



Support to High Intensity Operations

REPORT BY THE COMPTROLLER AND AUDITOR GENERAL | HC 508 Session 2008-2009 | 14 May 2009

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8 May 2009

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1 This report looks at the Ministry of Defence's (the Department's) arrangements for supporting high intensity operations and focuses on four key areas: equipment, logistics, pre-deployment training and support to personnel. The intention of this report is not to examine military judgement or the outcomes of operations, nor does it look at the support provided to the many smaller operations in which the Department is engaged. Following on from the National Audit Office's previous work on operations¹, the aim of this report is to examine the Department's support to high intensity operations, since it is on this kind of operation that support arrangements are most stress-tested. For each key area of support, the report sets out the Department's

generic arrangements before examining how well these arrangements have been working on Operation TELIC in Iraq and Operation HERRICK in Afghanistan, primarily over the last two years.

2 The United Kingdom has deployed forces in Iraq since 2003 as part of the United States-led Multi-National Force-Iraq. The number of United Kingdom forces has recently reduced to around 3,700 as they prepare for a planned draw down by July 2009. In Afghanistan, the United Kingdom has deployed around 8,300 personnel as part of a NATO-led International Security Assistance Force, predominantly in Southern Afghanistan.

1 Ministry of Defence: The Financial Management of the Military Operation in the Former Yugoslavia, HC132, 1996; Kosovo: The Financial Management of Military Operations, HC530, 2000; Operation TELIC – United Kingdom Military Operations in Iraq, HC60, 2003.

3 Both these theatres present real difficulties for United Kingdom forces and considerable support challenges for the Department. The combination of long distances between both Iraq and Afghanistan and the United Kingdom and the lack of direct maritime access to Afghanistan complicate the transporting of personnel and equipment. In addition, undertaking operations in both theatres means coping with difficult environmental conditions, including harsh and varied terrain, temperature extremes and dust. In Afghanistan the pace and intensity of operations continues to be high, against a significant ongoing and evolving threat from a dangerous and determined enemy. United Kingdom forces in Iraq have also faced evolving threats and circumstances over the years, and are now in the final stages of a drawdown.

Main Findings

4 In preparing for an operational deployment the Department selects the appropriate equipments to meet the military tasks that may arise. Not all equipment in the Department's inventory can be used on every operation. The capabilities provided by some equipment will simply not be needed. In some circumstances the Department's existing equipment may also be unsuitable for the task because they may be too imposing when operating closely amongst civilian populations; the protection of personnel needs to keep pace with the evolving and increasing threat posed by enemy forces; or because the terrain and/ or climatic conditions reduce equipment performance to unacceptable levels. In these cases the Department has a choice either to modify or upgrade existing equipment or to procure new equipment; items modified or procured in this way are known as Urgent Operational Requirements.

5 The Department has approved £4.2 billion on Urgent Operational Requirements as at March 2009, including modifications to helicopters and aircraft, better protection for existing vehicles, early attack warning systems for bases and electronic counter-measures. While additional armour and electronic counter-measures have improved protection, together with communications equipment they increase vehicle weights and power requirements. The availability of vehicles procured or upgraded as Urgent Operational Requirements has generally met or exceeded the Department's targets, except for the Vector vehicle, whose suspension and wheel hub reliability has been poor. There have also been shortages of spares for some fleets, particularly when the vehicle has been used in a role different to that intended, such as the Mastiff vehicle in Afghanistan. Armed Forces personnel throughout the chain of command in both theatres told us that Urgent Operational Requirement equipments had performed well overall, including those procured to enhance protected mobility.

6 The availability and serviceability of the helicopter fleets on operations have exceeded the Department's targets. Although none of the helicopter types was designed to operate in the environmental conditions in Iraq and Afghanistan, Chinook, Puma, Apache and Merlin have coped consistently with the harsh conditions and the Department has modified Sea King helicopters and is planning an upgrade for Lynx. There has been a paucity of some spare parts for some helicopter types which has led to short-term cannibalisation of helicopters in theatre. The Department has prioritised spares for operations, missing its targets for the availability of fleets back in the United Kingdom as a result.

7 The Department provides logistic support to United Kingdom forces through the Joint Supply Chain which sits within the Defence Equipment and Support organisation. The end-to-end supply chain stretches from the requirements of operational commanders through to industrial manufacturers in the United Kingdom and elsewhere. The Department uses a series of information systems to provide both inventory control and asset tracking of stocks between the United Kingdom and operational theatres. A system of priority codes is used to provide the Department with measurable targets for delivery of stocks from the United Kingdom to operational theatres.

Despite the challenging operational environments, 8 the Department has successfully delivered around 300,000 personnel and 90,000 tonnes of freight to the two theatres combined over the last two years. The Department has not consistently met its supply chain targets for the timeliness of delivery but there are signs that the supply chain is becoming more resilient. On average since July 2007, 57 per cent of all demands made in Afghanistan and 71 per cent made in Iraq have met the supply chain targets. The Department's performance against supply chain targets has varied monthly over time and is lower for Priority 01 (highest priority) demands than Priority 02. The average length of time a unit waits for a particular demand has however reduced by around 47 per cent in Afghanistan and 33 per cent in Iraq, suggesting the supply chain is becoming more stable and resilient. Further measures being taken to improve the effectiveness of supply include: a rebalancing of the stocks held in Afghanistan; and action to increase the proportion of routine requirements delivered by surface means. The Department's transport for passengers to Iraq, centred on a commercial charter to Qatar, provides a good level of service. Since February 2006, an average of 12.5 per cent of passenger flights to Afghanistan and 16.9 per cent of flights returning to the United Kingdom using the Department's own fleets have been subject to a delay of six hours or more, although these can be

attributed to many factors ranging from enemy action to aircraft reliability. The Department is now operating a complementary route which alleviates the pressure on the military air transport fleet and enables a more timely service to be achieved.

9 Training is an essential military activity which underpins capability and readiness for operations. The Department provides all personnel deploying on operations with training for those specific theatres (called pre-deployment training). Personnel may be deployed on operations either as part of a formed unit or individually. Pre-deployment training builds on generic war-fighting training to equip the individual, unit or formation with a specific skill set for operations in a particular theatre, role or environment.

10 For Iraq and Afghanistan, pre-deployment training is responsive to lessons identified in theatre and commanders are confident of its quality; but it is constrained by a number of factors. These include the difficulty of fitting all the required training elements into the allotted six months, the challenge of replicating operational environments and the large number of individuals who are not deploying with their units and complete short individual reinforcement packages rather than more extensive pre-deployment training. The Department has also, until recently, prioritised the delivery of new Urgent Operational Requirement equipments to theatre, and there have been shortages of equipments to train on that match the equipments in theatre. In response, the Department has introduced a new Operational Training Equipment Pool which has provided trainers with new vehicles and equipments not previously available, but numbers remain limited to support the scale of predeployment training.

The Department's Defence Medical Services provide 11 forward medical facilities and personnel up to "Role 3" which includes deployable field hospitals. The aim of intheatre medical support is to provide care which promptly returns personnel to duty and when necessary stabilises casualties in order for them to be medically evacuated to medical facilities in the United Kingdom. The Department's success in delivering life-saving medical treatment is underlined by the number of 'unexpected survivors' following the most severe of injuries. The introduction of the Medical Emergency Response Teams to quickly take life-saving medical support to casualties and evacuate them speedily to hospital has been a particular success. There is widespread confidence in the healthcare system in both theatres.

12 Accommodation for personnel at bases meets most needs and personnel are generally satisfied with it, although conditions at forward operating and patrol bases are more austere. It ranges from basic tents to more complex tented Expeditionary Campaign Infrastructure to hardened structures. Over the course of the operations in Iraq and Afghanistan the Department has moved from tented to more permanent structures.

13 The Department has a Deployable Welfare Package which aims to provide welfare support to personnel on operations to maintain their emotional and physical wellbeing. This package includes access to communications, leisure and laundry facilities and midand post-tour leave. The Department is delivering the Package successfully, although there are some problems with access to facilities during peak demand as a result of the application of specific planning ratios, and with welfare provision at forward bases.

14 To strike a balance between deploying people on operations, training and spending time with their families the Department has "harmony guidelines" which set out the frequency with which personnel should be deployed on operations. Both the Army and the Royal Air Force are struggling to meet harmony guidelines.

Conclusion on Value for Money

15 We have assessed value for money in terms of the effectiveness of the Department's support for the Armed Forces in theatre. Delivering effective support is complicated by the logistical challenges of supporting forces in distant locations and the harsh environments of Iraq and Afghanistan. In some areas, the Department has achieved significant success, not least the provision of medical support, including life-saving treatment at the front line, and responsive pre-deployment training which prepares personnel well for deployment. In other areas, performance has been less effective. For example new equipment, whilst providing improved capability, has in some cases been both difficult to support and not always available for training. The Department has also found it difficult to meet supply chain targets, in part because of fluctuations in demand. Overall, support to operations in Iraq and Afghanistan has improved over the timeframe we have examined, indicating that the Department's efforts are becoming more effective, despite evolving threats.

Recommendations

16 The Department is moving to a longer-term approach to the Afghanistan campaign, which should enable it to improve the effectiveness of support.

- i Urgent Operational Requirement equipments have performed well but there have been shortages of spares in theatre for some vehicles and insufficient equipments on which to conduct pre-deployment training. The Department has a difficult balance to strike between fielding Urgent Operational Requirements quickly and ensuring that support and training is put in place. The Department should, however, maintain a full capability once equipment is in theatre, through:
 - conducting analysis which takes into account possible scenarios under which new equipment might be used, as operational circumstances change, in order to provide sufficient spares to keep them available until actual usage patterns have become clear;
 - allocating a sufficient proportion of equipment for pre-deployment training so that personnel are up to date and familiar with equipment before arriving in theatre; and
 - cataloguing spares in a timely way, wherever possible before equipment is fielded.

Now the delivery of new equipment fleets, particularly vehicles providing protected mobility, is well underway, the Department should increase the priority it gives to spares purchases and the training fleet, relative to the delivery of vehicles to the operational theatre. For future fleets, it may be appropriate to increase the priority given to spares purchases and the training fleet from the outset.

ii Equipments provided to the Operational Training Equipment Pool are not always equipped to the same level as those deployed in theatre, making training less realistic. The Department should provide training equipment that resembles that used in theatre, either through including all modifications, so that equipments are at "theatre entry standard" or by modifying them so that they adequately represent that standard.

- iii The Department's performance against supply chain targets has been variable and lower for the highest priority demands, although there are signs that the supply chain is becoming more resilient. The Department should alleviate the pressure on the supply chain by smoothing the trend in demand from theatre, where possible, and enabling greater use of lower priority deliveries. It should also further improve and integrate its logistics information systems, including consignment and asset tracking, so users on operations have visibility over the stock already available at different locations in theatre, can track the progress of deliveries throughout the supply pipeline, and see stock availability back in the United Kingdom.
- iv In preparing to drawdown forces from Iraq, the Department has compiled a compendium of assets in theatre as a tool to enable detailed planning for redistribution, movement and repair. It should use this information to verify that it can properly account for all assets, reconciling them against its fixed asset registers, whether returned to the United Kingdom, gifted or exchanged. In continuing to develop its logistic information systems the Department should look to connect this information on its assets in theatre with its asset registers and inventory management systems.
- There is a significant difference in the provision of welfare packages at main operating bases, and at forward operating and patrol bases.
 The Department should roll out more welfare provision to personnel in forward positions in line with its existing planning ratios and, where this is impracticable, introduce more flexibility about the balance of provision between different items; for example, providing a greater number of satellite phones in lieu of internet access.

PART ONE

Equipment

Equipment needed for operations

1.1 This section examines how the Department provides the United Kingdom's Armed Forces with the equipment they need to conduct major operations. We have examined the availability of the Department's equipment to conduct operations and the support provided to these fleets; the progress the Department has made in a number of key equipment capability areas; and how the Department has reacted to the requirements of current operations. We have not examined the military effectiveness of these equipments in conducting war fighting operations.

1.2 The Department requires a range of vehicles, ships, aircraft and other equipment to respond successfully to a range of potential future scenarios. In identifying this equipment the Department constructs potential future scenarios and matches the required equipment capabilities against them. The Department then procures these equipments against a generic set of requirements. These requirements cover the majority, but not all, of the expected ways in which the equipment should perform on future operations. These equipments are resourced from the Department's own budget and form the Equipment Plan.

1.3 In preparing for an operational deployment the Department selects the appropriate equipments to meet the military tasks that may occur. It is clear that not all equipment in the Department's inventory can be used on every operation, in part because the capabilities provided by some equipment will not be needed. On operations, threats and requirements can evolve quickly and the Department may need to develop or adapt technology and equipment in response. In some circumstances the Department's existing equipment may be unsuitable for the task because: the equipment presents an undesirable force posture for the operation; the protection of personnel needs to keep pace with the evolving and increasing threat posed by enemy forces; or because the terrain and/ or climatic conditions reduce equipment performance to unacceptable levels.

1.4 Where capability is needed beyond that available in existing equipment fleets, the Department has a choice either to modify or upgrade existing equipment or to procure new equipment to meet the specific operational requirements. Both the procurement and modification of equipment takes place through the Urgent Operational Requirements process (**Box 1**). Equipment procured through this process is in most cases resourced solely by the Treasury or in some cases jointly by the Department and the Treasury.

Equipment procured specifically for operations in Iraq and Afghanistan

1.5 On operations in Iraq and Afghanistan (known as Operation TELIC and Operation HERRICK), the Department has had to contend with particular challenges in operating equipment: the climate is hot, with temperatures reaching 44 and 51 degrees centigrade in Helmand Province and Basra respectively; and the terrain is very dusty with few roads; in Afghanistan equipment is required to operate at a high altitude relative to that of the United Kingdom; and because of a lack of defined "front

BOX 1

The Department's Principles for an Urgent Operational Requirement

In-service assets: the requirement cannot be met through the redeployment of existing in-service assets.

Theatre-specific: the requirement must be theatre-specific.

Time: in order to qualify as a UOR, a capability must be capable of being deployed in time to make a contribution to an operation.

Quantity: the quantity procured should only be that required to support the operation, unless the value for money case for procuring additional capability is compelling.

line", all coalition personnel are at risk from an evolving enemy threat. To counter these particular circumstances the Department has procured new equipment and enhanced existing equipment specifically for operations in Iraq and Afghanistan through the Urgent Operational Requirements process.

1.6 By March 2009 the Department had approved £4.2 billion on Urgent Operational Requirements (Figure 1) for operations in Iraq and Afghanistan.
Enhancements to existing capabilities for these operations have included modifications to helicopters and aircraft, better protection for existing vehicles, early attack warning systems for bases, and electronic counter-measures. New equipment has included protected vehicles such as Mastiff and Jackal, accounting for around a third of the total expenditure, Unmanned Aerial Vehicles, deployable accommodation, communications and surveillance equipment. The Department has agreed with the Treasury an estimate of £635 million in 2009-10 for Urgent Operational Requirements.

1.7 In the view of Armed Forces personnel in both theatres throughout the chain of command, Urgent Operational Requirement equipment is performing well in Afghanistan and Iraq. Arrangements for the support of these "non-standard" upgrades and equipment are



Source: National Audit Office analysis of Ministry of Defence data

NOTE

Final figures for FY08/09 are not yet complete; the anticipated total approval figure is approximately \$800 million.

however not always as effective as they could be. This shortcoming reflects the fact that the Department has to make difficult judgements over the speed of delivery to theatre versus the maturity of the support and training solutions. As a result, equipment is often delivered to theatre with only limited trials and development achieved, as in the case of the Bulldog vehicle. In some cases, insufficient spares were initially procured to support the equipment's use in a different role, as for the Mastiff vehicle in Afghanistan (Box 3). In addition, personnel in theatre may receive limited training on the particular equipment because there are limited numbers of the equipment in the training pool.

Protected Mobility Provided by Land Vehicles

1.8 Since the end of the main combat operations in Iraq in 2003 and the deployment to Helmand province in Afghanistan during 2006, the Department has been faced with a number of equipment challenges. One of these challenges has been the procurement and modification of sufficient protected vehicles to carry out operations successfully in both urban and rural environments. Over the same time period the threat from road-side bombs and improvised explosive devices (IEDs) in Iraq, and more lately in Afghanistan, has increased (Figure 2 overleaf). The Department's procurement and modification activity has centred on improvements to the side and under-belly armour of existing vehicles such as Bulldog, Combat Vehicle Reconnaissance (Tracked) (CVR(T)), Challenger 2 and Warrior; and the introduction of new vehicle fleets to provide greater mine and blast protection, such as Mastiff.

1.9 The Department has introduced several new vehicles into service (Figure 3 overleaf and Box 2 on page 11). These provide soldiers with better protection through improved armour and the use of electronic countermeasures. Military commanders consider that protection depends at least as much on tactics and techniques as it does upon the effectiveness of the armour and other features. The use of the Jackal vehicle is a good example. It has been designed to have good mobility and carry heavy weapons, so uses mobility and firepower to achieve protection, along with under-belly armour. The Department told us that the Mastiff and Jackal vehicles, along with the armour upgrades to Warrior, had all performed well and confidence relating to the vehicles' reliability and protection among the Armed Forces personnel we spoke to in both theatres was high.





BOX 2

Mastiff, Jackal and Vector



The **Mastiff** vehicle used by British Forces in Afghanistan and Iraq is based on the United States Marine Corps Cougar vehicle, with additional armour and modifications. The work is performed in the United Kingdom by NP Aerospace. The vehicles are procured under a Foreign Military Sales agreement between the Department and the United States Marine Corps.



Vector has been used by British Forces in Afghanistan since April 2007. It is a light protected patrol vehicle, based on the in-service Pinzgauer vehicle. Originally procured specifically for Afghanistan the Department decided to deploy Vector to Iraq in May 2008.



Jackal is currently used only in Afghanistan; it was procured in 2008 as an enhancement to the Land Rover WMIK (Weapons Mount Installation Kit) capability. The Jackal provides an increased range, payload, mobility and protection over the Land Rover WMIK.



1.10 16 Air Assault Brigade and 3 Commando Brigade have had problems with the performance and mobility of Combat Vehicle Reconnaissance (Tracked) (CVR(T)) vehicles because of the combination of theatre conditions and the extra weight of the upgrades, in particular the additional armour and electronic counter-measures equipment. The Bulldog, Vector and Snatch fleets are near to, or are exceeding, their designed weight-carrying capacity and as a consequence reliability has suffered. The Department has a programme to upgrade the CVR(T) vehicle, including enhancements to its engine and gearbox.

1.11 Vector was procured as a lightweight patrol vehicle for Afghanistan, to address the mobility, payload and capacity constraints of Snatch II, while improving on the armour protection. The reliability of the suspension and wheel hubs has been poor and, when combined with low spares availability, led to vehicle availability levels in Afghanistan being on average below 60 per cent in 2008. Vector also has limited under-belly armour to counter the evolving IED and mine threat in Afghanistan and as a result confidence in the use of the vehicle was low among commanders, both those in theatre and those who have recently returned. As a consequence of the evolving threat, the use of Snatch Land Rovers has increased. The Department has responded to the gap in capability by modifying a small fleet of Snatch vehicles to improve their mobility, under-belly armour and protection from IEDs and mines. Thirty-two Snatch Vixen vehicles were upgraded at a cost of £5 million and deployed to Afghanistan in December 2008.

1.12 The Department stipulates a required level of availability for vehicles on operations. This target is determined by the Operational Sustainability Statement for each theatre. Since Jackal entered service in April 2008 in Afghanistan the fleet of vehicles have maintained on average 81 per cent availability against an 80 per cent target. Since June 2008 Warrior vehicles deployed to Iraq have maintained an average of 91 per cent availability and Bulldog vehicles 86 per cent, both against an 85 per cent target. Mastiff has performed well in both theatres. There have, however, been some problems with spares supply, affecting Mastiff (**Box 3**) and other Urgent Operational Requirement vehicle availability.

1.13 In 2009, the Department will begin to deploy to Afghanistan a total of 564 new protected vehicles and augment the existing proven vehicle fleets, approved at a cost of around £800 million. These include Jackal, Mastiff, Ridgeback, Panther and Tactical Support Vehicles Wolfhound, Husky and Coyote.

Helicopters

1.14 Helicopters provide essential capabilities for operations in both Iraq and Afghanistan. Apart from transporting personnel and supplies, helicopters are also used for surveillance, medical evacuation and to deliver fire support to troops on the ground. Helicopters have often been the preferred method of transportation because of the rough terrain, absence of suitable roads, and the threat to land travel from ambush, roadside bombs, IEDs and mines. Helicopters therefore both require support and provide an important component of logistics support in themselves, in addition to delivering military operations. We have focused on the availability of helicopters to conduct all of these roles.

BOX 3

There are currently 87 Mastiff vehicles deployed in Iraq and Afghanistan. The vehicle has performed well in theatre and confidence in its ability to provide good levels of protection is high. Availability of Mastiff in Afghanistan has been lower than in Iraq, and between February and October 2008 was on average 23 per cent below the Department's target level for Operation HERRICK (Figure 4).

Availability since February 2008 has suffered primarily because of a shortage of key spares. The Mastiff vehicle is heavily tasked in Afghanistan. Originally the majority of vehicles were bought for use in Iraq where they are predominantly used on-road in a similar use to the United States vehicles. When it was deployed to Afghanistan, however, the use of Mastiff evolved from that of an on-road protected transport vehicle to a patrol vehicle used regularly on cross-country activity. This aggressive off-road use causes durability problems with suspension components and accounts for 46 per cent of vehicle failures. The initial \$4 million spares package was based on the package the United States Marine Corps use to keep the deployed and training fleets of vehicles on the road for a year, bolstered by an additional \$1 million spares buy in May 2007. Once used off-road, the spares level proved inadequate: for example the deployed fleet of 87 Mastiff vehicles consumed an additional 176 axles between

December 2006 and January 2008. The Department told us that consumption of certain spares in both theatres has been high. On occasion the demand outstripped the ability of the supply system to deliver, for a number of reasons:

- The contract with Force Protection Inc. did not allow NP Aerospace to find alternative sources of spares other than direct from the United States manufacturer. The manufacturer, under United States law, was required to satisfy demands of the United States Marine Corps before any United Kingdom demand for spares. The Department told us that significant quantities of spares intended for the United Kingdom were diverted. In July 2008 NP Aerospace were given contract authority to source spares from alternative suppliers.
- The speed with which Mastiff was procured meant there was no codification of spare parts (where spares are catalogued and allocated a NATO stock number). Units demanding spares therefore had to identify them in the relevant Army Equipment Support Publication, but multiple editions of these publications made this more difficult. As a consequence, ordering of spares was slow and convoluted. The Department told us that they planned to complete full NATO codification for Mastiff spares in 2009.



A new definition of 'Limited Role' was introduced in June 2008. Limited role vehicles would previously have been classed as 'fit'.

1.15 Four principal types of helicopter are currently deployed to Afghanistan (Apache, Chinook, Lynx and Sea King) and three types are deployed to Iraq (Merlin, Lynx and Puma). In both theatres, some helicopters are held at high readiness, able to respond to a particular incident or emergency 24 hours a day (Figure 5). The remaining serviceable helicopters are tasked on a daily basis to move troops and materiel, or to provide escort to the immediate response helicopters. In addition, Apache helicopters are also tasked to provide "top cover" support to troops out on patrol.

1.16 Over the last two years the Department has been able to deliver on average five per cent above its target for serviceable helicopters to support operations (**Figure 6**). In Afghanistan and Iraq, whilst serviceability and flying hours are both high in operational theatres (**Figure 7**), the availability of spare parts in theatre has been a source of concern. Shortages have meant that short-term cannibalisation of helicopters in theatre has been required as a temporary expedient to maintain a serviceable fleet. To reduce the levels of cannibalisation the Department is planning to introduce deployable spares packs and consolidate in-theatre spares stock. Spare parts are prioritised to helicopters in theatre over those in the United Kingdom. As a consequence of the shortages of spares and maintenance personnel, availability of

United Kingdom-based helicopters since 2006 has been on average 11 per cent below the Department's target, reflecting the priority the Department gives to equipment deployed on operations.

1.17 There are shortages of spare parts for both Merlin and Apache helicopters because of a number of factors. The initial procurement of spares for both helicopters is still being delivered from industry and as a consequence there are some key components in short supply. The Department's view is that the benefits of deploying Apache early outweighed the risk posed by the lack of spare parts. As a result there has been a degree of cannibalisation of United Kingdom-based helicopters, across both fleets, to support operations in Iraq and Afghanistan.

1.18 None of the helicopter types were designed specifically to undertake missions in hot and dusty countries such as Iraq and Afghanistan. The mountainous nature of Afghanistan also means that helicopters are forced to fly at higher altitudes where the air is thinner and greater engine and rotor-blade performance is required. Of the six helicopter types only the Apache, Puma, Merlin and Chinook helicopters have been able to cope consistently with the harsh environmental conditions found in Iraq and Afghanistan. Lynx helicopters have struggled in the intense midsummer heat in both theatres.

5 How t	ne Department uses its helicopters in Afghanistan	
Helicopter	Role	
Chinook	Very high readiness Incident Response Team (24 hours a day; includes Medical Emergency Response Team)	Ready to respond
	High readiness (24 hours a day; used for short notice re-supply throughout Helmand Province)	Ready to respond
	Tasked with transport and re-supply operations within Helmand Province fulfilling an agreed flying programme coordinated between Task Force Helmand, Regional Command (South) and Joint Helicopter Force (Afghanistan)	Tasked daily
Apache	Very high readiness (24 hours a day; a helicopter will deploy to support troops on the ground or to escort the Medical Emergency Chinook)	Ready to respond
	Tasked to provide escort to support helicopter tasking and fire support to ground troops on patrol	Tasked daily
Sea King	High readiness (24 hours a day; used for short notice re-supply throughout Helmand Province)	Ready to respond
	Tasked with transport and re-supply operations within Helmand province fulfilling an agreed flying programme coordinated between Task Force Helmand, Regional Command (South) and Joint Helicopter Force (Afghanistan)	Tasked daily
Lynx	Tasked to provide mutual support in escorting support helicopters such as Chinook and Sea King. Some limited troop movement tasking	Tasked daily
Source: Nation	al Audit Office analysis of Ministry of Defence data	





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In December 2008 the Department announced that it was funding a £70 million Urgent Operational Requirement to upgrade Lynx helicopters with new engines, which will provide a year-round capability. This upgrade will enable Lynx to provide more hours performing a range of tasks such as escorting support helicopters, reconnaissance, and convoy protection, thereby freeing up Apache to support ground troops. The first helicopter should be available by the end of 2009. The Department, working in conjunction with industry, has in a similar way overcome performance limitations of its Sea King helicopters (**Box 4**). **1.19** In addition to the constraints placed on helicopter performance, the highly erosive conditions (**Box 5**) have had a significant impact on the levels of unscheduled maintenance required. Engineering manpower and spare parts required in both operational theatres and in United Kingdom depth maintenance facilities have increased. The amount of additional work required on top of standard maintenance packages in the depth facilities amounted to some 42,500 man hours across the fleet in 2007-08, primarily on the Chinook and Lynx helicopters.

BOX 4

Sea King helicopter modification for Afghanistan

In 2007, the Department's ability to deploy Sea King helicopters to Afghanistan was constrained by the aircraft's performance. Despite being routinely deployed to Iraq, the additional environmental challenge of operating in the high temperature and high altitude conditions of southern Afghanistan was such that the aircraft offered insufficient performance.

A new main rotor blade had been identified as a potential solution to the Sea King performance by the aircraft's Integrated Project Team. In conjunction with a new tail rotor and the installation of upgraded Gnome engines, the new rotor blades had the potential to offer improved speed and lift. Working in partnership with industry, the Department tested and modified a Sea King, after which a recommendation to progress to the design and manufacture phases was made.

A modified Sea King undertook the first flight in June 2007 before proceeding onto a programme of high altitude flight testing in Colorado in the United States. In October 2007, as Navy Command staff reviewed the safety evidence for flight clearance, 846 Naval Air Squadron pre-positioned its aircraft in Cyprus in preparation to commence pre-deployment training as soon as a clearance to fly was granted. Following this brief period of environmental training in Cyprus, the Squadron deployed to Afghanistan and declared an initial operating capability in November 2008, 11 months after the Business Case approval.

The main rotor blades, in combination with the five bladed tail rotor hub and Gnome 1T engine has enabled a 25 per cent increase in the speed of the Sea King, enabling it to operate in company with Apache and Chinook helicopters in theatre without reducing typical transit speeds. A secondary benefit of the modification is the revised downwash pattern of the Carson blades when in the hover. In such conditions, the new blades generate a "doughnut" shaped downwash which improves the pilots' ability to maintain visual reference with the ground when landing in dusty conditions. The upgraded helicopters began transport missions in Afghanistan at the end of November 2008.

BOX 5

Environmental Damage and the Department's Preventative Measures

Environmental Damage

There are limited ways in which the Department can solve the problems of operating and basing helicopters in the hostile environments found in Iraq and Afghanistan. For example, on landing, helicopter rotor blades produce vortices which can throw large amounts of dust and sand in to the air, a scenario called "brown out", which not only makes it difficult for the pilot to see, but erodes metal surfaces and attacks the internal parts of engines and other components. When the sand and dust mixes with oil it becomes a grinding paste, rapidly eroding internal parts; rotor blade and engine lives can be between 75 and 83 per cent shorter when compared to activities in the United Kingdom. The Department has developed a number of measures to protect aircraft.

Preventative Measures

- Anti-erosion tape and paint applied to the leading edges of the rotor blades
- Particle filters to avionic equipment compartments to reduce sand and dust entering
- Increased use of lubrication and modifications to reduce the contamination of hydraulic oil with sand and dust
- Improvements to repair and maintenance management schemes
- Shields used to minimise sand and dust damage to the tail rotor drive shaft during fitting or removal
- Enhanced ballistic windscreen protection
- Improved wash down facilities
- Engine specific modifications, such as air inlet particle separators to reduce sand and dust entering the engines

1.20 The Department has augmented the available helicopter capacity in Afghanistan with two commercial arrangements;

- From 1 February 2008, a NATO contract provides commercial helicopter support to NATO forces in Southern Afghanistan. This contract provides the United Kingdom as a coalition partner approximately 262 additional helicopter hours per month at a cost of around £9 million to date.
- From the end of November 2008, a separate contract let by the Department provided up to a maximum of 350 additional helicopter hours per month over five months, primarily to cover the additional hours required to deliver the Christmas post, at a cost of £11.2 million.

1.21 Helicopters are a key operational capability. In Afghanistan, senior commanders on the ground have sufficient helicopters to undertake their key tasks, but greater availability of these helicopters would give them more flexibility in the planning of deliberate offensive operations. The Department continues to work hard to increase the number of flying hours available to commanders, for example, through the re-deployment of Merlin helicopters from Iraq to Afghanistan at the end of 2009 and changes in the way helicopters are used within theatre.

Other Equipment Types

1.22 This section looks at some of the Department's other equipment types which provide a broad range of capabilities to support operations.

Unmanned Aerial Vehicles

1.23 In Iraq and Afghanistan the Department use Unmanned Aerial Vehicles to provide a persistent intelligence and reconnaissance capability. They have transformed the way commanders on the ground can see the area around them and therefore identify potential enemy forces. The Department has three main Unmanned Aerial Vehicle fleets (**Box 6**).

1.24 The imagery that the UAVs can produce, in particular the live video images, are highly effective at providing commanders with live pictures of the battlefield. Capability can be limited by the weather and requires the use of ground stations to control the UAVs and view the imagery.

1.25 The UAV fleets require significant levels of support. The UAV manufacturers themselves are small companies and have limited levels of production capability. As a result, the global pool of spares is small and has to support not just the United Kingdom's but other nations' aircraft. Support is provided by the prime contractors for each of the Hermes 450 and Reaper aircraft with high levels of aircraft availability being maintained.

Electronic Counter-Measures

1.26 The Department is doing much to improve its ability to counter the threat posed by roadside bombs and IEDs, in particular by developing electronic counter-measure systems to create a safe "bubble" around vehicles and personnel. Whilst effective, these systems are inherently heavy and require large amounts of power. In Afghanistan vehicle suspensions had been broken because of the weight of the equipment carried, which included ECM systems and their batteries. In both theatres individual soldiers on patrol carried electronic counter-measure systems which, while life-saving, were extremely heavy. The power requirements of the systems mean that soldiers also have to carry between four and six spare batteries per day.

BOX 6

The Department's Unmanned Aerial Vehicles

The **Reaper** Unmanned Aerial Vehicle (UAV), also known as Predator B, began operations in Afghanistan in October 2007 and capability continues to be built up. None have been shot down, but one was destroyed following a forced landing and one has been damaged as the result of a hard landing. Reaper can also carry weapons. Reaper weighs approximately 4,500 kg and has a 20-metre wingspan.

Hermes 450 is an off-the-shelf UAV, which is related to the Department's forthcoming Watchkeeper; this Urgent Operational Requirement system has been operating in Iraq and Afghanistan since mid 2007. The introduction into service of Hermes 450 has provided a good basis with which to prepare for the eventual use of Watchkeeper. Hermes 450 weighs approximately 450 kg and has a 10.5-metre wingspan.

The **Desert Hawk** (mini-UAV) was first deployed to Iraq in 2003 and to Afghanistan in July 2006. It has since been upgraded to improve its range and payload-carrying capacity. Desert Hawk is hand-launched, weighs approximately 5 kg and has a 2-metre wing span. **1.27** In Afghanistan electronic counter-measure systems were only partly "codified" – the process whereby equipment stores are assigned serial numbers, catalogued and allocated a NATO stock number. Ordering of spares, moving systems from one vehicle to another and the tracking of systems in theatre was therefore difficult. These systems also require specialist calibration equipment to ensure that they are functioning within the required limits, and there has been a lack of properly calibrated test equipment in Iraq.

Communications equipment and batteries

1.28 The Department uses a range of communications equipment within Afghanistan. The operational context of Afghanistan means that users require beyond line of sight communications, in mountainous terrain and in dry conditions where radio communication is limited. Bowman, as a radio-based communications system, is limited by the operating environment but, where it has been used, it has proved effective at providing secure voice communication between both fixed locations and patrolling troops. The use of satellite communication systems is available to some United Kingdom forces. Whilst these systems are highly effective they are limited in number and require careful management of access to scarce satellite bandwidth.

1.29 In September 2008, the Department conducted an audit of front-line Bowman stores, materiel and equipment in Afghanistan. Using expert logistic and equipment support personnel, the Department put in place improved accounting and storage arrangements. For example, since November 2008 all units that have Bowman radios are now required to account for them using the UNICOM unit accounting system and report their holdings every fortnight to Headquarters Land Forces and Joint Force Support (Afghanistan). There is however a shortage of ancillary equipment for the Bowman radio system, such as antennae and speakers, in both Iraq and Afghanistan. Both the weight and the short battery life of the system are taken account of by commanders when conducting planning.

1.30 Approximately 20,000 batteries are used every three months in Afghanistan. Battery requirements for 3 Commando Brigade's radios, electronic counter-measures and other electronic equipment needed to be re-supplied almost daily, adding to the significant re-supply burden.

Logistic Vehicles and Equipment

1.31 The Department uses the Rough Terrain Container Handler to move containers within Camp Bastion and Kandahar in Afghanistan and on the Contingency Operating Base in Iraq. The container handler is an important capability enabling the movement of ISO containers around bases, but is a complex piece of equipment and its reliability is a significant issue in both Iraq and Afghanistan. When we visited Camp Bastion two thirds of the vehicles deployed required maintenance. In Iraq low reliability levels of the Department's four vehicles have been mitigated through the use of a contractor, with four additional vehicles and experienced drivers, which is working well.

1.32 The Department has upgraded and modified existing equipment in-theatre to counter the rapidly changing threat conditions. One example is the modification of the Demountable Rack and Off-road Pick-up System (DROPS) logistic vehicle, which is used for delivery of stores and equipment. The vehicle was initially deployed to theatre with no armour protection from IEDs and mines, but is heavily used on combat logistic patrols. Working together, the Royal Electrical and Mechanical Engineers and the Department's in-theatre Scientific Advisor devised a solution, tested it and subsequently fitted the modification in theatre.

1.33 The Department's introduction of the new Support Vehicle (Recovery), in November 2008, has been a success in Afghanistan, providing a greatly improved capability over the old Foden recovery vehicle. The first use of the vehicle was to recover two of the heaviest vehicles, a Heavy Equipment Tractor and a Mastiff, which it managed with ease. The Support Vehicle (Recovery) requires fewer operators and can recover vehicles quicker than the Foden, reducing the risk to recovery mechanics and force protection troops during a recovery operation. In peacetime use SV(R) can cope with all expected recovery lifts. On operations, vehicles weigh more because of additional armour and other equipment and SV(R) can struggle with the heaviest suspended loads. However, in this situation, recovery mechanics can reduce the weight of the vehicle being recovered by removing an axle.



How the Department provides logistic support

2.1 This section sets out the ways in which the Department provides generic logistic support to operations and major exercises. It goes on to examine how the Department has performed in providing support to operations in Iraq and Afghanistan.

2.2 The Department provides logistic support to United Kingdom forces through the Joint Supply Chain which sits within the Defence Equipment and Support organisation. It is responsible for supply chain operations from the United Kingdom to operational theatres; the storage and distribution of equipment, spares and other materiel within the United Kingdom; and the eventual disposal of equipment and materiel.

2.3 The end to end supply chain stretches from the requirements of operational commanders to industry (**Figure 8 overleaf**). In-theatre commanders control logistics assets in operational theatres. The Joint Supply Chain organisation controls the operation of the strategic link between the United Kingdom and operational theatres through which all materiel, personnel and equipment flow, known as "the coupling bridge". It also provides input to Integrated Project Teams who liaise with industry. The co-ordination of day-to-day logistic supply and support to operations, including the reverse supply chain, is provided by Defence Supply Chain Operations and Movements (DSCOM).

2.4 The Department has made a number of important changes since the end of major combat operations in Iraq in 2003, including: the establishment of a single process owner for end-to-end logistics activity, single ownership of the coupling bridge by the Chief of Joint Operations, and improving the performance of the United Kingdom-based stores and distribution processes.

Logistics

2.5 The Department has a system of priority codes with which it sets its delivery targets to theatre. The unit in theatre demanding an item, such as a spare part, decides the urgency with which they require its delivery. This urgency level then dictates the standard priority code used for the particular item and determines whether the item travels by sea or air.

2.6 The Department aspires to send most items to theatre by sea, using a combination of charter and its fleet of Roll-on Roll-off ferries, as more cost-effective than air transport. Ship and surface transport is however, slower. The Department has a fleet of aircraft with which it can move personnel and freight to and from operational theatres. On arrival in theatre items are transported to the end user or store by a combination of air, land or sea, and using both contracted and military transport.

2.7 The daily tasking of the air transport fleet is complicated by a number of factors. The fleet consists of 69 aircraft, but the number available to the Department to conduct support operations on any one day is limited. The fleet provides a mixture of capabilities in terms of how much they can carry and their potential range. Some of these aircraft also have dual transport and air-to-air refuelling roles such as the Tristar KC1 and the VC10.

2.8 The age of some of the aircraft, the level of their operational usage and the threat environment means they are often undergoing maintenance, capability upgrades, or modification. These activities can lower the number of available aircraft by as much as 50 per cent for some fleets, in particular for the Tristar, VC10 and the K variant of the C130 Hercules fleets (**Figure 9 on page 21**). The more complex and intrusive capability upgrades can take aircraft out of service for many months. The aircraft are also required for aircrew training and to support both exercises and operations.



2.9 Knowing the location and status of stocks in theatre or in transit enables the Department to prioritise their use. In order to track items through the supply chain the Department uses a range of logistic information systems **(Box 7)**. These systems only provide a limited tracking capability: a consignment is only visible once it passes through a specific point in the logistics chain, but cannot be tracked at all points along the course of its journey. Nonetheless consignment tracking has improved since the initial deployment to Iraq in 2003.

2.10 Provisioning for stock is important both in operational theatres and at the base supply depot in the United Kingdom. Historical usage data and operational plans are used to maintain stable stock levels in-theatre. At the base supply depot, historical theatre usage along with data on industrial lead times are used to maintain enough stock on the shelf to satisfy any stock demands from theatre. To improve the provisioning of stocks, the Department is introducing new inventory planning and modelling policies, training inventory managers and reviewing the balance of stocks held in operational theatres. The Department expects that these initiatives, together with the introduction of improvements in asset/ consignment tracking, will help to place more accurately the right stocks in theatre.

The Royal Air Force's air transport fleet

A: 6	N 1		
Aircraft	Kole	Fleet Size	Average Available Daily
VC10 CMk1	Personnel and Freight Transport; Air to Air refuelling	10	4-5
VC10 K3/K4	Air to Air refuelling	5	3-4
Tristar K1	Air to Air refuelling	2	
Tristar KC1	Personnel Transport; Air to Air refuelling	4	4-5
Tristar C2	Personnel Transport	3	
C130K 1/3/3a	Personnel and Freight Transport	15	8
C130J 4/5	Personnel and Freight Transport	24	14
C17	Personnel and Freight Transport	6	4
Total		69	37-40

Source: National Audit Office analysis of Ministry of Defence data

BOX 7

Asset and Consignment Tracking Systems

Visibility In-Transit Asset Logging (VITAL). Developed by the Department in 1993-94, it interfaces with both warehouse and inventory systems and air movement information systems.

RN Invoicing and Delivery Systems (RIDELS). Developed by the Royal Navy in 1990-93, RIDELS is confined to the simpler static environment of the Naval Bases and interfaces with both warehouse and inventory systems.

Logistic IT System (LITS) was designed specifically for the Air environment in 1993-94.

Total Asset Visibility Minus (TAV(-)). This is based on the United States Army Total Asset Visibility System but provides a more limited capability. The Department procured the Total Asset Visibility Minus (TAV(-)) prior to Operation TELIC 1. It has continued to be used since and has enhanced the tracking of ISO containers. Integration of Systems. The integration of TAV(-) with VITAL and RIDELS has significantly improved consignment tracking, but a consignment is only visible once it passes through a specific logistics node (a point in the supply chain where the TAV(-) reader would "read" and recognise the consignment), and cannot be tracked at all times throughout the course of its journey. Typically there are TAV(-) nodes at strategic locations along the supply chain route such as the Air and Sea Points of Embarkation and Disembarkation. Consignment data stored on VITAL and RIDELS can be updated automatically using TAV(-). Once an item arrives in theatre the Theatre Logistics Group will track items up to the end of the logistic nodes at formation level using VITAL. Items moved forward to unit level are tracked using a paper trail and accounted for at unit level using a logistic application called Unit Computing (UNICOM) or manual accounting methods. Reliable tracking relies therefore on correct procedures and documentation being used throughout the item's journey.

2.11 The Department regularly uses contractors to support operations. Contractors can provide a range of capabilities, from laundry facilities at operating bases to landing Unmanned Aerial Vehicles. The Department also uses locally employed contractors to support operations.

Strategic Logistics Support to Iraq and Afghanistan

2.12 There are two main routes or lines of communication in Iraq and Afghanistan: by air, and by sea and surface. Personnel are flown to both Afghanistan and Iraq. Freight can be flown direct to Basra in Iraq and to Kandahar and Camp Bastion in Afghanistan. Freight also travels by sea

to Iraq via Umm Qasr (Figure 10) and to Afghanistan via Pakistan then on to Camp Bastion and Kandahar over land (Figure 11). All transport through Pakistan is provided by a United Kingdom contract with Seafast Logistics who in turn contract with a local transport provider, who has achieved a high level of success.

2.13 Since January 2006 the Department has successfully moved approximately 201,000 personnel and 25,750 tonnes of freight and equipment by air and sea from the United Kingdom to and from Iraq; and approximately 186,000 personnel and 64,260 tonnes of freight and equipment by air and sea from the United Kingdom to and from Afghanistan.





2.14 The Department uses sea lines of communication to both Iraq and Afghanistan when timeframes allow. Certain stores and materiel have to be flown to both Iraq and Afghanistan (**Box 8**). No munitions, sensitive or "war-like" stores are sent to Afghanistan by sea because the line of communication passes through insecure areas. The Department flies all personnel to theatres and its policy is that all passenger-carrying aircraft in Iraq and Afghanistan should be fitted with defensive aids suites; only military aircraft, therefore, can fly the final leg into theatre.

2.15 The Department transports personnel to Iraq using a commercial charter flight from Royal Air Force Brize Norton to Qatar then on to Iraq using the Department's C130 Hercules aircraft. The commercial charter provides a good level of service.

2.16 The Department transports personnel to Afghanistan using its own fleet of aircraft and there have been some significant delays (**Figure 12**). Since February 2006 an average of 12.5 per cent of flights to Afghanistan, and 16.9 per cent of flights returning to the United Kingdom, have been subject to a delay of six hours or more. Delays cannot be attributed to any single factor as the weather, enemy action, and availability of landing slots at Kandahar's coalition airfield all have an impact.

2.17 The Department's air transport fleet is small, consists of aircraft types that are old by comparison to modern civilian fleets and is therefore susceptible to mechanical breakdown. In addition, the integration of modern defensive aids suites on to these aircraft has caused reliability problems. The availability of the Tristar fleet, the Department's main passenger carrying aircraft, has been low (**Figure 13**). Of the seven Tristar passenger-carrying aircraft, on average 45.5 per cent since January 2006, have been unavailable to support operations. Significant effort by those responsible for the air transport fleet has enabled the Department to deliver the overall task but the airbridge remains under considerable strain. To mitigate this situation, the Department is also operating a complementary route to Afghanistan, using a civilian charter to the Middle East and a C17 from there to Kandahar. This alleviates the pressure on the Tristar fleet and enables a more timely service to be achieved.

BOX 8

What the Department flies to Iraq and Afghanistan

- Personnel
- Medical supplies
- Stores demanded through the supply chain as a Priority 01 or a Priority 02 requirement
- Munitions for Afghanistan but not always for Iraq
- Fresh food supplements to Afghanistan
- Any classified materiel or equipments incorporating classified materiel and "war-like" stores





2.18 The Department uses charter aircraft to complement the military air transport fleet to move personnel, freight and equipment to Iraq and Afghanistan (Figure 14). In some circumstances, as set out in the Defence Planning Assumptions, the Department uses large freighter charter aircraft because its own military aircraft are unavailable or because they are unsuitable to transport volumes of extremely heavy or outsize equipment.

2.19 From February 2007 to October 2008, the Department chartered 799 aircraft at a cost of £102.3 million to support Iraq; and 613 aircraft costing £125.9 million in support of Afghanistan; a total of £228.2 million (Figure 14). Over 41 per cent of these charter aircraft are small freighters, on average an additional 28 small freighter aircraft every month, costing approximately £4.5 million. Although the Department procured a sixth C17 aircraft in July 2007, it still needs to charter these small freighter aircraft, as well as large freighter aircraft for outsize loads.

Supply of key stocks in theatre

2.20 Equipment, ammunition and spares are delivered directly to main operating bases such as Camp Bastion or the Contingency Operating Base, by the Joint Supply Chain. The delivery of fuel, fresh food and water is provided by contractors. The Department pays for some deliveries such as fuel when the contractor delivers to main operating bases such as Camp Bastion. Whilst the Department has broadly achieved success in maintaining the supply of commodities to main operating bases, there have been some problems with the guarantee of supply in Afghanistan though these have been effectively mitigated:

- In July 2008 holdings of bottled water at Camp Bastion were just ten per cent of the mandated target. The Department has since conducted a review of stock holdings accurately to reflect the numbers of personnel supported in the camp and, with contractor support, has developed a water bottling plant at Camp Bastion and has developed the provision of potable water in forward locations by means of boreholes and military water purification equipment. After some initial production line difficulties, this plant produces a consistent and significant amount of bottled water each day. It has enabled a stock of bottled water to be established and reduced the burden on the contracted delivery of water into the camp; and
- In July 2008 the stock of fuel held at Camp Bastion was approximately five per cent of the storage capacity against an 80 per cent target. The shortage arose because the actual consumption of fuel was not compared to the predicted rate and at times could be as much as 100 per cent higher. Consumption was therefore outstripping supply and this imbalance was exacerbated by the challenge of delivering fuel in theatre. To restore fuel levels the Department was forced to enact its contingency plan and look for additional suppliers of fuel to supplement the existing NATO agreement with a single prime contractor, setting up four further fuel delivery contracts. Since July 2008, both the stocks of fuel and the fuel storage capacity at Camp Bastion and other operating bases have increased and fuel is regularly maintained at the mandated 80 per cent level. The Department now has a more rigorous approach to predicting when fuel re-supply orders are needed and a more robust contingency plan in place should shortages arise in the future.

2.21 The Department also uses contractors in a number of roles at main operating bases, such as the provision and maintenance of telephones and internet services, and the provision of engineering supplies. In November 2008 there were 2,660 contractors working in Afghanistan. In Afghanistan, the Department spends approximately £42 million on theatre-let contracts, predominantly with companies based in Afghanistan or the surrounding region. In addition there are United Kingdom-let contracts such as the three-year "soft multi-activity contract" which includes catering, laundry, waste management facilities, vermin control and the provision of gym assistants on camp. This contract was let to KBR (UK) on 1 January 2008 and is worth an estimated £42 million. The Department has

contract staff in theatre to oversee its contracts and has made progress in consolidating them over the last two years. The Department and commanders in theatre told us that the contractors were performing well.

2.22 The Department provides logistic support in Iraq and Afghanistan to each of the forward operating bases, using largely military personnel and equipment. The local distribution of materiel, fuel, water, rations and equipment is both difficult and dangerous, given the dispersal of locations (**Figure 15 overleaf**) and the increased incidence of IED and mine attacks. The threat to combat logistic patrols (**Box 9 on page 29**) has necessitated better armour protection for logistic vehicles.

			Op TELIC				o	p HERRICK		
	Personel Movement	Small Freighter	Large Freighter	Monthly Total	Cost £m	Personel Movement	Small Freighter	Large Freighter	Monthly Total	Cost £m
Feb 07	17	6	5	28	1.92	0	12	4	16	1.77
Mar 07	12	17	2	31	1.79	11	13	3	27	3.48
Apr 07	20	26	0	46	3.01	14	13	8	35	3.78
May 07	19	20	6	45	5.24	1	13	9	23	4.24
Jun 07	16	23	5	44	4.08	0	14	5	19	3.77
Jul 07	18	24	7	49	3.58	1	12	15	28	5.50
Aug 07	19	10	9	38	7.47	0	14	7	21	5.37
Sept 07	17	10	5	32	8.00	16	13	9	38	7.42
Oct 07	19	26	7	52	3.13	20	15	10	45	7.47
Nov 07	28	9	14	51	6.73	0	15	12	27	4.69
Dec 07	20	9	13	42	5.50	4	17	6	27	3.70
Jan 08	17	10	0	27	5.37	2	13	9	24	5.65
Feb 08	16	8	4	28	4.83	3	14	4	21	5.24
Mar 08	18	9	8	35	10.14	16	14	7	37	5.78
Apr 08	19	15	1	35	4.32	14	13	7	33	9.38
May 08	31	10	7	48	4.73	1	13	7	21	6.10
Jun 08	16	11	6	33	6.44	0	13	4	17	5.56
Jul 08	18	15	7	40	2.88	1	13	15	29	8.47
Aug 08	17	9	8	34	4.19	2	14	11	27	6.92
Sept 08	17	10	6	33	4.51	15	13	8	36	11.46
Oct 08	28	15	1	28	4.48	28	22	12	62	10.24
Totals	402	292	121	799	102.33	149	293	172	613	125.98
Source: Nat	ional Audit Offi	ce analysis of	Ministry of De	efence data						

The quantity, type and costs of charter aircraft used to support operations since Jan 2007



2.23 In October 2008, combat logistic patrols provided 49 per cent of all logistics re-supply within Helmand province, with the remainder achieved through the use of military helicopters, contracted civilian helicopter support and air despatch from Royal Air Force Hercules aircraft. Although military helicopters deliver some essential logistic support, they are focused on the movement of personnel around Helmand province, rather than freight.

Supply Chain Performance

2.24 The Department uses an Operational Sustainability Statement to set priorities for each theatre which include the target times for performance of the supply chain (Figure 16 overleaf). Using these targets the Department has been able to monitor the performance of the supply chain, and its measurement of this performance has improved over recent years.

BOX 9

A typical combat logistic patrol in Afghanistan

The Logistic Regiment in Afghanistan has a rolling programme with which it aims to resupply each of the main forward operating bases once every few weeks. Combat logistic patrols have to operate all year round in changing environmental conditions in order to re-supply the outlying operating and patrol bases in Helmand province.

A typical summer logistic patrol:



A typical winter logistic patrol:



A combat logistic patrol is made up of up to 150 vehicles and can stretch several kilometres in length. A patrol is made up of logistic transport vehicles, force protection vehicles and recovery and other equipment support vehicles. Due to the threat from IEDs all vehicles in the patrol are fitted with electronic counter-measures devices. Aircraft also provide support to the patrol.

In delivering supplies to forward operating bases a patrol can cover up to 200km in one direction taking up to 3 days. As well as delivering equipment and other logistic support, patrols also take equipment and vehicles requiring maintenance or repair back to Camp Bastion or other main operating bases.

16 The Depar	tment's target tim	tes for the delive	ery of supplies	to Iraq and A	fghanistan				
	Standard Priority Code	Demand Transmission Time to UK	Demand Processing Time	Materiel Handling Time	Time for Distribution to UK point of Embarkation	Time for Distribution to Theatre	Average Time for in Theatre Distribution	Total Supply Chain Pipeline Time	Mode of Distribution
	01 Immediate	Within	1 hour	1 hour	22 hours	48 hours	24 hours	4 days	Air
	02 Priority	3 hours	3 hours	18 hours	24 hours	4-9 days	3-9 days	9-20 days	Air
							5 days KSF	59 days	Surface/Air
IRAQ							8 days COB Basra	ó2 days	Surface/Air
	03/04 Routine	6 hours	18 hours	3 days	3 days	47 days	11 days Baghdad, MCC Bahrain ACC Al Udeid Seeb	65 days	Surface/Air
	01 Immediate	Within	1 hour	1 hour	22 hours	3 days	24 hours	5 days	Air
	02 Priority	3 hours	3 hours	18 hours	24 hours	3-9 days	2-9 days	7-20 days	Air
AFGHANISTAN							4 days Kandahar	77 days	
	03/04 Routine	6 hours	18 hours	3 days	3 days	66 days	14 days Lashkar Gar	87 days	Surface
							10 Days Camp Bastion and Kabul	83 days	
Source: Ministry of L	lefence (DSCOM)								

2.25 The task of supporting both Iraq and Afghanistan is considerable. Between July 2007 and October 2008, the total number of demands placed on the supply chain has been 218,000; 123,000 from Afghanistan and 95,000 from Iraq (Figure 17).

2.26 The Department has achieved some success with the delivery of logistic support to both operational theatres. Overall, fifty-seven per cent of all demands made in

Afghanistan and 71 per cent made in Iraq have met the supply chain targets. Whilst there is monthly fluctuation in performance against the Department's targets, overall achievement is generally constant in the period for which the Department has been collecting detailed performance data (Figure 18). Furthermore, what variation exists is not linked to changes in demand, for example as a result of increased operational activity.





2.27 The average length of time a unit waits across all demand types has reduced by an average of 43 per cent in Afghanistan and 25 per cent in Iraq in the year following September 2007. High priority (01 and 02) demands that are moved by air transport have reduced (Figure 19) over the same period in Afghanistan by an average of 68 per cent but increased by an average of 2 per cent in Iraq. These reductions, together with less pronounced variations in performance either side of these averages, suggest a more stable and resilient supply chain.

2.28 There is variation in the Department's performance against its own targets in delivering Priority 01 and Priority 02 demands:

- Of the Department's Priority 01 (highest priority) demands, 45 per cent from Iraq and 59 per cent from Afghanistan achieved their target times.
- For Priority 02 demands which are also flown to theatre, 82 per cent of demands from Iraq and 57 per cent from Afghanistan achieved their target times.

2.29 The targets for each demand code are challenging because the supply chain can be undermined by many factors. Of the demands that failed to meet the waiting time target (**Figure 20**) on average, 28 per cent were due to a failure of the supply chain to transport the item in the appropriate time; 33 per cent were due to a failure in provisioning, meaning that the Department either has no stock or a lack of visibility has required a manual search in order to locate it; and 38 per cent resulted from a combination of both factors.

2.30 Holding the correct amount of stock in theatre is a complex task. The Operational Sustainment Statement dictates the rate at which stock will be used during an operation. This rate is then used to calculate the required stock holdings for items such as spare parts, ammunition and ration packs. There have however been some shortages of spares in Afghanistan and Iraq, for example to support the Bowman radios and the Explosive Ordnance Disposal vehicles. Shortages of spares can be attributed to any one of a number of factors such as industrial capacity, unexpected vehicle usage or poor provisioning caused by a lack of visibility of the items in the supply chain.

2.31 The Department seeks to have a reliable buffer of in-theatre stocks and an optimised stocks replenishment process, but performance is reliant on good quality logistic information and processes. The Department currently relies on single Service information systems to maintain

19 The aver particula	The average length of time a unit waits for particular demands						
Afghanistan	Priority 01 (Days)	Priority 02 (Days)	Priority 03/04 (Days)				
Sept 07	42.8	69.1	112.5				
Average (Jan-Oct) 2008	14.4	21.6	94.6				
Iraq	Priority 01 (Days)	Priority 02 (Days)	Priority 03/04 (Days)				
Sept 07	16.2	15.2	98.2				
Average (Jan-Oct) 2008	14.9	19.1	63.8				

Source: National Audit Office analysis of Ministry of Defence data



deployed inventories of spares and equipment, which hampers the introduction of standardised process for provisioning across the all three Services. The Department is planning to introduce the Management of the Joint Deployed Inventory (MJDI) programme. This programme aims to provide information with which to make good provisioning decisions, such as the ability to see stock available at different locations in theatre and elsewhere in the Department's inventory, as well as all demands made for the particular item.

2.32 MJDI will also flag up, for the first time, where items need returning to United Kingdom for repair. Tracking the return of items is necessary as the Department increasingly contracts with industry for the overall availability of equipment fleets, which depends on the speed of return of major components for repair and subsequent re-use. The Department has set prioritised targets for each item moving through this "reverse supply chain" and plans to improve the collection and analysis of the reverse supply chain performance data.

2.33 Through the introduction of MJDI and other logistics programmes, the Department is aiming to make the supply chain more efficient. The Department could then develop a "flatter" demand profile, than that which currently exists. More items could then be sent by sea and surface (**Figure 21**), reducing the pressure on and costs of the air line of communication. Full funding is not yet approved but the Deputy Chief of the Defence Staff (Equipment Capability) has agreed to levy a charge during the first three years of the programme on all of the Department's equipment approvals so that they all contribute to paying for MJDI's budget of £92 million.

2.34 The Department plans to introduce a new equipment repair facility at Camp Bastion, which will provide a greater level of equipment support than is currently available, removing the need to return many vehicles to the United Kingdom for depth repair. The Department intends that the savings arising from reduced usage of strategic lift will repay the capital costs of the project within two years, around £36 million. The Department expects to have an interim capability for a limited number of vehicles and equipment from September 2009 and a full capability from September 2010.

The Iraq Drawdown

2.35 By July 2009 it is anticipated that British forces will have completed their mission in Iraq and withdrawn all equipment, personnel and infrastructure from the Contingency Operating Base at Basra airport. The Department began the final drawdown of combat forces from Iraq in early January 2009 (**Box 10 overleaf**).



BOX 10

Case Study: The drawdown from Operation TELIC

When we visited Iraq in December 2008, the Department had a long-term plan in place for completing the "conditions-based" withdrawal of British combat forces from Iraq by the end of July 2009. The plan includes withdrawal of all equipment, vehicles, stores and other items from Iraq initially to the Kuwait Support Facility and then on to the United Kingdom or if required to Operation HERRICK in Afghanistan.

The diagram shows the generic plan for the physical withdrawal of British equipment and personnel from Iraq.



The Department routinely withdraws equipment capabilities from operational theatres when they are no longer required, but reviewed its holdings in Iraq in late 2008 to withdraw early anything that could safely be returned without prejudicing operational capabilities. Twelve Warrior and 12 Bulldog armoured vehicles left Iraq in mid October 2008. They were followed by 126 logistic vehicles and Land Rovers in October and a further 197 vehicles in November 2008. In addition 11 ISO containers of ammunition have been moved from Iraq by sea from the Kuwait Naval Base, and 70 pallets have been transported to Afghanistan by air. Ammunition that is no longer useable has been disposed of or used in training (29 tonnes from September to November 2008).

The Department is in the process of compiling a compendium of all equipment, stocks and infrastructure in Iraq. It has done so to ensure that there is a clear and comprehensive record of assets in theatre. It intends to use this compendium in order to sort all equipment, stocks and infrastructure into two categories: 1) items that are required for return to the United Kingdom or Germany to be stored for future operations (or for onward deployment to Afghanistan); 2) items that the Department no longer requires and can be disposed of (normally via local sale).

The Department has shown this compendium to the United States forces, to allow them to consider whether there are, in fact, any assets that they would want to have in order to achieve a smoother and more rapid transition. The Department then negotiated with the United States the sale price for the items in question, and the United Kingdom is seeking, for those items in category 1) above, to cover the additional costs of purchasing replacement assets when compared to the recovery and remediation of the existing assets – or, for those items in category 2) above, a figure that would match the price we might expect if undertook a normal local sale). At time of writing, these discussions were ongoing. It is planned that the fixed facilities, including the Tier 3 accommodation, which the Department has constructed (or was in the course of constructing) – which, under the terms of the agreement with the Government of Iraq will ultimately become the property of Iraq – will be gifted, or written off as constructive losses.

In addition to the transfer of assets there have been detailed discussions with the United States about the handing over of the running of the Basra base. Essentially, the United States is re-competing all the life support and other contracts so that once the United States take over the base, their contracts are then in place to support the operation. The Department expects its current contractors to be well placed to win many of these contracts – but this is, ultimately, a matter for the United States.



Pre-Deployment Training

3.1 Training is an essential military activity which underpins capability and readiness for operations. The Department provides all personnel deploying on operations with training for those specific theatres (called pre-deployment training). Once in theatre all personnel are subject to an induction process (known as Reception Staging and Onward Integration) which involves top-up training and familiarisation with the environment. Personnel may be deployed on operations either as part of a formed unit or may deploy individually to bring a unit up to full strength or to fill a headquarters or specialist post (known as "individual augmentees").

3.2 This section examines pre-deployment training for Operations TELIC and HERRICK. Pre-deployment training builds on a foundation of war-fighting training (known

as the "adaptive foundation") to equip the individual, unit or formation with a specific skill set for operations in a particular theatre, role or environment. The theoretical thirty-month cycle of training and operations for the Army is shown in **Figure 22**. Pre-deployment training commences with an assumption that individuals, units and formations will have:

- attained the required level of Collective Training (level 4);
- passed their annual single Service tests, including fitness and weapons handling; and
- completed their individual specialist training e.g. trade training for Explosive Ordnance Disposal specialists.



3.3 For the Army and Royal Marines pre-deployment training for Iraq and Afghanistan is directed by Headquarters Land Forces (HQLF) and facilitated by the Land Warfare Centre and the Operational Training and Advisory Group (OPTAG) based in the United Kingdom. The Royal Navy and Royal Air Force have their own arrangements and maintain close links with OPTAG. In addition, some troops undergo tailored exercises or specific specialist training, some of which may be located outside the United Kingdom, to experience the climate and terrain. The Department does not have a system for capturing the overall costs of pre-deployment training.

3.4 Two main training packages are offered by OPTAG for Army and Royal Marine personnel: one for formed units deploying overseas, delivered in the phases of training shown in **Box 11**; and individual reinforcement packages for those who have missed elements of, or all of, their collective training package, or who are deploying as individuals. These include personnel deploying individually, those taking up individual headquarters appointments, those joining units already on operations and battlefield casualty replacements. The Royal Navy and Royal Air Force deliver their own individual reinforcement packages.

3.5 Individual reinforcement packages deliver the minimum essential skill set to allow deployment. The content of these packages is consistent across the three Services and is updated to reflect the current operational picture within theatres. The Department also runs two-week courses for Reservists at the Reserves Training Mounting Centre (RTMC) Chilwell. Civilians deploying to operational theatres receive a three-day, theatre-specific training package, including battlefield awareness and first aid, which is also conducted at Chilwell.

Specific training for Operations TELIC and HERRICK

3.6 Between 2006 and 2008, some 124,000 personnel received pre-deployment training from the Operational Training and Advisory Group for all operations (**Figure 23**). Of these 59,032 were trained for Operation TELIC and 57,797 for Operation HERRICK. All those deploying individually in the Army and the Royal Marines receive a 3-5 day training package, delivered by OPTAG. The Royal Navy and Royal Air Force run different packages for personnel who will be operating on main bases, known as "inside the wire", and for those who will be operating "outside the wire".



Quality of pre-deployment training

3.7 Commanders in theatre and those who had recently returned from operations were generally impressed with the quality of pre-deployment training and personnel we spoke to in theatre said that they felt they had the necessary skills and were well prepared for the specific theatre. There is continuous liaison between those involved in training and those in theatre to understand the changing environment, and a good process of capturing lessons learnt which appears to be well embedded.

3.8 There are, however, challenging issues concerning time pressure, the availability of equipment for training, training for those deploying individually, and the extent to which United Kingdom facilities replicate theatre environments.

Timing of pre-deployment training

3.9 In the Army, pre-deployment training usually commences six months prior to deployment to theatre. It is becoming increasingly difficult to fit all that needs to be covered into the six months allocated to pre-deployment training. One of the major challenges is trying to get the right balance between technical and tactical training. With the high demand for drivers on operations and the increase in equipment types, priority is given to personnel doing technical training to ensure that they have the required licences to operate equipment in theatre (**Box 12 overleaf**). This priority often leaves a reduced amount of time to gain practical experience of using equipment in the tactical environment.

3.10 Staff at the Land Warfare Centre and Headquarters Land Forces are currently investigating which military skills, currently being taught in pre-deployment training, are relevant to a "generic" conflict and could be therefore moved into the adaptive foundation training in order to decompress pre-deployment training.



NOTES

- 1 The Royal Air Force individual reinforcement training figures are for the financial year starting 2006-07. All other data are in calendar years.
- 2 Training includes those trained for Operation TELIC, Operation HERRICK and other operations around the world.

Equipment

3.11 Personnel should have the opportunity to familiarise themselves with in-theatre equipment such as vehicles, weapons and personal equipment before they deploy. Priority is given to the deployment of new Urgent Operational Requirement equipment to theatre rather than to training, which has led to a shortage of appropriate theatre-specific equipment to train on. OPTAG, the Front Line Commands, personnel in both theatres, and those who had just returned from theatre told us that the equipment available for training did not match equipment available in theatre. The main issues were that equipment in training did not include Urgent Operational Requirement upgrades, equipment was not of the same standard as in theatre ("theatre entry standard"), there were equipment shortages in many areas and some key equipments were missing altogether. Many troops have not had direct experience of some equipment, such as electronic counter-measures systems, before arriving in theatre. The Department is looking at ways initially to deliver some Urgent Operational Requirements to training, which will then be rolled out to theatre with the troops who have trained on them.

3.12 Personnel could not train consistently with the same equipment and some trades experienced skills fade between training and deployment. Lack of training equipment in the Operational Training Equipment Pool also has implications for equipment repair, as vehicle and recovery mechanics may deploy to theatre without ever having the opportunity to repair certain vehicle types and have to rely on their ability to go back to "first principles".

BOX 12

Constraints in delivering Mastiff driver and operator training

- The length of time to attain the appropriate driving licence required to drive a heavy vehicle such as a Mastiff. It takes approximately 5 days' theory and 10 days' practical driving training if already holding a normal driving licence. For those not holding a driving licence it takes approximately 10 days' theory and 15-20 days' practical driving, followed by 10 days of conversion training onto Mastiff.
- The number of Mastiff vehicles available at the Defence School of Transport (18 available now, an increase of 10 vehicles from the time of our field work)
- Legislation does not allow Mastiff to be driven on United Kingdom or German roads. Driving experience can therefore only be gained on specific driver courses (above), ranges, or during exercises.
- Insufficient number of vehicles in the exercise training pool (five for TELIC, four for HERRICK) and therefore very limited opportunities to gain driving experience before deployment, especially at night.

3.13 So that personnel could train on theatre-specific equipment which they might not have within their units, the Department introduced an Operational Training Equipment Pool, which units could draw upon during predeployment training. The Operational Training Equipment Pool has been in existence since December 2007 and since then trainers have received new vehicle variants and weapons not previously available. Even so, the numbers available in the Operational Training Equipment Pool as at December 2008 (Figure 24) are insufficient to support the scale of pre-deployment training (Box 13).

3.14 The Department acknowledges the importance of personnel training on equipment which fully replicates that in theatre, and has put steps in place to improve the process by which equipment is procured under the Urgent Operational Requirement process. The Department has agreed with the Treasury a change in approach to procure a proportion of the equipment fleet specifically for the training pool. The Department plans that in future a percentage of all new equipment fleets procured for theatre will go straight to the training pool. This change will take time, as there is not yet sufficient equipment in the training pool to conduct large scale training exercises such as a Mission Rehearsal Exercise. Until this change in approach is fully realised, risk is passed on to commanders in theatre who have to ensure that training takes place when troops arrive in Iraq and Afghanistan. In some cases, such as the rear gunner on a Merlin helicopter, the first opportunity to practice using equipment is once they have deployed.

Training for Individuals

3.15 Staff at OPTAG and the Land Warfare Centre have some concerns over the increasing proportion of personnel who do not complete collective predeployment training and who therefore receive the Individual Reinforcement Package, which for the Army and Royal Marines is currently only four and a half days in duration. Unlike the Royal Navy and Royal Air Force, OPTAG deliver one Individual Reinforcement package regardless of whether the individual will be deploying "inside the wire" (inside main operating bases) or "outside the wire", as Headquarters Land Forces expect all soldiers deploying to be capable of operating "outside the wire" if required to do so. In 2008, 48.5 per cent of soldiers and Royal Marines received the individual reinforcement training package. Whilst most individuals will have had the opportunity to conduct additional training with the unit deploying, there will be others who only manage to complete the minimum individual reinforcement package. Equipment numbers in the Operational Training and Equipment Pool

Equipment	Operation	HERRICK ¹	Operati	on TELIC ¹
	Number in OTEP	Number available ²	Number in OTEP	Number available ²
Jackal	28	14	N/A	N/A
Land Rover (WMIK)	46	32	2	2
Vector	22	9	9	3
Snatch	40	40	52	16
Bulldog	N/A	N/A	17	17
Ridgeback	0	0	N/A	N/A
Mastiff	8	4	10	5
Warrior	5	5	10	10
CVR(T)	0	0	N/A	N/A
Viking	8	8	N/A	N/A
Bowman Broadband Antenna	0	0	0	0
Electronic Counter-Measures Manpack Suite	56	56	112	112
LUCIE (Driver Night Vision Goggles)	75	75	0	0
General Purpose Machine Gun	92	92	16	16
Heavy Machine Gun	63	63	26	26
60mm Mortar	9	9	9	9
Osprey Body Armour	1,500	1,500	1,500	1,500

Source: Ministry of Defence

NOTES

1 There are two equipment pools as training for TELIC and HERRICK may be conducted concurrently, and to allow for some vehicles to be repaired.

2 The number available to train on varies on a day to day basis. The difference between the number in the pool and the number available reflects the fact that vehicles may be damaged, in repair, at training schools, or at other locations.

3.16 Those not deploying with their unit often maintain their day to day roles at the same time as trying to fit in pre-deployment training in the six months prior to deployment. Individuals have sometimes completed only the Mission Rehearsal Exercise with the deploying Brigade, and have not done prior training with the unit.

3.17 Commanders in theatre and Front Line Commands have recently confirmed that individual pre-deployment training is generally fit for purpose, but all identify clear room for improvement. Concerns focussed upon common military (soldiering) skills and tactical awareness among personnel from non-combat units. The Individual Pre-Deployment Training Working Group has recommended the introduction of a clearly defined, graduated, joint standard of Individual Pre Deployment Training (**Box 14 overleaf**).

BOX 13

Specific equipment shortages for training

New or upgraded vehicles such as those procured through the Urgent Operational Requirement process to improve protected mobility including Mastiff, Jackal, and Bulldog.

Counter-IED equipment including electronic counter-measures and other equipment.

Night vision equipment such as shortages in LUCIE night vision goggles.

Weapons and ammunition including 60mm mortar, sniper rifles, heavy and light machine-guns and ammunition.

Communications equipment such as Bowman radios and satellite communications.

Body armour with only a limited number (3,000 sets) of Osprey body armour in the training pool.

Training facilities in the United Kingdom and Germany

3.18 The majority of pre-deployment training is completed in the unit's home location with the aim to reduce the amount of time spent away from home, or "nights out of bed". Pre-deployment training is delivered using a combination of simulated and live environments. For example, personnel are able to simulate real life scenarios and to enact rules of engagement training using DVD-based simulators which provide a range of different operational scenarios. Following the exercise the whole "battle" can be played back for post-exercise analysis. Whilst the simulators are effective in practising a range of tactics, the simulated vehicles do not always match the range of equipment in theatre.

3.19 Headquarters Land Forces has to date lacked sufficient training facilities to replicate an Iragi/Afghan environment, but building work is ongoing to rectify this deficiency. Mission Rehearsal Exercises are completed on Salisbury Plain (United Kingdom) and Sennelager (Germany) which do not replicate the climate and environment in either Iraq or Afghanistan. Live firing ranges available for training have been used intensively and pressure on their usage has made it difficult for some units to achieve high standards. Staff at OPTAG, Headquarters Land Forces, Air Command and Navy Command, and 3 Commando Brigade in Afghanistan said that there was a lack of theatre-specific urban and rural close-quarter battle live-firing facilities and that range restrictions do not allow personnel to practise certain elements such as live firing at night.

3.20 The Department has a number of enhancements planned to improve the facilities for pre-deployment training. For example, work is currently ongoing at the training facilities in Norfolk which includes: the development and enhancement of suitable rural and urban villages which better represent the environments the Department are currently operating in; construction of a facility for explosive methods of entry training; improvements to existing infrastructure to make them more realistic; and upgrades to roads to allow for increased use. The construction of the rural village was completed in April 2009 at a cost of £18 million.

3.21 A number of personnel in specific roles have completed tailored exercises outside the United Kingdom in order to experience realistic climate and terrain, and specifically to gain experience landing helicopters in dusty environments. These include Chinook and Sea King helicopter aircrew who trained in Africa and Apache helicopter aircrew in Arizona.

Effects of pre-deployment training on other training

3.22 The view of staff at Headquarters Land Forces and the Land Warfare Centre was that current operations in Iraq and Afghanistan are having a significant impact on other training and exercises designed to prepare forces for high intensity warfare. In particular they noted the difficulties for most brigades in programming activity to achieve the continuum of training culminating in Collective Training Level 4 prior to pre-deployment training. Personnel from 3 Commando Brigade in Afghanistan told us that prior to pre-deployment training they struggled to complete all the elements required to achieve Collective Training Level 4.

3.23 The current high level of operational commitments is affecting the ability of the Royal Air Force to train for general warfare. In order to focus on current operations, the Royal Air Force has had to "hibernate" certain skills by minimising the number of personnel trained and is therefore carrying an element of risk until they have time to regenerate capabilities. Examples include Harrier pilots landing on aircraft carriers at night and helicopter pilots training for fighter aircraft evasion.

BOX 14

Graduated, joint standards of Individual Pre-Deployment Training

Category 1 Individual Pre-Deployment Training. Personnel whose duties routinely remain within the confines of Main Operating Bases.

Category 2 Individual Pre-Deployment Training. Personnel whose duties may require deployment outside defensive locations. This category incorporates mission specific activity and ground movement.

Category 3 Individual Pre-Deployment Training. Personnel whose duties encompass the full range of operations in theatre. This category includes those elements whose role can include closing with and engaging enemy forces in planned and deliberate combat operations.

PART FOUR

4.1 The Department aims to provide support to personnel on operations to maintain their emotional and physical well-being whilst deployed. This section of the report sets out the ways in which the Department provides support to personnel on operations, and goes on to examine specifically the support to personnel on Operations TELIC and HERRICK. The section covers: medical support; accommodation; welfare; personal clothing and equipment; and the time personnel spend on operations.

Medical Support

4.2 Medical support is a key element in the physical and psychological well-being of military personnel and underpins morale as well as physical capability. A principal aim of the United Kingdom Defence Medical Services is to provide the Armed Forces on operations with a medical service which is comparable to the standards expected in peacetime, while allowing for the special circumstances of the battlefield. Defence Medical Services personnel are drawn from all areas of the National Health Service (NHS) and Military Commands, with the majority of clinical training taking place in NHS hospitals in the United Kingdom. The aim of the Defence Medical Services in theatre is to provide Primary and Secondary care (Figure 25 overleaf) in order to return personnel promptly to duty and when necessary stabilise casualties. Defence Medical Staff in conjunction with the Royal Air Force, evacuate critically injured personnel and personnel who are not expected to return to duty quickly, from theatre back to the United Kingdom. During the initial stages of an operational deployment, medical accommodation and hospitals are based in tented accommodation, which may in time be transformed into hardened accommodation depending on the operational need.

Support to Personnel

Medical treatment in Iraq and Afghanistan

4.3 There are three levels or "Roles" of medical treatment facility available to United Kingdom personnel on the operations in Iraq and Afghanistan (Figure 25). United Kingdom medical support has been augmented by coalition partners in both theatres.

4.4 Since January 2006, over 5,000 United Kingdom military and civilian personnel have been treated at hospital facilities in Iraq and Afghanistan. The majority of admissions have been in Iraq although there has been a higher proportion of wounded in action in Afghanistan than Iraq (Figure 26 overleaf).

In-theatre healthcare standards

4.5 The Defence Medical Services aim to deliver the highest standards of care to those deployed on operations and constantly seek to improve healthcare delivery. Over recent years, important changes that have been made include: the introduction to the operational environment of more formalised procedures for patient care; the use of new technologies and techniques; and efficient aero-medical evacuation. We found that there was widespread confidence in the medical healthcare system from professional medical staff both in the United Kingdom and in theatre who told us that they had the equipment and processes they needed to deliver care broadly as they would in the NHS. Similar levels of confidence are expressed by military personnel in both Iraq and Afghanistan.

4.6 The success of the medical services in delivering lifesaving treatment to casualties is underlined by the number of personnel that the Department has recorded as "unexpected survivors" given the severity of the injuries which they received. Forty-four United Kingdom personnel, coalition forces and local civilians from both theatres have survived in unlikely circumstances during the period from April 2006 to July 2008. The Department is currently reviewing these and similar cases to learn lessons so that troops in theatre receive the best possible clinical care.

25 United Kingdom Medical Facilities on Operations						
Type of facility	Role 1	Role 2 Enhanced	Role 3			
Function	Primary health care, specialised first aid, triage, resuscitation and stabilisation. Casualty collection from point of wounding and preparation of casualties for evacuation.	Secondary care facility built around primary surgery, Intensive care units, and beds with nursing support. A Role 2 E facility is able to stabilise post- surgical cases for evacuation to the United Kingdom without the need to put them through Role 3 first.	Provision of theatre secondary health care within the restrictions of the Theatre Holding Policy.			
Typical personnel	Small teams of doctors and combat medical technicians. In addition to this, one in four soldiers should be "Team Medics" – soldiers who are not professional medics but trained in initial trauma care.	Larger teams comprising consultants in accident and emergency, surgery, anaesthetics, intensive care and medicine, general and specialist nurses, combat medical technicians, pharmacists, radiographers, biomedical scientists, physiotherapists and dental teams.	All types of medic deployed, including specialist consultants.			
Clinical timescale	Battlefield Advanced Trauma Life Support resuscitation should be available as swiftly as possible.	Access to Role 2 Enhanced or Role 3 medical fo available within two hours.	acilities should be			
TELIC	1 facility	Medical Group Hospital Squadron at the Contingency Operating Base – Basra Air Station.	None			
HERRICK	12 facilities	Medical Group Hospital Squadron at Camp Bastion.	Multi-national hospital at Kandahar.			
Source: Ministry of De	fence					

Evacuation of casualties

4.7 Speedy evacuation from the battlefield to a field hospital can save lives but depends upon ambulances and support helicopters in theatre:

- there are currently 49 ambulances across both theatres which collect casualties close to the point of wounding, if necessary under fire. In 2007 the Department introduced new ambulance variants based on Mastiff and Bulldog vehicle types. Whilst the space within them is a physical constraint the Defence Medical Services told us that in terms of mobility and protection the new ambulances are performing well and are an improvement over previous vehicles; and
- there are allocated support helicopters for medical evacuation in both theatres (Merlin helicopters in Iraq, Chinook helicopters in Afghanistan). Dedicated teams are on call 24 hours a day in order to respond to any injuries that United Kingdom and coalition forces and local civilians suffer in the battlefield. The introduction of these teams has undoubtedly saved lives. (Box 15).

26 United Kingdom Casualty Figures in Iraq and Afghanistan since 2006

	Wounded in action	Disease or non-battle injury	Fatalities		
Iraq					
2006	93	1,209	29		
2007	202	1,098	47		
2008	20	758	4		
Total	315	3,065	80		
Afghanistan					
2006	85	155	39		
2007	234	598	42		
2008	235	773	51		
Total	554	1,526	132		
Overall Total	869	4,591	212		
Saura Defense Architical Saurice Arcon					

4.8 The Defence Medical Services and the Royal Air Force operate a medical evacuation system from Iraq and Afghanistan to the United Kingdom, which was described by Defence Medical Services and commanders in theatre as highly effective. Since 2006, some 1,737 military and civilian personnel have been aero-medically evacuated from Iraq and 1,633 personnel from Afghanistan back to the United Kingdom on medical grounds (not just battle casualties). The speed of evacuation is driven by the clinical need of the patient rather than performance targets. Seriously injured patients receive the most urgent attention. For example, seriously injured casualties from Afghanistan have been back in the United Kingdom within 22 hours from the time they were wounded. Typically, seriously ill or injured casualties are moved to the United Kingdom within 48 hours of stabilisation.

New technologies for improving patient care

4.9 Various enhanced medical technologies and new procedures have been successfully introduced, based on research by the Birmingham-based Royal College for Defence Medicine and in liaison with allies, principally the United States (Box 16 overleaf).

Hospital in Camp Bastion



BOX 15

Afghanistan Medical Emergency Response Team

The Medical Emergency Response Team (Enhanced) is based at the field hospital at Camp Bastion in Helmand Province. The MERT(E) delivers advanced resuscitation to those injured on the battlefield and is composed of a registered paramedic, an Emergency Nurse, an Emergency Medicine Consultant/Registrar or Consultant/Registrar Anaesthetist, and a fourth practitioner. They are supported by a Quick Reaction Force of between four and eight soldiers who provide force protection for the medical team when on the ground.

Teams are on call 24 hours a day with notice to move at 30 minutes in the day and one hour at night. On a typical call-out, the team will be given a tactical situation brief before embarking on to a medically equipped Chinook helicopter. The typical time from receiving a call to take off is between 9 and 15 minutes.

En route, the team prepare intravenous drips and other medical instruments in preparation for landing. Once the Chinook helicopter lands, the Quick Reaction Force disembarks to provide all-round defence, ready to engage any potential threat. Apache helicopters provide additional protection. The patient is stretchered on to the aircraft and assessment and treatment begins immediately. Once the Quick Reaction Force is back on board the Chinook takes off and heads back to the hospital at Camp Bastion. Conditions on board are challenging; dust, noise, vibration, and temperature extremes add to the already difficult conditions of trying to administer life-saving treatment on board a helicopter which is flying tactically to avoid enemy action. On arrival at Camp Bastion, the ambulance crew quickly take charge of the stretcher; the patient is loaded in to the ambulance, and is taken to the emergency department.

The average time from incident to handover to emergency department is 110 minutes, which is extremely quick given that up to an hour of that time may be flying to and from the incident, and the target time to get back to a Role 2E hospital is two hours.

The Department's experience in Iraq and Afghanistan, and from earlier campaigns, shows that there are three key timelines: haemorrhage and airway control must be achieved within 10 minutes of wounding, medical evacuation assets must reach the casualty within 1 hour of wounding, and those requiring surgery should be in a suitably equipped facility within 2 hours of wounding. The standard aimed for, from time of wounding to 'wheels down' at Camp Bastion, is 90 minutes, allowing for notice to move, collection of the casualty at the scene, and up to 60 minutes total flying time. This 90-minute standard allows the 2-hour timeline to surgery to be met.

From January 2007 to September 2008 the Medical Emergency Response Team in Afghanistan evacuated 1,612 personnel from the battlefield.

Collective training for medical units

4.10 United Kingdom medical groups in Iraq and Afghanistan can comprise people from over 70 donor units, from all three Services. Many are Reservists, while others may be civilian contract staff, with varying experience of operations. Joint training for such disparate teams is critical. Defence Medical Services senior staff and medical commanders in theatre said that the establishment of 2 Medical Brigade in April 2005 had significantly

BOX 16

New Technologies



A Computerised Tomography ("CT") scanner was introduced to Iraq in 2005, the first time a scanner had been deployed to a United Kingdom field hospital on land. This technology has considerably improved diagnostic imaging. A similar Computerised Tomography capability was introduced in Afghanistan in 2007.

and headquarters).

raised standards of pre-deployment training for medics deployed to the hospital squadron. Staff spoke highly of

the training and the realism of the exercises, and felt that

Services, civilian contractors and Reserve personnel had

been extremely beneficial. The Department is planning to

(medical squadron, hospital squadron, support squadron

expand collective training to the level of the medical group

training collectively with military personnel from the three



Improvements to the First Field Dressing. The "Improved First Field Dressing" has been issued to all deployed personnel.



The Combat Application Tourniquet. Over a six month period in Afghanistan alone, the tourniquet was used to arrest life-threatening haemorrhage in at least eight UK soldiers. The Combat Application Tourniquet has been issued to all deployed personnel.



QuikClot® Haemostatic Topical Dressing is a sterile traumatic wound treatment that can arrest high volume blood loss and achieve haemostasis in large wounds. It has been made available to deployed medical personnel and to personnel in treatment facilities.



The HemCon® Dressing is a pliable, sterile dressing that provides rapid control over moderate and severe external haemorrhage. HemCon® has been made available to a range of personnel, including specifically trained medical and non-medical staff.

Medical services manning

4.11 There is a general shortage of regular Armed Forces medical manpower and specific shortfalls have occurred in "pinch point" professions such as emergency medicine consultants, general surgeons, intensive therapy unit nurses, and emergency medicine nurses (Figure 27).² For the most part shortfalls can be filled by Reservists³ and contracted staff. Medical Reservists made up the majority of the hospital-based medical personnel in Afghanistan during 2007. They are also the main source of some specialists, such as burns, which could not be provided by the regular Armed Forces. In 2007-08 four contractors were employed in Iraq to fill gaps and six in Afghanistan, at a cost of £1.15 million.

4.12 Although most shortfall gaps can be filled by Reservists and contractors there are some gaps that cannot. Some military medical roles do not have a civilian equivalent, such as combat medical technicians who are specifically trained in battlefield advanced trauma life support techniques. Shortfalls have meant that some Regular medical personnel have deployed to theatre more frequently than planned and than is envisaged in the Department's guidelines on how often personnel should deploy, known as "Harmony Guidelines". For example, 19 per cent of Medical Officers in the Royal Air Force had breached the guidelines for the period between November 2006 and September 2008.

Mental health

4.13 The Department recognises mental illness as a potentially serious and disabling condition, but one that can be treated. Mental Health Nurses and chaplains are available in both Iraq and Afghanistan and a process known as Trauma Risk Incident Management (TRIM) has been used to recognise personnel who may be suffering stress since August 2007. For TRIM, in addition to deployed medical staff, up to one in ten personnel are trained to spot the signs and symptoms of stress in colleagues both on operations and once returned to the United Kingdom. Personnel from 3 Commando Brigade in Afghanistan were complimentary about the TRIM process and felt that signs of stress were more likely to be noticed by friends. These indicators could then be flagged up to others (without the perceived stigma of self referral) and either managed by support within the unit or referred for expert medical advice as appropriate. TRIM is increasingly recognised within the Armed Forces as best practice and training is being rolled out across the three Services.

4.14 Decompression began in 2005 and involves placing groups into a structured and monitored environment in which to begin winding down and rehabilitating to a normal, routine, peace-time environment. Decompression, mandatory for formed units, is suitable for groups of people who have shared common operational experiences but not necessarily for individuals who have not deployed with a unit. Feedback from those having undertaken decompression is largely positive and the decompression process is gaining wider acceptance. Since 2006 approximately 30,000 troops have been through decompression. Headquarters staff from the Army's 16 Air Assault Brigade who recently returned from Afghanistan told us that they invited those injured on operations and recovering back in the United Kingdom to Cyprus to decompress with the rest of the unit. They told us that it had been a success, and that it had been a psychological boost to both wounded and comrades alike.

Accommodation

4.15 The Department provides accommodation to personnel in theatre according to one of three types depending upon the capability required; Tier 1, tented structures; Tier 2 cabin structures, and Tier 3 hard structures made from concrete, steel and masonry. The requirement depends on: speed of provision; level of force protection; maintenance and durability; and the expected duration of the requirement. The comfort afforded by the accommodation is a factor but not necessarily a determinant of the requirement.

27	Shortfalls in key medical personnel at
	September 2008

Role	Annual Operational Requirement	Deployable Regulars
Anaesthetist	108	45
General Surgeon	54	22
Emergency Medicine	27	16
Neurosurgeon	9	0
Emergency Medicine Nurse	96	74
Intensive Care Nurse	92	47
Infection Control Nurse	5	4
Pharmacist	12	8
Source: Ministry of Defence		

2 Pinch point professions, including those in the medical services were examined by the National Audit Office in its report on Recruitment and Retention in the Armed Forces (HC 1633 2005-06).

3 More information on Reservists can be found in the National Audit Office report on Reserve Forces (HC 964 2005-06).

Accommodation in Iraq and Afghanistan

4.16 In Iraq and Afghanistan the Department has progressed from tented accommodation to more permanent and in some cases hardened accommodation **(Box 17).**

4.17 The accommodation we observed in Iraq and Afghanistan (Box 17) was largely fit for purpose and in a satisfactory state of repair. Headquarters staff in theatre told us that personnel were generally satisfied with the standard of their accommodation and facilities considering the circumstances of the operations. Personnel in Iraq had previously been concerned about the protection afforded by the accommodation against enemy attacks. This threat has been mitigated by the use of concertinaed protective walls,⁴ lightweight overhead protection systems, ballistic grade fibre-glass protection over individual beds, concrete structures to sleep in and a system to provide early warning and defence against rocket and mortar attack. In March 2007 the Department approved of a scheme to mitigate the risk of an attack on Basra Air station causing mass casualties by building new hardened Tier 3 accommodation at the base. The Department currently estimates the final cost of this project to be around £100 million. Box 18 highlights some of the difficulties in making a decision to invest in accommodation in a changing environment.

4.18 Accommodation at Camp Bastion is a mixture of tented and Tier 2 structures. It is intended that improvements will be made to the domestic accommodation as the future plans for Camp Bastion emerge, which should provide troops with more comfort and better protection. There are plans to improve conditions at the forward operating bases. These plans will take account of the significant logistical challenges which restrict the amount of engineers, materials and power that can be transferred to these forward bases.

Deployment Welfare Package

4.19 The Department aims to provide welfare support to personnel on operations to maintain their emotional and physical well-being within the constraints of the operational environment and availability of resources. Overseas welfare support is provided through a Deployment Welfare Package (**Box 19**) and is largely delivered by contractors working on the main operating bases. The Package should be provided to Service personnel and, where appropriate, contractors deployed on qualifying operations⁵, exercises and other deployments.

4.20 The difference in the facilities available at the main operating bases and the forward operating bases are set out in **Box 20 on page 48**.

BOX 17

Accommodation in Iraq and Afghanistan

Iraq

At the United Kingdom base at Basra Air Station in Iraq, there is accommodation for about 5,000 personnel. In May 2007 the accommodation comprised about 60 per cent temporary deployable accommodation (Tier 1), some 25 per cent in cabins (Tier 2) and some 15 per cent of personnel in existing buildings at Basra Palace (Tier 3). The facilities include a "welfare village" comprising café, internet terminals, an area for chaplaincy and pastoral care, a post office, gift shop and barbers. In addition there are take-away food shops.

Afghanistan

Main operating bases. In Afghanistan some 3,500 United Kingdom personnel and 1,700 contractors are based at Camp Bastion in Helmand province, which covers eight square miles. Accommodation is a mixture of the interim tented camps (Tier 1), each housing between eight and ten people, and new Tier 2 accommodation built in 2007 which houses two people per room. The new upgraded Tier 2 field hospital opened in March 2008. Camp Bastion has its own water bottling plant, cookhouse, gym, recreation room, and a shop which sells basic items such as sweets, magazines and toiletries, and a take-away food shop.

Forward operating bases. Conditions at forward operating bases and patrol bases which typically accommodate between 20 and 150 personnel are more austere. Conditions in these bases vary; some of the more established bases have welfare tents and solid weatherproof accommodation. Accommodation in forward bases is normally in tents. In the past some Forward Operating Bases have been prone to flooding. The Department now annually deploys Royal Engineers forward to make accommodation more resilient to winter conditions and to make sure that it does not flood.

4 These are prefabricated, multi-cellular defence wall systems made of galvanised steel. Units can be extended and joined together easily and rapidly.
5 Qualifying operations are those operations overseas, expected to last for 2 months or more, with a designated name and under the operational command of Permanent Joint Headquarters, for which a Chief of Defence Staff directive has been issued. Maritime deployments outside UK home waters expected to last for 2 months or more, also qualify.

BOX 18

Operation TELIC Tier 3 Accommodation

The Department's decision on the required level of accommodation in Iraq was balanced by the level of force protection required, the number of personnel on the base and the expected duration of the operation. The Contingency Operating Base in Basra became the main target for attack after a British base at Shaibah was closed down in 2007 and amalgamated with the base at Basra Air Station. The number of attacks on Basra Air Station increased steadily from May 2006 to summer 2007, and the Department decided that additional investment in accommodation was necessary to counter the risks to the safety of personnel and the risk of an attack causing a mass-casualty incident.

In June 2007, Permanent Joint Headquarters sent the Investment Approvals Board a business case for the construction of four hardened tier 3 structures providing hardened kitchen, dining and communal welfare facilities for 4,500 personnel (tranche 1). Tranche 2 of the business case set out the proposal to construct a further four Tier 3 structures; one to provide a medical facility, and the remaining three to provide accommodation. The contract was subsequently let to KBR (UK).

During the second half of 2008, the security situation in Iraq improved considerably – though the base was still subject to attack, and the risk of a mass casualty incident continued, and the Department began planning for a change of mission and the eventual drawdown of troops. The Department, aware that money had already been committed for tranche 2, scaled back its plan to construct a fully fitted hospital and three accommodation blocks and instead opted to finish the construction of the four structures but leave them as empty shells. The Department plans to write off the tranche 2 facilities as constructive losses – and make them available to the United States (and is in discussion with the Foreign and Commonwealth Office as to whether they would wish to make use of part of one of the buildings). The four tranche 1 structures will be gifted to the United States – who will make use of them. In total the Department currently estimates that it has spent around £100 million building these eight structures.

BOX 19

Main components of the Deployment Welfare Package (Overseas)

Access to Communication. provision of publicly funded telephone calls; access to the internet and e-mail facilities or SMS text access; forces mail and electronic "e-bluey" postcards. In September 2007 free phone calls were increased from 20 minutes a week to 30 minutes a week, with an extra 30 minutes over Christmas. Since 2007 families and friends have been able to send parcels of under 2kg to personnel on operations free of charge.

Leisure and relaxation. provision of television, DVD, radio and gaming stations; live entertainment; newspapers, magazines and books, board games; access to operational fitness equipment; the ability to buy personal items from shops.

Laundry and shower facilities. Provision of a regular and reliable laundry service and regular availability of shower facilities during all deployment phases.

Mid-tour Rest & Recuperation (commonly known as R&R). Service personnel have access to a structured rest and recuperation package – time for personnel to "recharge batteries" away from the theatre. The time, length and location are at commanders' discretion. For personnel on a six-month tour the maximum length of time is 14 nights inclusive of travelling time. R&R does not affect an individual's annual leave allowance.

Post-operational tour/detachment leave. When Service personnel return from operations they receive post-operational leave – 20 working days (in addition to annual leave allowance) for every six months completed on an operational tour. This leave enables them to spend time with their families and friends to assist in the process of adjustment.

BOX 20

Differences in we	Differences in welfare facilities at forward and main operating bases					
	Main operating bases	Forward operating bases/patrol bases				
Telephone	Access to telephones on a scale of 1 telephone per 40 personnel. Queues at peak periods, especially during Relief In Place.	Iridium satellite hand-held phones were in short supply, but the Department has now issued at least one phone per patrol base/forward base and plans to increase the number of phones in theatre. Environmental conditions mean phones do not last very long.				
Internet/email	Access to internet terminals on a scale of 1 terminal per 40 personnel. Problems with reliability and speed of internet access because of inadequate bandwidth availability. WIFI being rolled out to main bases.	In 2008 there was a shortage of Internet and Textlink facilities. To address the shortage, the Department, in December 2008, delivered 20 BGAN systems, which provide internet access and 35 Textlink units.				
Post/ e bluey postcards	Enduring Free Mail Service allows individuals to send a 2kg parcel free of charge to any member of the Armed Forces.	Delivery of mail is dependent on helicopter support and mail often has to take a lower priority to other essential supplies and equipment. There can be further delay if				
	lraq: average time to receive post 3.28 days. Deliveries 5 days a week	conditions are such that flying into forward bases is dangerous. Delivery for these reasons can therefore take up to 2 weeks to those austere locations.				
	Afghanistan: average time to receive post 4.72 days. Deliveries every day to Kandahar plus two days a week direct to Camp Bastion.					
	Over 147,000 bags despatched to the two theatres since introduction of the Enduring Free Mail Service, an increase of 43.5 per cent (compared to 01 Sep 06–31 Aug 07).					
	In 2007, total number of e-blueys downloaded was 1,186,002, an increase of 45.14 per cent from 2006.					
Gym facilities	Environmental conditions mean gym equipment needs to be maintained regularly. Maintenance of fitness equipment has been slow but Department has improved maintenance contracts and speeded up repair times.	Most do not have gym facilities, although more established bases may have some personal fitness equipment. Environmental conditions mean they are easily broken and logistical difficulties mean equipment is slow to be repaired.				
Shopping Facilities	EFI has shops on all main bases providing personnel the ability to purchase confectionery, magazines, cigarettes, toiletries etc. EFI shop stocks essential goods, but some items are significantly more expensive than in the United Kingdom.	NAAFI Rapidly Deployable Shop when force protection circumstances allow, although to date the operational circumstances have prevented the use of this facility in some bases.				
Welfare areas	Iraq has a "welfare village" comprising internet terminals, an area for chaplaincy and pastoral care, post office and barbers. Bastion has two EFI shops and cafes, but planned welfare village will not be operational for another two years.	Most do not have a communal welfare area for force protection reasons.				
Laundry and Shower facilities	Laundry and hygiene are contracted out under the "soft-mac" contract. Laundry is returned within 24 hours. Shower blocks with hot and cold running water.	Water is a scarce commodity and must be prioritised for drinking. Accordingly, most forward bases do not have laundry/washing facilities other than bucket and soap and solar showers. Environmental health teams make regular inspections to reduce the likelihood of personnel suffering from diarrhoea and vomiting.				
Food	Food is good with plenty of fresh fruit and vegetables.	Personnel at austere bases and Patrol Bases are living				
	Quantities required for Afghanistan per month: 700 tons Operational Ration Pack, 800,000 cases commercial food and 0.67 million litres bottled water, at a cost of £2.5 million.	on tood prepared daily trom 10-man Operational Ration Packs; supplemented by additional tinned and dry products; and frozen and fresh fruit and vegetables. These enhancements are delivered weekly by helicopter,				
	Quantities required for Iraq per month: 100 tons Operational Ration Pack, 170,000 cases commercial food and 0.96 million litres bottled water per month, at a cost of £1.5 million.	although security concerns occasionally prevent delivery.				

Overseas welfare arrangements

4.21 During our visits to theatre we found that personnel were generally satisfied with the welfare support provided. There were however, some specific problems for the Department to consider.

- There is a significant difference in terms of the provision of the Deployed Welfare Package in main operating bases and forward operating and patrol bases. There is no specific compensation for personnel living in more austere environments.
- The planning ratios used to provide elements of the Deployed Welfare Package (for example telephones are provided on a planning ratio or "scaling" of one telephone per 40 personnel for static locations) are based on the number of United Kingdom Forces and contractors on the base and do not take into account other coalition nations for whom the Department provides food and welfare facilities under formal agreements, nor the "Relief in Place" periods where brigades change over and numbers on the main bases double. Personnel in theatre told us, that at times, some facilities come under significant pressure, making them hard to access.
- If flights for R&R are delayed or cancelled, the Department cannot guarantee that soldiers who have lost days of their R&R will have their leave extended but, on a case-by-case basis, will attempt to ensure that individuals are not unduly disadvantaged.

Personal clothing and kit

4.22 The Department's policy on personal clothing and kit is that personnel should have the necessary clothing and kit to enable them to perform their role to the maximum effect. The Department provides all personnel deploying on operations with a range of clothing and personal equipment including desert combat clothes, boots, helmet, body armour and personal weapon. The Department has made significant investment in defence clothing including the introduction of improved body armour, new boots and a new helmet offering increased protection.

4.23 Personnel in theatre were in the main complimentary about the quality of the kit they received, and recognised that much more personal equipment was available than before. A small number of personnel told us that there were problems with the durability of clothing, although recognised that clothing needs to be light and breathable as well as able to withstand wear and tear. We found no evidence to suggest that there were shortages of clothing or personal equipment in-theatre to prevent worn items being replaced.

4.24 The Department has improved the effectiveness of personal protection provided to soldiers. Personnel in theatre told us that the effectiveness of body armour had improved and in contrast to the combat phase of operations in Iraq,⁶ that it has been available to everyone. With a modified helmet and improved Osprey body armour, soldiers have improved protection against blast, fragments and small arms fire compared to the body armour issued at the start of operations in Iraq. To provide this level of protection, however, the new body armour is necessarily heavy. Along with a weapon ammunition, food and water, and personal kit, the dismounted soldier may carry a combination of radios, electronic counter measure equipment, equipment specific their role and spare batteries to power all of the equipment. In total the soldier on foot patrol may be carrying between 50 and 90kg. Commanders recognise that there is a trade off between protection and mobility, as well as the physical impact on soldiers. The Department is investigating whether lighter equipment can be developed.

Harmony guidelines

4.25 To strike a balance between deploying people on operations, training and spending time with their families the Department aims to meet its "harmony guidelines" (**Figure 28 overleaf**). Each Service reports performance against two guidelines – an individual guideline which sets out the maximum amount of separated service that individuals should serve within any given period, and operational tour intervals to determine the frequency with which individuals should deploy on operations. The guidelines are based on routine levels of activity as set out in the Defence Planning Assumptions, although the Department accepts that it is operating above those assumptions.

6 Operation TELIC – United Kingdom Military Operations in Iraq (HC 60 2003-04). Insufficient numbers of enhanced combat body armour were distributed in theatre.

4.26 In 2007-08 some ten per cent of Army personnel had breached the individual separated service guidelines at some point in the previous 30 months (Figure 29). In the Royal Air Force some four to six per cent of personnel had exceeded guidelines every year since 1998, increasing to around nine per cent during 2007-08. The Royal Navy had largely met its targets for harmony, in part because ships have increased the frequency and levels of crew rotation.

4.27 The Army has been least able to meet the harmony guidelines because of the heavy demands placed upon it. The Department accepts that operating above the Defence Planning Assumptions places a greater strain on its personnel. The Army's individual separated service guidelines have not been met since they were introduced in 2003, and many soldiers are failing to meet the desired operational tour interval. Average operational tour

interval calculations, however, amalgamate all trades and specialisations within their parent units. This presentation masks the impact on pinch point trades and takes no account of individual movement between units or sub-units.

4.28 The Army does not currently have data on Individual Separated Service recorded on the Joint Personnel Administration (JPA) system. Data from the system is currently only available to the Royal Navy and the Royal Air Force. The Army, being the last to transfer to JPA, does not yet have sufficient data to provide meaningful statistics, although units in theatre were actively monitoring and managing the level of separate service for individual personnel. A complete period of data should become available in January 2010. Even with a full cycle of data the system is not configured to identify individual tour intervals for Service personnel.

28 The Department's harmony guidelines					
	Operational Tour Interval	Individual Separated Service			
Royal Navy and Royal Marines	Personnel should spend a maximum of 60 per cent of time deployed in a three-year cycle and 40 per cent alongside their base	Individuals should spend no more than 660 days away from home over a rolling three-year period			
Army	Six months on operations followed by an interval of 24 months	No more than 415 days over rolling 30-month period			
Royal Air Force	Four months on operations followed by an interval of 12 months	Personnel should not exceed 280 days over rolling 24-month period			
Source: Ministry of De	efence				

29 Performance against Individual Separated Service targets

	Percentage of individuals breaching target		Individual seperated service target
	2006-07 %	2007-08 %	
Royal Navy/Royal Marines	<]	<1	All personnel should be away less than 660 days over 36 months
Army	13.4	10.3	All personnel should be away less than 415 days over 30 months
RAF	6.2	9.6	No more than 2.5 per cent of personnel should exceed 140 days away in 12 months. Changed in 2008-09 stipulate that all personnel should not exceed 280 days in a 24 month rolling period
Source: Ministry of Defence			
NOTE 2008-09 data not vet available.			

APPENDIX ONE

1 This Appendix sets out the scope of the study and the methodologies used.

Scope of the study

2 The study focuses on four key areas of the Department's support to major operations: equipment; logistics; pre-deployment training; and welfare/support to personnel. Both the decisions to undertake major operations and assessments of military outcomes lie outside the scope of this study. We confined our assessment of evidence to recent developments in each theatre and, in most cases, to data from the last two or three years.

The study focuses specifically on the support to 3 personnel whilst on operations and with the exception of pre-deployment training, excludes the support both prior to deployment and after returning from operations. We examined the medical support provided to personnel in theatre, from the point that the person is wounded to their evacuation to the United Kingdom. We did not look at the provision of medical support in the United Kingdom. In looking at the welfare support to personnel, we considered in-theatre welfare provision and excluded the process of normalisation and Post Operational Stress Management when personnel return from operations. Whilst recognising the role that families play in the support of personnel, and the importance of supporting those families, we excluded this from the scope of our study, choosing to focus only on the support to those deployed on operations.

4 This report follows earlier studies that have focused on recent exercises and operations: Exercise Saif Sareea II, published in 2002; The Rapid Procurement of Capability to Support Operations, published in 2004; and Operation TELIC – United Kingdom Military Operations in Iraq, published in 2003.

Methodology

Visits to Iraq and Afghanistan

5 We visited Iraq and Afghanistan in November and December of 2008 to obtain first hand evidence of the Department's support to operations and to ensure the findings from investigations in the United Kingdom were borne out by the current experience in theatre.

6 We visited Basra in Iraq in December 2008. We interviewed the General Officer Commanding MND(SE) and other members of the Armed Forces including staff within: Force support, 903 Expeditionary Air Wing, Training, Equipment Support/Equipment Capability, Unmanned Aerial Vehicles battery, Joint Helicopter Force, Strike Battle Group, logistics battalion, finance and commercial teams. We visited the hospital facilities and accommodation and welfare arrangements for the troops.

7 In November 2008 we visited Afghanistan and interviewed senior officers including: Commander Task Force Helmand, Commander Joint Force Support, and Commander Bastion. We carried out interviews with members of the Armed Forces in Kandahar, Camp Bastion in Helmand Province, and Lashkar Gar, including staff from; finance and contracts, equipment capability, Theatre medical group, 904 Expeditionary Air Wing, Joint Helicopter Force (Afghanistan), Combat Logistic Regiment, Welfare, Equipment Support, Training, Chaplaincy team, Joint Force Engineers. We visited welfare, medical and accommodation facilities at Kandahar, Camp Bastion and Lashkar Gar.

8 We obtained evidence in theatre through a combination of structured and unstructured interviews with personnel of all ranks. We also interviewed elements of 16 Air Assault Brigade on their return from Afghanistan to ensure we captured the experience of the previous battle group to deploy.

Key interviews

9 We conducted semi-structured interviews throughout 2008 with a wide range of commands and organisations within the Department. These are listed in **Figure 30**.

Review of post-operational reports

10 Post-operational reports are documents prepared by unit commanders at the end of each tour (approximately every six months). We reviewed post-operational reports from Afghanistan, covering the period 2005 to 2007, and Iraq, covering the period 2005 to 2007, to identify support issues faced by commanders in theatre.

11 Our assessment of post-operational reports was supplemented by a review of post-operational interviews, which are conducted by the Land Warfare Centre and capture a less formal record of operations than the post-operational reports.

Financial and statistical analysis

12 We collected an analysed a range of financial and non-financial data from the Department. Information and data were obtained from a number of sources including data maintained by the Department and the single Services, data collected by the Defence Analytical Services Agency and from answers to Parliamentary Questions. We collected financial data where available and included costs of contracts, equipment, clothing, infrastructure developments. Analysis of non-financial data included equipment availability and performance, joint supply chain performance, pre-deployment training throughput, casualty rates, medical evacuation statistics, quantities of food, post, medical supplies and equipment delivered to theatre, and compliance with harmony guidelines.

Ministry of Defence Central Staffs	Royal Air Force	
Director Operational Policy	Headquarters Air Command	
Chief of Joint Operations	Defence Equipment and Support	
Assistant Chief of the Defence Staff (Logistics Operations)	Director General Helicopters Director General Land Equipment	
Director of Equipment Capability (Intelligence Surveillance Targeting Acquisition and Reconnaissance)		
Director of Equipment Capability	Director General Supply Chain	
(Expeditionary Logistics Support)	Defence Supply Chain Operations and Movements	
Director of Equipment Capability (Ground Manoeuvre)	Joint Supply Chain Business Support Team	
Permanent Joint Headquarters	Armoured Fighting Vehicles Group	
16 Air Assault Brigade	Support Vehicles Group	
Service Personnel Policy	Expeditionary Campaign Infrastructure Integrated Project Team	
Defence Medical Services	Medical and General Supplies Integrated Project Team	
Director General Information (Corporate Memory)	Defence Clothing Integrated Project Team	
Royal Navy/Royal Marines	Defence Food Services	
Headquarters Fleet Command	Other MoD Organisations	
Logistics Operations to the Deployed Fleet	British Forces Post Office	
Army	Defence Analytical and Statistics Agency	
Headquarters Land Forces		
Land Warfare Centre		
Operational Training Advisory Group		
Headquarters Joint Helicopter Command		

Source: National Audit Office

13 We have had access to raw data throughout the course of our investigation. In some areas of this study however, the Department has requested that we do not publish details of the material that we have reviewed, particularly in relation to the numbers and locations of different types of equipment in Iraq and Afghanistan. This is because the material was classified at a high level or because, taken in conjunction with other publicly available material, it might have given valuable information to enemy forces in both theatres. Where possible, we have tried instead to provide information at an aggregated level or on a trend basis.

Review of Departmental Papers

14 In addition to the post-operational reports, we also reviewed a range of Departmental papers including those on:

- equipment performance, availability, capability gaps, business cases and data related to the Urgent Operational Requirement process;
- the logistic supply chain, including sea lift and air lift arrangements, consignment tracking, pipeline delivery times and the reverse supply chain;
- detailed guidance manuals on the content of predeployment training;
- medical support, casualty evacuation and the medical supply chain;
- welfare arrangements, harmony guidelines, and accommodation; and
- planning papers for the management of the drawdown from Iraq.

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