie include the SKYFLASH, ALARM and AMRAAM missiles, which are kept in the underground stores. The stores are built to withstand a direct hit from a 1,000lb bomb. Also at Crombie is an Integrated Weapons Complex, which tests, refurbishes and repairs a number of missiles.

Crombie stores Mine Disposal Charges specifically for the Royal Navy that are part of the Remote Control Mine Disposal System. The Royal Naval

Countermeasures Squadron used these charges in the Gulf in 2003. In addition to this, as part of the U.K.'s defensive mine policy, Crombie also provides training services for mine clear up operations.

The complex's jetty can accommodate every surface vessel in the British fleet and during Operation Telic, ships were queuing in the Forth to load up on munitions.

● **97. Dalgety Bay.** (NT 169 830)

The nuclear submarine Z-berth in Dalgety bay is no longer operational.

● **98. Hawklaw, Cupar, Fife.** (NO 377 157)

A former Composite Signals Organisation Station, which fed information to GCHQ, Hawklaw was closed in 1988.

● **99. Kirknewton, Midlothian.** (NT 104 684)

Kirknewton was the Scottish Eastern Zone Control headquarters, responsible for the wartime government of Lothian and the Borders. Further information and pictures are on the Subterranea Britannica website, which can be accessed at [www.subbrit.or.uk/rsg/sites/k/kirknewton](http://www.subbrit.or.uk/rsg/sites/k/kirknewton).

● **100. Knock Hill, Dunfermline.** (NT 054 937)

The transmitters overlooking the Knock Hill motor racing circuit were formerly part of a Royal Navy radio station. The masts are now used for civilian telecommunications. Pictures can be found at [www.tx.mb21.co.uk/gallery/knock-hill.asp](http://www.tx.mb21.co.uk/gallery/knock-hill.asp).

○ **101. RAF Leuchars.** (NO 470 208)

RAF Leuchars in Fife houses two fighter squadrons and one reserve squadron, each of whom use the F3 variation of the Tornado. Both of the active squadrons, 43 and 111, comprise of 16 F3 Tornados and a total of 14 aircraft from both squadrons were sent to the Gulf as part of Operation Telic in 2003 and deployed over Iraq.

The F3 Tornado is the UK's principal air defence fighter, and there are 51 based at Leuchars. The F3 can carry a number of different armaments including air to air and air to surface missiles. In 2003, the Tornado F3 squadrons were equipped with the ALARM anti-radiation missile, designed to suppress enemy air defences. The ALARM missile contains a loiter function whereby it ascends to a height of 13km if the target radar is shut down and deploys a parachute. When the target radar is turned on again, it fires a secondary motor to attack it. The Iraq conflict of 2003 saw this missile being used on a wide-scale basis for the first time.

Squadrons 43 and 111 from Leuchars were based in Al Kharj, Saudi Arabia during the conflict and their main task was to patrol the no-fly zones over Iraq. They had total air superiority due to air power and technology. In total, the aircraft from RAF Leuchars flew nearly 1,000 hours of missions during the conflict.

It is expected that the Eurofighter Typhoon will replace all of the Tornado F3s based at Leuchars in 2008. This means that there will be £51 billion worth of aircraft based in Fife. In 2001-2002 the operating costs of the base were £60.5 million.

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### ● **102. Pitreavie, Fife.** (NT 117 848)

Pitreavie was the principal maritime command centre in Scotland and was housed in a large bunker underneath Pitreavie Castle. In an emergency, Pitreavie would have controlled all NATO forces from the North Sea to the North Pole. Pitreavie also acted as a surveillance centre concerned mainly with the activities of Soviet vessels and submarines in the North Sea. The bunker, which was opened in 1941 and modernised during the 1960s was closed in 1995. Pitreavie's functions were transferred to Faslane<sup>[74]</sup> at this time.

Pitreavie Castle is being converted into a hotel and the bunker was demolished and sealed in 1996 and the site is now no more than an empty patch of land.

### ○ **103. Rosyth, Fife.** (NT 096 822)

Until 1996, there were two major establishments at Rosyth, the naval base HMS Cochrane and the naval dockyard. HMS Cochrane was closed in 1996 and the engineering school HMS Caledonia is the only remaining part of the base. At the same time, the dockyard was privatised and sold to Babcock International Group plc.

The naval dockyard has been used to refit and refuel nuclear submarines but was closed in the mid 1990s. During the process of refitting, the old fuel core from the reactor is removed and a new fuel core lowered in its place. This is a very dangerous operation. The procedures used are not following the best practice - the core is lifted and moved using a large crane - which involves more risk than necessary.

Rosyth has been identified as a possible location for the storage of nuclear waste from decommissioned submarines as part of the ISOLUS project. The dockyard has been used as a storage location for scrapped submarines since 1983 when HMS Dreadnought, Britain's first nuclear powered submarine was towed into the yard.

On the 6<sup>th</sup> March 2000 there was an accident involving a nuclear submarine at Rosyth. HMS Sceptre was undergoing trials in the dock towards the end of a major refit when the vessel broke its moorings and shot forward off the cradle it was on. It moved forwards 30 feet inside the dock, which at the time was full of water. Some of the workers in Rosyth said that it was the most serious accident that had ever taken place in the yard.

Further information on Rosyth can be found at the Scottish CND website at [www.banthebomb.org/scotland/rosacc.shtml](http://www.banthebomb.org/scotland/rosacc.shtml)

### ● **104. Turnhouse (Edinburgh Airport), Edinburgh.** (NT 158 737)

There were two military facilities located at Edinburgh Airport. One was the HQ of 24 Group ROC that would monitor nuclear blast and fall-out data in East Central Scotland and the Borders. A photograph of the now demolished building can be found at [www.subbrit.org.uk/rsg/sites/t/turnhouse2](http://www.subbrit.org.uk/rsg/sites/t/turnhouse2). The other facility was an RAF station that has shut down and its buildings are used for air cargo storage.



**GLOSSARY**

<b>ACE High</b>	Allied Command Europe High Frequency Communications system
<b>ALARM</b>	Air-Launched Anti-Radiation Missile
<b>AMRAAM</b>	Advanced Medium-Range Air-to-Air Missile
<b>AWE</b>	Atomic Weapons Establishment
<b>BAe</b>	British Aerospace Ltd
<b>BNFL</b>	British Nuclear Fuels Limited
<b>BUTEC</b>	British Underwater Test and Evaluation Centre
<b>CRC</b>	Control and Reporting Centres
<b>DARA</b>	Defence Aviation Repair Agency
<b>DCSA</b>	Defence Communications Services Agency
<b>DERA</b>	Defence Evaluation and Research Agency
<b>DGPS</b>	Differential Global Positioning System
<b>DSDA</b>	Defence Storage and Distribution Agency
<b>DSMP</b>	Dounraey Submarine Prototype reactor
<b>DSTL</b>	Defence Science and Technology Laboratory
<b>DU</b>	Depleted Uranium
<b>EMG</b>	Electro-Magnetic Gun
<b>EURATOM</b>	European Atomic Energy Community
<b>Eurofighter</b>	Typhoon warplane developed jointly by Germany, Italy, Spain and the UK
<b>FIBUA</b>	Fighting in Built-Up Areas
<b>FOST-MPV</b>	Flag Officer Sea Training – Mine, Patrol and Survey Vessels
<b>GCHQ</b>	Government Communications Headquarters
<b>GPS</b>	Global Positioning System
<b>'Golfball'</b>	Protective cover over satellite dishes
<b>HMNB</b>	Her Majesty's Naval Base
<b>IAEA</b>	International Atomic Energy Authority
<b>ISOLUS</b>	Interim Storage of Laid Up Submarines
<b>JMC</b>	Joint Maritime Course
<b>LFA</b>	Low Flying Area
<b>MATO</b>	Military Air Traffic Operations
<b>MATELO</b>	Maritime Air Telecommunications Organization
<b>MEFFV</b>	Marine Expeditionary Family of Fighting Vehicles
<b>MoD</b>	Ministry of Defence
<b>MSD</b>	Minimum Safe Distance
<b>MSP</b>	Member of Scottish Parliament
<b>NARS</b>	US North Atlantic Radio System
<b>NATO</b>	North Atlantic Treaty Organisation
<b>NATS</b>	National Air Traffic Services
<b>NAVCOMMSTAUk</b>	US Naval Communications Station UK
<b>Navstar</b>	Space-based radio-positioning system
<b>NSA</b>	US National Security Agency
<b>PFI</b>	Private Finance Initiative
<b>POL</b>	Petroleum, Oil and lubricants
<b>OLF</b>	Operational Low Flying
<b>QinetiQ</b>	(Pronounced "Kinetic") runs the bulk of facilities previously operated by the Defence Evaluation and Research Agency
<b>RA</b>	Royal Artillery
<b>RAF</b>	Royal Air Force
<b>ROC</b>	Royal Observer Corps (defunct)
<b>sigint</b>	Signals intelligence
<b>SSBN</b>	Ship Submersible Ballistic Nuclear
<b>SSSI</b>	Site of Special Scientific Interest
<b>STCICS</b>	Strike Command Integrated Communications System
<b>TTA</b>	Tactical Training Area
<b>UKAEA</b>	United Kingdom Atomic Energy Authority
<b>USAF</b>	United States Air Force
<b>UKASACS</b>	United Kingdom Air Surveillance and Control System
<b>UKCAOC</b>	United Kingdom Air Operations Centre
<b>UKWMO</b>	United Kingdom Warning and Monitoring Organisation (defunct)
<b>Z-berth</b>	A location deemed suitable for visits by nuclear powered warships



## **APPENDIX A: Z-BERTHS**

Berths suitable for nuclear powered warships are split into two categories, X and Z berths. An X-berth is an operational Naval base or a building and refitting yard whilst a Z-berth is a location deemed suitable by the Defence Nuclear Safety Committee for operational visits or stand offs by nuclear powered warships. The Ministry of Defence state that Z-berths in Scotland are often used for operational and recreational purposes. In 1995, there were 17 Z-berths in Scotland suitable for nuclear powered warships but today that figure has fallen to 6, with 2 X-berths. The 16 berths were at:

- Broadford Bay in Skye
- Brodick Bay in Arran
- Campbeltown Loch
- Coulport, Loch Long
- Dales Voe, Shetland
- Dalgety Bay, Fife
- Firth of Forth
- Glenmallan, Loch Long
- Holy Loch
- Lerwick Harbour, Shetland
- Loch Ewe (2)
- Loch Goil
- Loch Striven
- Portree, Skye.
- Raasay
- Rothesay, Isle of Bute

Today, the remaining Z-berths are those at Broadford Bay, Coulport, Loch Ewe, Loch Goil, and Rothesay. The X-berths are at Faslane and Rosyth. The only Z berths in England and Wales are at Plymouth Sound, Spithead, Southampton, Cardiff and Liverpool

A Z-berth can either be a jetty like the one pictured below, or a mooring buoy, usually yellow.





## APPENDIX B: QINETIQ IN SCOTLAND

QinetiQ is a science and technology company that was formerly an agency of the Ministry of Defence. In 1998, as part of a Strategic Defence review undertaken by the MOD, it was recommended that a Public Private Partnership was the most effective way of keeping costs down and maintaining the operational value of Britain's military research and development. Three years later, QinetiQ took over the bulk of the facilities that had been operated by the British government's Defence Evaluation and Research Agency, with only the most sensitive and secretive areas of research left in the hands of the MOD.

In December 2002, one third of the company was sold to the American investment group Carlyle for £150 million. Carlyle owns a number of defence and technology companies in the United States and amongst its senior management team are a few high profile individuals with links to President George W. Bush and previous Republican administrations.

These include:

- George Bush Senior, who acts as a senior advisor to the Carlyle Group
- Ronald Reagan's Secretary of Defence Frank Carlucci, who also acts as the Chair for the RAND Organisation's Centre for Middle East Public Policy.
- James A. Baker III, a lawyer who has led the campaigns of the last four Republican Presidents and who was George W. Bush's spokesman at the 2000 election. He was also Secretary of State from January 1989 through August 1992 in Bush Senior's administration, Secretary of the Treasury in the Reagan administration and was President Reagan's White House Chief of Staff from 1981 to 1985. His work at the White House began in 1975 as President Ford's Under Secretary of Commerce and ended with his service once again as White House Chief of Staff for President Bush from August 1992 to January 1993.
- Richard G. Darman who served as Director of the U.S. Office of Management and Budget and as a member of President George Bush Senior's cabinet. Richard Darman also held senior policy positions under four Presidents in six Cabinet Departments and the White House. These positions included: Assistant to the President of the United States (1981-85); Deputy Secretary of the U.S. Treasury (1985-87); and Assistant U.S. Secretary of Commerce (1976-77)
- In Europe, the Chairman of the Carlyle Group is John Major, the former Conservative Prime Minister.

QinetiQ manages the 42 installations in the UK, those in Scotland include:

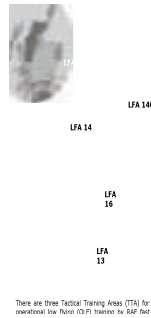
- The former Royal Ordnance Factory in Bishopton, Renfrewshire<sup>[60]</sup>
- Burntisland in Fife<sup>[92]</sup>
- BUTEC in Ross-shire<sup>[24]</sup>
- Hebrides (South Uist and Benbecula) in the Hebrides <sup>[33 & 12]</sup>
- Kirkcudbright in Dumfries and Galloway<sup>[69]</sup>
- Loch Goil in Argyllshire<sup>[68]</sup>
- Rona in Ross-shire<sup>[30]</sup>
- Rosneath in Dunbartonshire<sup>[83]</sup>
- Rosyth in Fife<sup>[103]</sup>
- Skipness on Loch Fyne<sup>[86]</sup>
- West Freugh in Wigtownshire<sup>[88]</sup>

For further details on QinetiQ visit [www.qinetiq.com](http://www.qinetiq.com)



## APPENDIX C: Low Flying Areas in Scotland

Three Low Flying Areas (LFA's) cover virtually all of Scotland. These are areas where planes can routinely fly as low as 250 feet (85 m) above ground level. The areas covered represents over 40 % of the total usable Low Flying area in the UK. Within these three Low Flying Areas are also two of the three UK Tactical Training Areas used for operational low flying training by NATO fast jets and Hercules aircraft. Here planes can fly as low as 100 feet (or 30m) above the ground.



LFA 14 covers mainland Scotland north of the central region, the Western Isles, Orkney and Shetland. It was the most used Low Flying Area in the UK in 2003 with over 8,000 hours of low-flying occurring here. LFA 14 covers 56,670 km<sup>2</sup> and represents 31 % of the UK Low Flying System.

(LFA14C is the coastal area between Aberdeen and Rattray Head and military activity is controlled through air traffic controllers at Aberdeen airport due to the high level of helicopter activity.)

LFA 16 is located in south Scotland and includes the Border Region, Dumfries and Galloway and up to the central belt. It covers 16,142 km<sup>2</sup> and represents 9% of the UK Low Flying System.

LFA 13 includes the South Borders, west Northumberland and northeast Cumbria. Covering only 2,035 km<sup>2</sup> it represents 1% of the UK Low Flying System.

*In 2001 there were a reported 750 individual complaints recorded by the Ministry of Defence Low Flying Complaints and Inquiries unit, meaning that on average complaints were made about low flying at least twice a day by people in Scotland.*

Source: [www.mod.uk/issues/lowflying/index.html](http://www.mod.uk/issues/lowflying/index.html)





## APPENDIX D: SUBMARINE EXERCISE AREAS

The West Coast of Scotland plays host to the majority of submarine exercises in the UK. The map below shows where RN and NATO submarines routinely exercise and warnings to fishing boats are broadcast daily by the Coastguard.



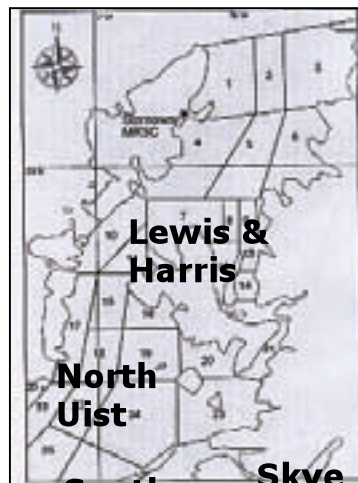
Known as the 'Subfacts' scheme, broadcasting of areas where submarines are due to exercise was introduced on the Upper Clyde following the sinking of the Antares trawler in November 1990 and then extended to cover the shaded areas in 2002.

The chart below shows the break down of the exercise areas between the Western Isles and the mainland, including the QinetiQ ranges at Rona, Applecross and the Kyle of Lachalsh as well as areas close to Cape Wrath. Each area where submerged submarines may be present is broadcast by the Coastguard twice daily on MF and VHF. The Marine Rescue Co-ordination Centre at Clyde broadcasts 'Subfacts' six times daily.

(Taken from: [www.royal-navy.mod.uk/static/pages/data/%5B\(1423\)-08-07-2002%5DUK%20FV%20Code%20for%20www.pdf](http://www.royal-navy.mod.uk/static/pages/data/%5B(1423)-08-07-2002%5DUK%20FV%20Code%20for%20www.pdf))

**Key:**

- |                      |                            |
|----------------------|----------------------------|
| <b>1</b> Tiupan      | <b>14</b> Raasay           |
| <b>2</b> Minch North | <b>15</b> Neist            |
| <b>3</b> Stoer       | <b>16</b> Bracadale        |
| <b>4</b> Shiant      | <b>17</b> Ushenish         |
| <b>5</b> Minch South | <b>18</b> Hebrides North   |
| <b>6</b> Ewe         | <b>19</b> Canna            |
| <b>7</b> Trodday     | <b>20</b> Rhum             |
| <b>8</b> Rona West   | <b>21</b> Sleat            |
| <b>9</b> Rona North  | <b>22</b> Barra            |
| <b>10</b> Lochmaddy  | <b>23</b> Hebrides Central |
| <b>11</b> Dunvegan   | <b>24</b> Hawes            |
| <b>12</b> Portree    | <b>25</b> Eigg             |
| <b>13</b> Rona South | <b>26</b> Hebrides South   |



**mainland**



## APPENDIX E: REGIONAL PRIME CONTRACTING

The Defence Estates Regional Prime Contracting Programme is a method of introducing Public and Private Partnerships (PPP) to Britain's Defence industries. Under this programme, a single contractor is responsible for the design, integration and management of a facility, but the MoD would retain ownership and responsibility for the full capital and running costs.

In Scotland, the Regional Prime Contract was awarded to AMEC Turner Ltd, a joint venture between Turner Facilities Management and AMEC, one of the UK's largest international engineering services company in March 2003.

The contract is worth £460 million pounds over seven years from October 2003. It means that AMEC Turner is in charge of estate management, and construction and engineering services in every Ministry of Defence facility in Scotland. This includes work on capital works, known as "core works" and facilities management and property services, known as "core services".

Core services awarded in the contract include the maintenance of the whole of the Ministry of Defence's Scottish Estate, including major bases such as RAF Leuchars to unmanned communication links and weather masts. Core Works involve co-operation between AMEC Turner and the MoD in the building of a range of individual capital projects.

The Regional Prime Contract for Scotland was the first of five Regional Prime Contracts to be awarded and the first major capital project to be completed as part of the contract was the SSN berthing facility at Faslane. AMEC was responsible for the concept design of a jetty to accommodate the new Astute Class Submarines. This was developed into the Prime Contract for the full design and construction of the jetty. The project involved the provision of a new floating jetty, which included specialised cranes, all electrical and mechanical services, as well as a jetty support building.

AMEC has a history of providing engineering and technical services to the defence sector and has recently been involved in consultancy work for the MoD's next generation of aircraft carriers. The company also provides design, project delivery and maintenance support to clients in the oil and gas industry. This includes three of the world's biggest oil companies, Shell, BP and Exxon.

The non-executive chairman of AMEC is Sydney Gillibrand CBE who was previously vice-chairman of British Aerospace plc. He also holds the position of chairman of TAG Aviation as well as being a non-executive director in a number of other companies including ICL and Messier-Dowry, an aircraft-engineering firm that manufactures landing gear systems. Messier-Dowry landing gear systems are used on a number of military aircraft including the Eurofighter Typhoon and the Panavia Tornado. In 1991, Sydney Gillibrand co-wrote a book with Gerald A. Johnston entitled *The Atlantic Partnership: An Industrial Perspective on Transatlantic Defence Cooperation*.

AMEC's chief executive is Peter Mason, who was previously an executive director of BICC plc and chairman and chief executive of Balfour Beatty Limited. He was appointed to the position of CEO of AMEC in March 1996. Mr Mason is also a board member of British Trade International and chairman of the UK Government's export drive for the overseas sales of UK goods for the railway industry. Peter Mason is a major supporter of the British Government's Private Finance Initiative scheme, and much of this type of work

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goes through AMEC's Investment Division. AMEC built the first PFI hospital, opened in June 2000 by Tony Blair.

Others on the AMEC board of directors include Liz Airey, previously financial director of Monument Oil and Gas Ltd, and Martha Hesse, President of Hesse Gas Company. In 1986 President Reagan appointed Ms Hesse chairman of the U.S. Federal Energy Regulatory Commission. In addition to this, Martha Hesse was assistant secretary for management and administration at the US Department of Energy.

AMEC has worked on defence projects all over the world, including rescue and recovery support at the Pentagon in Washington D.C. after September 11. Also in the United States, AMEC has been involved in developing a Homeland Security Programme to plan, protect, respond and/or restore operations related to a myriad of emergency situations including natural disasters and terrorist attacks.

AMEC is also currently involved in the rebuilding of Iraq, and was awarded a \$780 million share of a \$1.6 billion contract with Fluor, a U.S. engineering company that donated to the Republican party in the run up to the 2000 U.S. Presidential election.

In January 2005 AMEC announced that it expected an increase in profits for 2005. For the first time, the results of AMEC's business in Iraq would be included to give the company an estimated pre-tax profit of £125.5 million.

## PHOTOGRAPHS AND IMAGES

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