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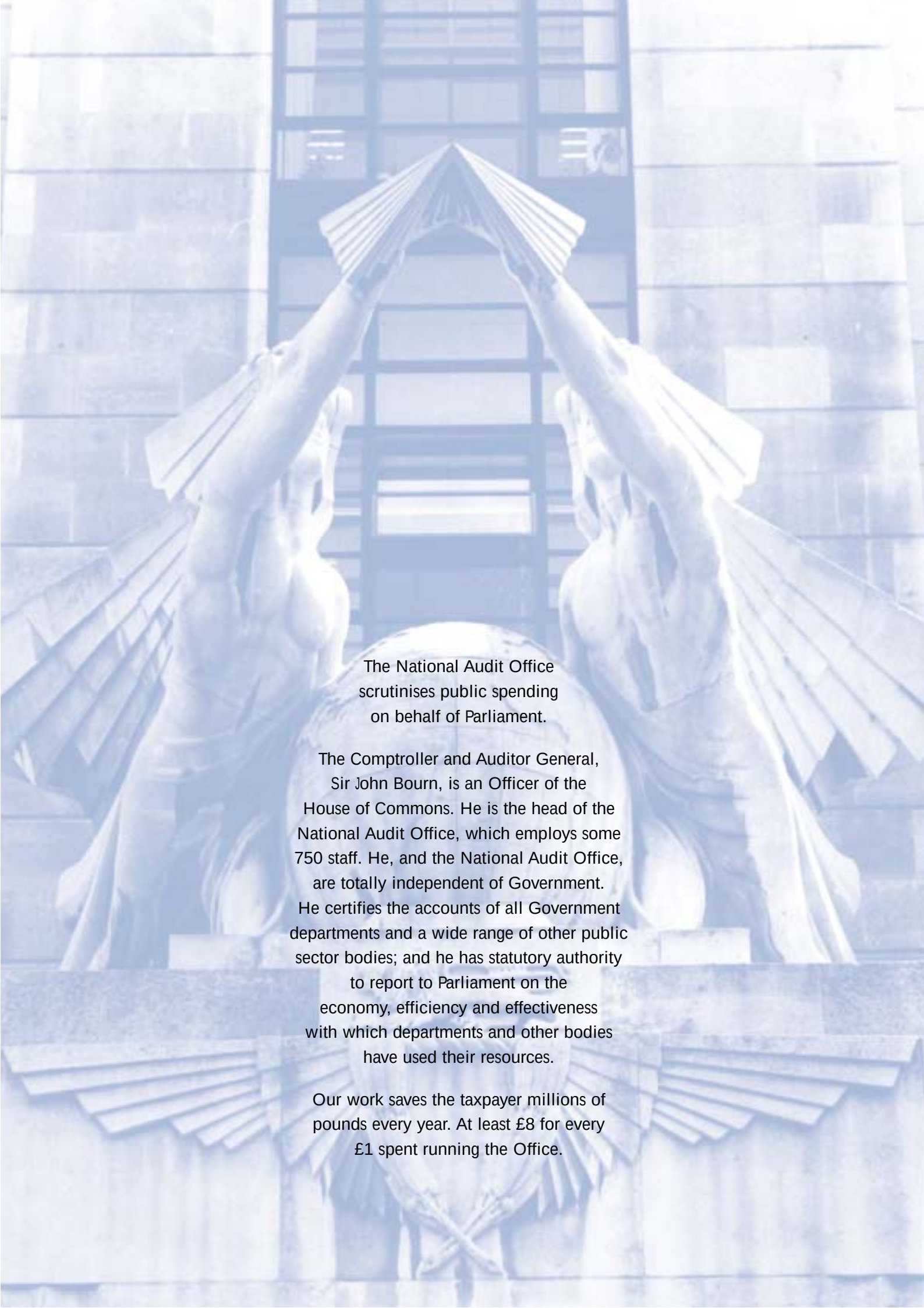
Ministry of Defence

Exercise Saif Sareea II

REPORT BY THE COMPTROLLER AND AUDITOR GENERAL
HC 1097 Session 2001-2002: 1 August 2002



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Comptroller and Auditor General

National Audit Office
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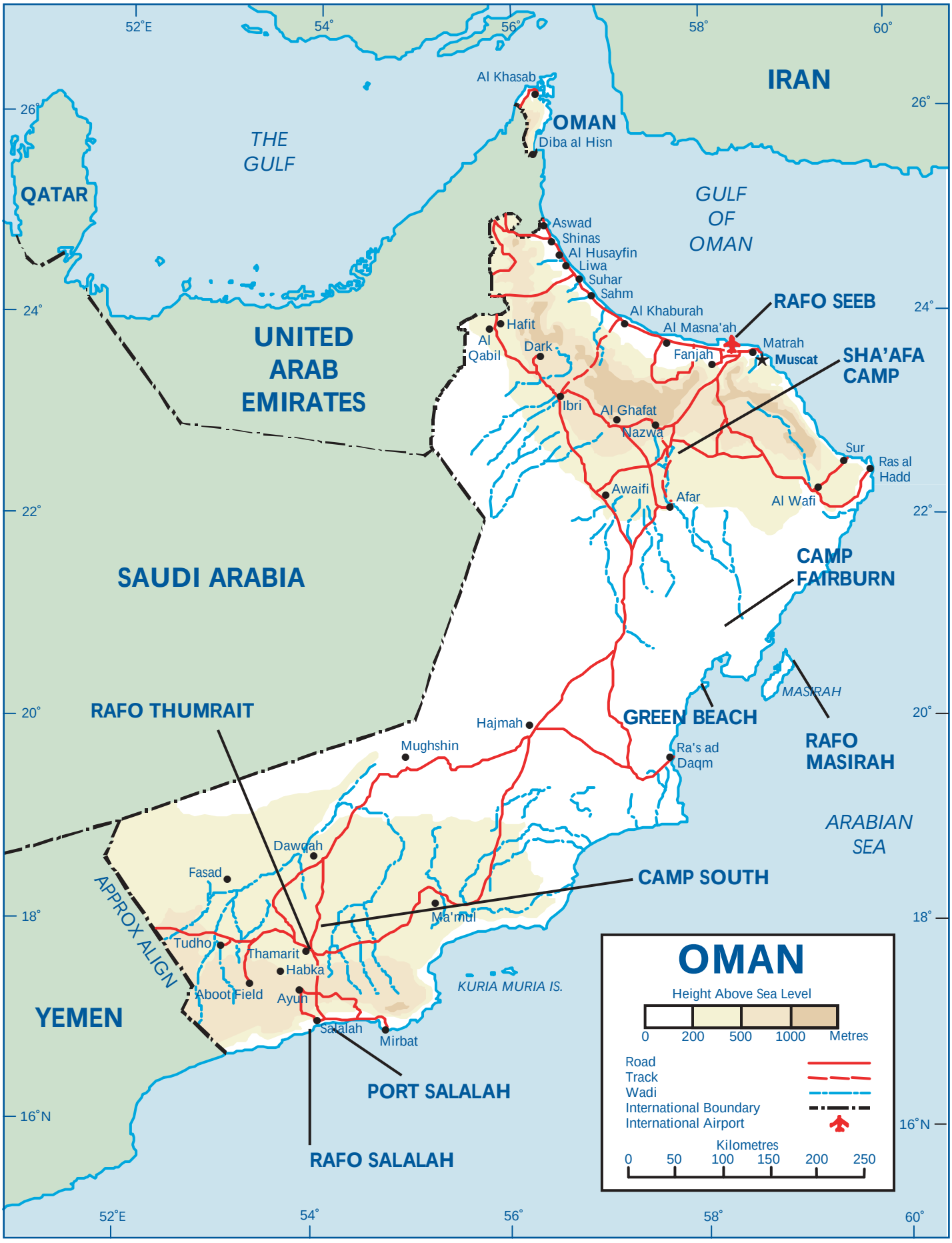


executive summary

In this section

1 Exercise "Saif Sareea" II (Swift Sword II) was the largest deployment of the United Kingdom's military forces since the Gulf War. Over 22,500 personnel, 6,500 vehicles and trailers, 21 naval vessels, 49 fixed wing aircraft and 44 helicopters were deployed to the Sultanate of Oman in September and October 2001 to exercise with Omani forces.

2 The Exercise was designed to demonstrate key elements of the United Kingdom's ability to conduct expeditionary warfare. In particular, it was a test of the progress that is being made in drawing together the capabilities of the Joint Rapid Reaction Forces (a number of well trained and equipped Units and capabilities across the three Armed Services held at a high state of readiness from which a single force can be drawn and sent quickly to any area of the world where the United Kingdom might be expected to fight). The Exercise was also intended to identify lessons, provide training, and to support foreign-policy objectives.

3 This Report examines whether the Exercise was successful in meeting all these objectives. The methodology we adopted is set out in Appendix 1.

4 We found that the Exercise successfully demonstrated key elements of the Joint Rapid Reaction Forces concept. The United Kingdom projected and recovered, over a distance of 5,000 miles, a medium-scale task force. The ability of men and equipment to perform in desert conditions was severely tested, which led to lessons being identified where things worked well and where improvements can be made. The conduct of the Exercise at the time of preparation for operations in Afghanistan, while coincidental, provided advantages, although it limited some of the training aspects of the Exercise. Nevertheless, the Exercise helped to advance British national interests in Oman. Complexities in the scoping, costing and funding of the Exercise led, however, to difficulties in planning.

Saif Sareea II successfully demonstrated key elements of the Joint Rapid Reaction Forces concept

5 The Department successfully demonstrated key elements of the Joint Rapid Reaction Forces concept. A medium-scale joint task force was generated and projected over a distance of 5,000 miles. While communications were stretched in the austere environment, the command and control structure deployed on the Exercise worked. Logistic support was demonstrated with personnel and equipment being successfully moved to, from, and around a large theatre of operations. Overall, the Exercise has shown that the United Kingdom is capable of mounting a balanced, coherent force over a strategic distance. Amongst its allies, the United Kingdom is the only country, other than the United States, that has demonstrated this.

6 A number of key elements of the Joint Rapid Reaction Forces concept were not chosen by the Department for demonstration. For example, the Exercise was planned over three years and did not set out to demonstrate readiness and rapid deployment. Medical facilities were not scaled to cope with casualties that may have arisen from an actual operation. Because of funding constraints half, rather than a complete, armoured brigade was taken. In addition, full war stocks of munitions were not taken on the Exercise. If they had been, it would have increased substantially the, already large, logistic challenge.

The Department identified a number of lessons across the whole range of the Exercise

7 The Department had comprehensive arrangements for identifying lessons and over 2,000 observations were recorded on its database.

8 A number of positive lessons emerged from the Exercise about things that worked well. Much equipment performed to a high standard, including Warrior armoured fighting vehicles, the C17 strategic lift aircraft and the Personal Role Radio. A number of non-warfighting elements also functioned successfully. For example, the Operational Welfare Package (which includes making available mail and telephone facilities) was generally well received in the main camps

although it was not possible to provide the same services to those on detached sites or those who were on the move. The standard of food provision on the Exercise was generally excellent. The recovery of the bulk of 16,000 Army personnel from the theatre was completed on time in mid-November with the remainder being recovered by February 2002 as planned. Each of the three Services concluded that the majority of their objectives for the Exercise had been achieved despite the redeployment of some elements to concurrent operations.

9 One of the purposes of the Exercise was to identify areas where there is room for improvement. These are set out in more detail in paragraphs 2.14 to 2.50 of this Report. Key areas include:

- The Exercise fully extended the Department's dedicated strategic lift assets. Even with the capability offered by the new C17 aircraft, future deployment will be heavily dependent on the use of chartered civilian sea and air assets. Guaranteed access to sufficient civilian strategic lift resources in a crisis, to supplement military lift, is necessary. The Department considers this to be a manageable risk.
- Manning shortages among key personnel such as engineers, signallers and medical personnel manifested themselves during the Exercise, though within these constraints each of these elements performed very well.
- Some equipment did not work well in the hot and dusty conditions and some was kept going at a much higher than expected logistic cost. Problems with the Challenger 2 Main Battle Tank had the biggest impact on the Exercise in that its need to be sustained with more than expected air filters, road wheels, and track pads impacted on the supply of spares to other equipment. There were also complaints from personnel about a failure to supply personal equipment and clothing suitable for desert conditions. In principle, equipment belonging to the very high readiness elements of the Joint Rapid Reaction Forces ought to be suitable for operating in any of the climatic areas in which it might be expected to fight. Either robust equipment is needed or it must be operated within a controlled environment. Equipment must be suitably modified, or be capable of being modified within the readiness period. Similarly, adequate stocks of suitable clothing and personal equipment need to be kept if they cannot be procured within the readiness period.

- Previous operations have identified the importance of being able to track supplies and equipment as they are transported so that they can be delivered to the right place at the right time. The unreliability of asset tracking systems meant that there were periods when it was not possible to track items sent from the United Kingdom to the Exercise theatre.

10 Some lessons identified during previous operations were re-learnt. For example, the lack of reliability of some vehicles in the desert had already been demonstrated during the Gulf War. This example illustrates a tendency that suggests that experience gained on medium-sized operations such as the Gulf War dissipate over time, as do skills as people move on. There is a strong argument that exercises of the size of Saif Sareea II need to be conducted regularly in order to keep skills and experience up to date and to check that lessons identified previously have been implemented.

11 The Exercise provided valuable training experience in the sort of environment in which future deployments might occur. The Department was able successfully to practise joint operations with land, sea and air forces, and to prepare all forces to participate in a combined joint task force with the Omanis. There were, however, some limitations on the training that took place. Conditions, and the absence of Tactical Engagement Simulation, affected the tempo of the training.

Complexities in the scoping, costing and funding of the Exercise led to difficulties in the planning process

12 Uncertainty about the scope and funding of the Exercise had an impact on military planning and cost-effectiveness. Planning went through several iterations regarding size, location, and budget until the Department finally settled on the deployment of a medium-scale joint task force to Oman within a budget of £90.3 million. There was uncertainty as to which Top Level Budget holders would be responsible for the additional funds that were needed because of changes to the budget. Apart from making planning more difficult and tying up those responsible for doing the planning, it also acted against the achievement of maximum value for money. As the Department's First Impressions Report of the Exercise makes clear: "The knock-on effect of these events … resulted in us paying an additional premium for some facilities and detracted considerably from the planning." Some cancellation fees for chartered aircraft also resulted.

13 Normally, before the Department's equipment or works projects are approved, an investment appraisal is carried out. This is not done in the case of exercises, although options are informally costed. There were no formal option appraisals of certain elements of the Exercise, for example, on whether equipment transportation should be provided from the United Kingdom or sourced locally. It is therefore hard to be sure that the most cost-effective design was chosen for the Exercise.

14 The final outturn cost of the Exercise will not be known until July 2003. The estimated outturn cost of the Exercise in July 2002, however, is around £83 million. It is longstanding Departmental policy, agreed with the Treasury, that when costing operations the net additional costs, such as additional fuel and transport costs directly attributable to the operation should qualify for additional funding. Other costs, for example the salaries and wages of personnel taking part in the operation, do not. This is on the basis that military capability represented by the Armed Services, if not deployed on an operation, would be deployed elsewhere and be paid for from existing budgets. The Department extends this argument by analogy to exercises. The National Audit Office considers that there is a case, however, for basing decisions on a knowledge of the full cost of an exercise, not least because the real scale of the resources consumed by any activity is generally a key factor in deciding whether it should take place or not. The Department's view is that such a practice would be time consuming and costly and would not provide useful management information to justify the effort. In the case of Saif Sareea II, full costs have not been calculated but they are likely to be significantly more than the figure of £83 million representing the additional costs.

15 In calculating additional costs, there were inconsistencies in terms of what was regarded as additional. The advent of Resource Accounting and Budgeting was unable to resolve this problem. The Department has issued a policy paper to address shortcomings in this area and templates to describe and identify cost drivers have been implemented. While these proposals will not completely eradicate the problem, they do represent progress.

The Exercise met foreign-policy objectives

16 The Exercise had clear foreign-policy objectives to demonstrate the United Kingdom's commitment to the Gulf region and to advance British interests in Oman. The Department, together with the Foreign and Commonwealth Office, had to ensure that the Exercise passed off without incident. While there were no explicit objectives to promote defence or civil exports, the potential for enhancing the United Kingdom's position as a trading partner with Oman was recognised.

17 The Exercise demonstrated the United Kingdom's ability to conduct operations with allies in the Gulf Region. The presence of United Kingdom forces in Oman, while a coincidence, was beneficial in allowing the United Kingdom to contribute to concurrent operations in Afghanistan. The Exercise did not lead to any friction with the local population while its impact on trade is difficult to quantify and will tend to show up only in the longer term. There was, however, a significant contribution to the local economy as a direct result of the Exercise.

Recommendations

18 The Department should:

a) Consider, given the success of Exercise Saif Sareea II and the number of useful lessons identified, whether further large exercises of this type might have a place in its exercise programme.

b) Consider how to demonstrate, through exercises or other means, as yet untested aspects of the Joint Rapid Reaction Forces.

c) In taking forward lessons learned from the Exercise, in particular, address:

- how key staff can be retained;
- whether, even with the additional assets planned, there will be sufficient strategic lift to meet the requirement of a real medium-scale operation;
- whether the Department holds, or can modify or procure within the required readiness timescale, equipment able to operate in all the climatic conditions that the Joint Rapid Reaction Forces might reasonably be asked to face; and
- the extent to which asset tracking can be improved.

d) Ensure that the scope and funding of future exercises is clear and agreed at the outset.

e) Ensure that all costs are captured, and that an investment appraisal is carried out when planning exercises of this size.

f) Consider whether it should move to identifying the full cost of resources consumed by individual exercises.

Part 1

Saif Sareea II successfully demonstrated key elements of the Joint Rapid Reaction Forces concept

1.1 Exercise "Saif Sareea" II (Swift Sword II) took place in the Sultanate of Oman during September and October 2001, and constituted the largest deployment undertaken by the Ministry of Defence (the Department) since the Gulf War in 1991. The deployment involved some 22,500 personnel, 6,500 vehicles and trailers, 93 aircraft of all types and 21 naval vessels. The Exercise was part of the Department's joint exercise programme and was designed to demonstrate the concept of the Joint Rapid Reaction Forces. It also provided an opportunity to operate with the Armed Forces of a friendly nation, and to conduct unit and formation level training in theatre.

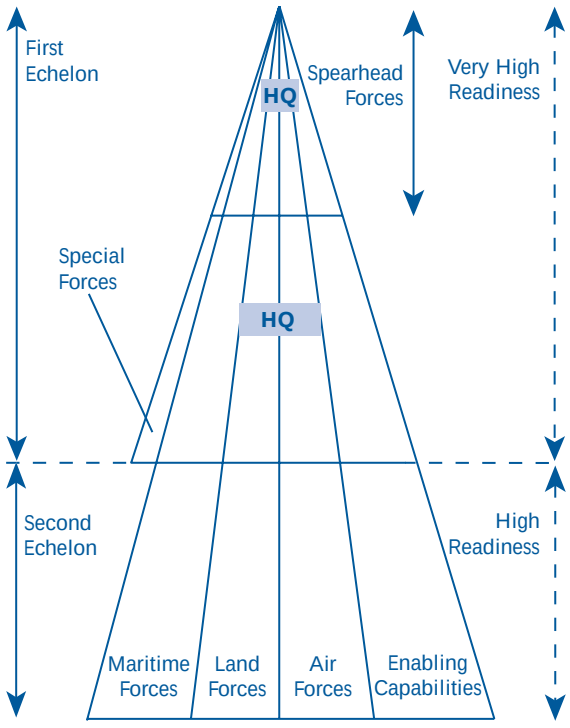
1.2 This Part of the Report examines the structure and role of the Joint Rapid Reaction Forces; the key elements of capability that were and were not to be demonstrated during the Exercise; and sets out the extent to which those elements that were chosen were tested. We found that the Joint Rapid Reaction Forces' role in conducting expeditionary operations was successfully demonstrated during the Exercise. However, given that elements of the Joint Rapid Reaction Forces' capability were not tested during the Exercise, there is still some way to go to prove that all the constituent force elements of the Joint Rapid Reaction Forces are fully equipped and ready for deployment in the most demanding scenarios assumed.

The Joint Rapid Reaction Forces have a key role in expeditionary operations

1.3 The Strategic Defence Review of 1998 confirmed that British defence policy would be informed by the principle of expeditionary operations, whereby the British Armed Forces could be deployed anywhere in the world at short-notice in a variety of conflict scenarios. The Department identified the Joint Rapid Reaction Forces as the most important element of the review. The Joint Rapid Reaction Forces pool the high readiness units from across the Armed Forces. These units are divided into two echelons. First echelon forces should be available at very high readiness and include Special Forces. The pool also includes a spearhead battlegroup based on a light infantry battalion or commando group. Second echelon forces should be available at high readiness (ready to deploy from barracks at 20 to 30 days notice) to provide more substantial capabilities should the first echelon require strengthening or need to conduct subsequent operations. These forces would probably require a combination of military and commercially contracted transport assets to deploy. **Figure 1** illustrates the Joint Rapid Reaction Forces' structure.

1 The structure of the Joint Rapid Reaction Forces

The Joint Rapid Reaction Forces' structure consists of two echelons, one at very high readiness and the other at high readiness



Source: Ministry of Defence

1.4 The pool of forces available to the Joint Rapid Reaction Forces will vary, but should include around 20 major warships (aircraft carriers, attack submarines, amphibious ships, destroyers and frigates); some 22 other naval vessels (mine warfare and support ships); four brigades from the Army and Royal Marines; and about 110 combat aircraft and 160 other aircraft. Given the range of missions that the Joint Rapid Reaction Forces may have to undertake, the Department adopts what is known as a "golf bag" approach when drawing upon forces from the Joint Rapid Reaction Forces pool. The joint task force commander ("the golfer") is involved in planning which assets ("the clubs") are required to complete a particular mission.

1.5 Prior to Saif Sareea II, the Joint Rapid Reaction Forces were deployed in numerous operations of varying size including Kosovo, Sierra Leone, Mozambique, and East Timor.

Saif Sareea II was designed to demonstrate the key elements of the Joint Rapid Reaction Forces concept

1.6 Staff within Permanent Joint Headquarters undertook detailed planning for the Exercise by designing objectives against which outcomes could be measured. Originally, it had been intended to validate the Joint Rapid Reaction Forces concept in order to prove it. As a result of funding constraints and the withdrawal of some force elements, the objective of the Exercise was eventually altered to one of demonstrating key elements of the concept as a step towards proving it at a future date. This was to be done by mounting, operating, sustaining and recovering a medium-scale, joint task force in a multinational warfighting scenario. **Figure 2** defines the four stages of deployment.

2 The fours stages of deployment

Exercise Saif Sareea II demonstrated an ability to mount, operate, sustain and recover a joint task force

Mount	The projection of a tailored force package, in a timely manner, to achieve a stated objective.
Operate	Military actions, primarily combat, to deliver desired effects, within a given time, to achieve a military objective or end-state.
Sustain	The maintenance of the necessary level of combat power required to achieve objectives.
Recover	The extrication of forces, in a timely manner, having achieved a stated objective.

Source: National Audit Office

The Department chose to demonstrate five key elements of the Joint Rapid Reaction Forces concept during the Exercise

1.7 The Department identified five key elements required to demonstrate the Joint Rapid Reaction Forces concept. These were:

- force generation;
- deployment of a medium-scale Joint Rapid Reaction Forces expeditionary force at strategic distance;
- command and control structure;
- practising and developing logistics support; and
- practising joint, combined operations and preparing all forces to take part in a combined, joint task force.

Force generation

1.8 Saif Sareea II aimed to generate a medium-scale joint task force from the Joint Rapid Reaction Forces' force pool. Permanent Joint Headquarters' planning assumptions indicate that a medium-scale war-fighting task force should consist of up to a brigade group (land forces); a Maritime Task Group of 15 major warships; 60 fast jets; and 50 other aircraft/helicopters.

Deployment of a medium-scale Joint Rapid Reaction Forces expeditionary force at strategic distance

1.9 The Joint Rapid Reaction Forces concept envisages that the bulk of a medium-scale task force will be deployed into the area of operations through the concurrent use of air and sea strategic lift assets, supplemented, where necessary, by chartered civilian sea and air assets. During Saif Sareea II, the Department attempted to demonstrate its ability to deploy a medium-scale task force to Oman.

1.10 Oman is situated on the eastern side of the Arabian Peninsula. It is some 5,000 miles from the United Kingdom and is of strategic importance **(Figure 3)**. Oman's topography consists of desert in the central plain and rugged mountains in the north and south. Its climate is hot and humid along the coast, and hot and dry in the interior, though the far south does experience monsoon conditions between May and September. As a longstanding British ally in the Gulf region, Oman was an ideal location for the Exercise.

Command and control structure

1.11 The Strategic Defence Review signalled the Department's intent to establish a standing Joint Force Headquarters. The Joint Force Headquarters is central to the Joint Rapid Reaction Forces' command and control, and is held at the highest readiness. The Department intended to demonstrate the use of the standing United

3 Oman and the Middle East

Oman occupies an important strategic position within the Middle East

Source: National Audit Office

Kingdom Joint Force Headquarters as the basis for a Combined (United Kingdom/Omani) Joint Task Force Headquarters during the Exercise. **Figure 4 overleaf** shows the place of the Joint Task Force Headquarters within the wider joint task force command structure.

1.12 The Joint Rapid Reaction Forces concept states that the Joint Rapid Reaction Forces require secure, resilient and reliable communication and information systems compatible with single Service force elements, static and deployed headquarters, and the forces of likely allies. Joint force communications were managed by a Combined Joint Communication and Information Systems Component Command, which was required to support the information flows between 12 in-theatre operational level headquarters, strategic communications to the United Kingdom, and the interface with Omani communication and information systems. Communications were relatively fragile owing to the need to fulfil a more complex task than would be expected on an actual operation. This was because the communications architecture comprised two Combined Joint Task Force Headquarters and a neutral organisation for the exercise controllers.

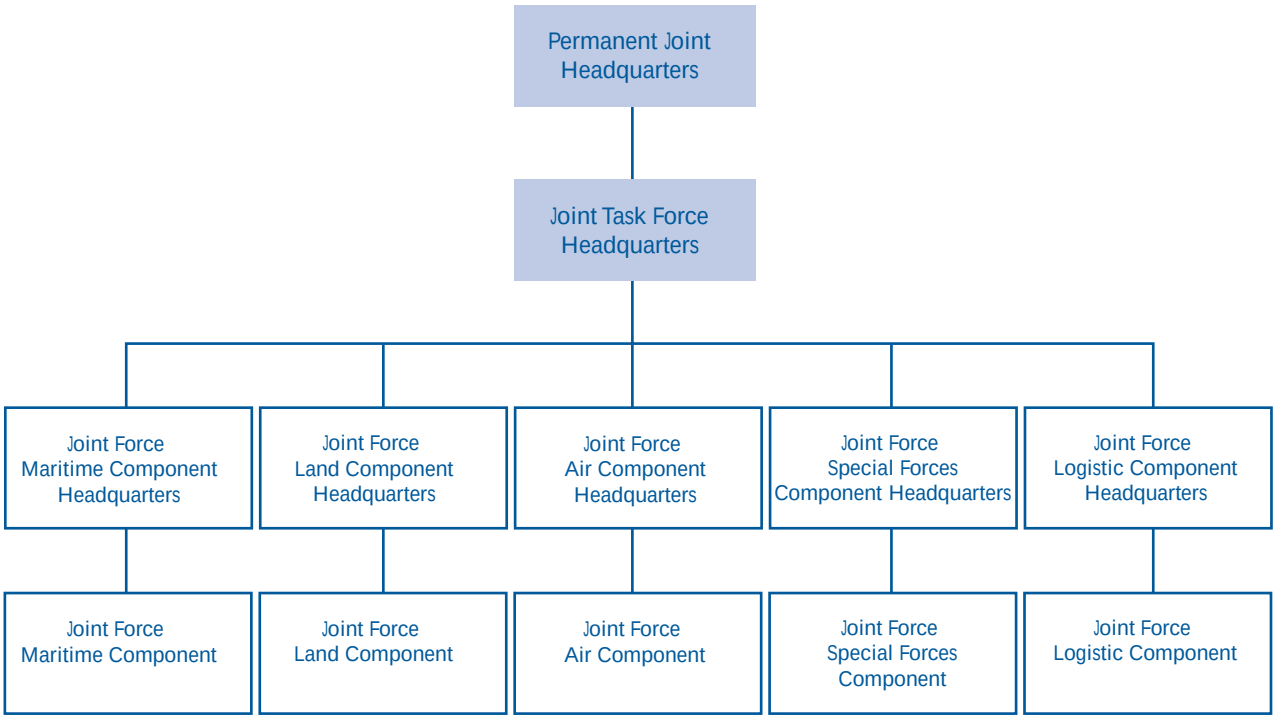
Practising and developing logistics support

1.13 The Strategic Defence Review recognised the need to improve the United Kingdom's operational logistics capabilities. As such, it called for the creation of two Joint Force Logistic Component Headquarters. The Joint Rapid Reaction Forces concept indicates that, where an operation reaches a sufficient level of complexity, a Joint Force Logistic Component Headquarters will be established to implement theatre logistic policy as set by the Joint Task Force Headquarters.

1.14 Exercise Saif Sareea II was the first occasion on which the concept of a Joint Force Logistic Component Headquarters was utilised in a medium-scale warfighting scenario and the Department sought to demonstrate the validity of the concept. Logistic support was provided over an extensive line of communication between the United Kingdom and Oman.

4 Joint Task Force Command Structure

The Joint Task Force Headquarters is the hub of command and control for the joint task force



Source: National Audit Office

Practising joint, combined operations and preparing all forces to take part in a combined, joint task force

1.15 One major objective of the Exercise was for each of the Service environments (Land, Sea, Air, and Special Forces) to conduct their own individual training in theatre prior to participating in joint training with each other and in a combined exercise with the Omanis. More information about the conduct of the training can be found in paragraphs 2.54 to 2.60.

The Department chose not to demonstrate a number of key elements of the Joint Rapid Reaction Forces concept

1.16 The Department did not demonstrate some other key elements of the Joint Rapid Reaction Forces concept during the Exercise. These were:

- readiness and rapid deployment;
- full logistics support;
- the Nuclear, Biological, and Chemical Regiment; and
- other elements.

Readiness and rapid deployment

1.17 The Joint Rapid Reaction Forces concept states that elements of a medium-scale task force should be "ready to deploy from its base or other designated location within 30 days of notice". Since this was an Exercise, however, cost was a key consideration and extending the deployment timetable enabled the Department to reduce costs. The Exercise took three years to plan, and the deployment to Oman took place during the period between May and September 2001, and did not therefore demonstrate the Joint Rapid Reaction Forces' ability to generate a medium-scale task force within the readiness profile envisaged by the concept.

Full logistics support

1.18 The land and air elements of the joint task force did not deploy with full war stocks, some 40,000 tons of munitions, since that would have greatly added to the burden on strategic lift. In line with extant doctrine, the Department made maximum use of host nation support for the provision of water and fuel.

The Nuclear, Biological, and Chemical Regiment

1.19 The Strategic Defence Review recommended that a joint Nuclear, Biological, and Chemical Defence Regiment should be formed to provide an integral part of the Joint Rapid Reaction Forces' force protection capability. However, because of regional sensitivities regarding nuclear, biological, and chemical issues, the Department chose not to deploy this Regiment during the Exercise.

Other elements

1.20 Some of the capabilities that will be available to the Joint Rapid Reaction Forces are still being developed. Clearly those elements not yet in service, for example, the Attack Helicopter or those not taken for other reasons, such as the Multiple Launch Rocket System, were not tested. Constraints on funding also restricted the scope of the Exercise, for example only half an armoured brigade, rather than a full brigade, was sent.

1.21 Not surprisingly, there was also a degree of artificiality about the Exercise. For example, although the areas set aside for training were larger in scale than those used in the United Kingdom and Germany, there remained restrictions on the amount of room for manoeuvre, particularly during the live exercise. In addition, medical services were not scaled to cope with the casualties that may have arisen on an actual operation. And host nation facilities were more readily available than may otherwise be the case in a typical expeditionary operation because such facilities cannot be relied upon in actual operations. Finally, force protection was easily achieved, partly because of Omani concerns about ensuring the safety of British forces.

Despite arising concurrent operations, the Department successfully demonstrated key elements of the Joint Rapid Reaction Forces concept

1.22 Despite the redeployment of some forces to participate in preparations for operations in Afghanistan following September 11, the key elements of force generation, deployment, and the practising of joint operations were demonstrated. Concurrent operations did, however, impact on the command and control structure, logistics, and elements of air, maritime and Special Forces training. On the other hand, the flexibility of the Joint Rapid Reaction Forces was displayed in the redirection of manpower, equipment and assets from the Exercise to the arising operations in Afghanistan as a result of the declaration of the War on Terrorism.

Tornado GR4 at Thumrait

Force Generation

1.23 A medium-scale joint task force was generated from across the range of Joint Rapid Reaction Forces capabilities. It comprised some 6,500 vehicles and trailers (including 547 armoured vehicles such as Challenger 2 tanks, Warrior armoured fighting vehicles, and AS90 self-propelled guns), 21 naval vessels (including the aircraft carrier HMS Illustrious and the landing platform for helicopters, HMS Ocean), 49 fixed wing aircraft (including Tornado GR4s and F3s, and Harrier GR7s) and 44 helicopters. The Royal Air Force deployed at the low end of the scale of medium-scale warfighting levels. A detailed breakdown of the forces involved appears in Appendix 2.

Deployment

1.24 The Department succeeded in deploying the generated force at strategic distance. **Figure 5** illustrates the key phases of the Exercise. A more detailed chronology is at Appendix 3.

5 Key dates in the Saif Sareea II deployment phase

The bulk of the Exercise force deployed to Oman in September 2001

Date	Event
May 2001	Enablers (engineers/pioneers/logistics personnel) deployed to prepare in theatre for the arrival of main force elements. Joint Force Logistics Component Headquarters established
7-11 September	Land force (personnel) main body arrives in theatre
13-19 September	Air force main body arrives in theatre
19 September - 2 October	Land force unloads shipping (heavy vehicles, etc). Main naval body arrives in theatre

Source: National Audit Office

1.25 The deployment effort utilised significant air and sealift transport assets; some 16 shiploads of equipment were deployed to Oman, entering through the main point of disembarkation at Port Salalah **(Figure 6)**. Forty-nine flights, using both military (23 flights) and chartered civilian aircraft, deployed some 13,000 personnel into theatre, primarily through the main air point of disembarkation at the Royal Air Force of Oman base at Thumrait. Saif Sareea II was the first occasion on which the Royal Air Force's recently acquired C17 strategic transport aircraft were deployed.

6 Quantities of equipment moved into theatre through Port Salalah

A large volume of equipment was transported into theatre via the sea point of disembarkation at Port Salalah

Equipment Type	Numbers deployed
A vehicles (i.e. armoured vehicles)	547
B and C vehicles (includes Land Rovers and trucks, etc.)	3,788
Trailers	2,169
ISO containers	1,826

Source: Ministry of Defence

Practising joint operations

1.26 Concurrent operations ensured that some force elements were withdrawn from the Exercise at an early stage. Nevertheless, land, sea, and air forces conducted their own training successfully; 4th Armoured Brigade, exercising with two of its four battle groups, achieved collective performance five readiness.[1] The multinational exercise involved 3 Commando Brigade Royal Marines conducting an amphibious operation and engaging a United Kingdom/Omani combined joint task force.

Command and control structure

1.27 The Department's intent to demonstrate the ability of the standing Joint Force Headquarters to act as a Combined Joint Task Force Headquarters was partially constrained by the United Kingdom's contribution to operations in Afghanistan, which included sending the standing Joint Force Headquarters to the United States Central Command in Florida. First Mechanised Brigade Headquarters took over as Combined Joint Task Force Headquarters for the Exercise. While this arrangement functioned well throughout the Exercise, the Department has acknowledged that the Saif Sareea II Combined Joint Task Force Headquarters was an ad hoc affair. Despite this, the Department judged that the Combined Joint Task Force Headquarters has demonstrated its ability to co-ordinate combined, joint operations within the constraints of the Exercise and the influence of events elsewhere in the region.

1.28 The Joint Communications Component Commander concept was successfully trialled. A complex communication and information systems structure was deployed, exceeding the scale of effort expended in Kosovo. In the event, however, the communications infrastructure was stretched (paragraphs 2.29 to 2.36).

Logistics support

1.29 As planned, the Joint Force Logistic Component Headquarters was established in May 2001 to co-ordinate the influx of personnel and materiel to Oman, and to prepare the theatre for the entry of the main force. Primarily, this significant effort involved the construction of tented camps and temporary infrastructure at a number of locations, accommodating some 13,000 personnel. Once the main force had arrived, the Joint Force Logistic Component Headquarters co-ordinated the movement of personnel and equipment from their respective points of entry to numerous locations across the theatre.

1.30 The size of the logistics task in theatre can be illustrated by comparing distances within Oman to those within the United Kingdom. The length of the main supply route between Muscat in the north and Salalah in the south is some 1,000 kilometres - approximately the same distance as that between John O'Groats and Lands End. Throughout the various stages of the Exercise, the Joint Force Logistic Component Headquarters managed operational logistics for the two forces participating in the Exercise and, despite some shortcomings discussed in paragraphs 2.48 - 2.50, demonstrated the benefits of an integrated joint support component.

Other elements

1.31 There is a need to demonstrate other, as yet untested, aspects of the Joint Rapid Reaction Forces through exercises and other means. Moreover, the impact of arising concurrent operations on air and maritime forces meant that planned elements of their involvement in the Exercise, such as anti-submarine warfare and close air support, had to be abandoned. The participation of Special Forces in the Exercise was also restricted. Some of these elements were, however, at least partially tested during operations in Afghanistan.

1 *Defined as a formation fully prepared for combined arms operations or other tasks.*

Part 2

The Department identified a number of lessons across the whole range of the Exercise

2.1 This Part of the Report examines the nature of the lessons identified from the Exercise - both those that are positive and those that illustrate areas that can be improved. Lessons relating to the planning process are addressed separately in Part 3. A number of lessons were identified because of the specific circumstances of the Exercise while others confirmed lessons identified on previous exercises and operations that had not yet been resolved. The Exercise provided worthwhile training opportunities despite some of the limitations that were placed on the extent of the training.

2.2 One of the objectives of the Exercise was to identify lessons for the ongoing implementation of the Joint Rapid Reaction Forces concept. Staff from the Permanent Joint Headquarters formed an After Action Review team so as to capture lessons from the Exercise. The Joint Exercise Management System, an information technology system that allows for lessons to be captured in real time, was used for the first time on an exercise of this scale. A number of post exercise reports were written by participants and some 2,000 observations were recorded in the Joint Lessons Identified Database. These will inform the future action plans of the Permanent Joint Headquarters. In addition to this activity, the Directorate of Operational Capability has conducted a high-level capability audit of the Exercise.

Lessons to show things that worked well

2.3 The Department identified a number of positive lessons from the Exercise for operating a medium-scale Joint Rapid Reaction Forces task force. Overall, the Exercise demonstrated that a medium-scale operation of this nature could be managed successfully. In so doing, it demonstrated the validity of joint education initiatives such as the Joint Services Command and Staff College.

Warfighting elements

Equipment performance

2.4 Despite the adverse conditions, much equipment worked well in the Exercise. The family of Warrior armoured fighting vehicles performed very well with availability being maintained at 79 per cent owing to a high turnover of repairs. The utility of the helicopter fleet was shown through large numbers of heavy lift and command and control missions, in addition to its training tasks of reconnaissance, attack support, troop lift, direction of fire support and casualty evacuation.

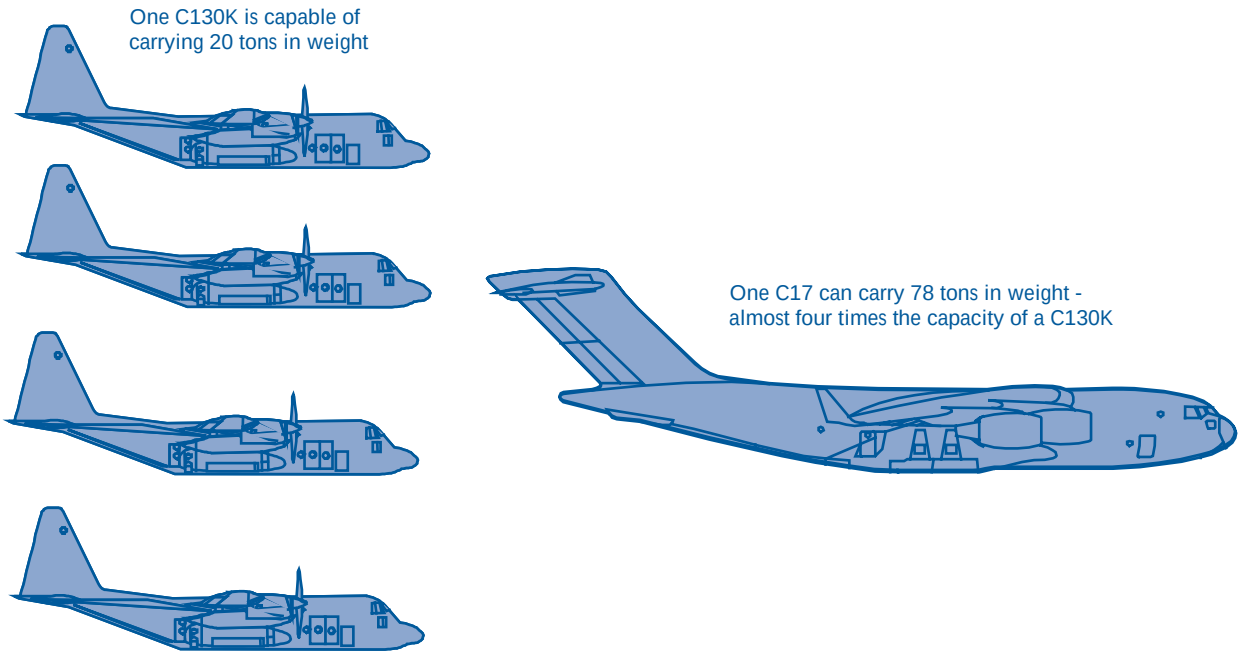
Strategic lift capability

2.5 Saif Sareea II saw the first use of the Royal Air Force's new C17 "Globemaster" strategic lift aircraft, which the Department has leased from Boeing. The aircraft operated very effectively, significantly enhancing the United Kingdom's ability to move considerable quantities of equipment by air between the United Kingdom and Oman. During the Exercise, the fleet of four C17s each carried an average of 27 tons per flight, with actual cargo capacity on each flight dependent on factors such as fuel load and weather conditions. Among the equipment transported were helicopters, boats, food, and tentage. The availability rate of the C17s was around 75 per cent during the main stages of the Exercise.

2.6 The C17 is an interim outsized airlift solution, pending the introduction into service of the European A400M in 2010 which is also the Department's replacement for the Hercules C130K aircraft which has a much smaller lift capacity. Four C130Ks were deployed on the Exercise to fulfil the function of intra-theatre transport of personnel and materiel. On average, the C130Ks carried nine-and-a-half tons of general freight during the Exercise. The availability of the C130K fleet averaged 50 per cent overall during the Exercise. **Figure 7** illustrates the lift capacity of the C17 compared to that of the C130K.

7 A comparison of the C17 and the C130K

A C17 can carry considerably more in weight than a C130K can



Source: National Audit Office

2.7 The enhancement provided by the C17 was augmented by the use of Joint Rapid Reaction Forces Provisional Service Roll-on Roll-off ferries, which made 20 voyages and charter vessels, which made 11 voyages. Despite the fact that only half an armoured brigade and no war stocks for land or air forces were moved, the Exercise fully extended the Department's dedicated strategic lift assets. Therefore, even with the planned acquisition of six Joint Rapid Reaction Forces Full Service Roll-on Roll-off ferries, the Joint Rapid Reaction Forces will continue to rely upon the availability of commercial lift assets. The Department considers this to be a manageable risk.

Communications systems

2.8 The Exercise saw the first major deployment of the new Personal Role Radio intra-section communications system. Some 600 sets were distributed among the Royal Marines who were delighted with its performance. The Army will also be using the equipment and up to 40,000 units will be available for use from mid-2003. The Personal Role Radio is currently being used by troops in Afghanistan.

Achievement of individual Service objectives

2.9 Despite the redeployment of some air and maritime elements to other operations, each Service environment is satisfied that it achieved the bulk of its objectives for the Exercise. The maritime component achieved its objectives with the exception of those requiring attack submarines, which were absent for operational reasons. The Exercise has allowed the Royal Air Force better to understand expeditionary operations. Although the Royal Air Force deployed fewer personnel and aircraft than would be the case on a medium-scale operation, the Exercise allowed participating squadrons excellent experience including unique opportunities to deliver precision-guided munitions.

Non-warfighting elements

Welfare and provisions

2.10 In March 2001, the Department unveiled a new Operational Welfare Package that was to be made available to all personnel engaged on operations under the command of the Permanent Joint Headquarters, maritime deployments lasting more than two months, and other operational or exercise deployments overseas lasting more than two months. **Figure 8** illustrates the elements making up the Operational Welfare Package on the Exercise, which was its first large-scale deployment. On balance, the Package was a qualified success. It was well received at large, static locations such as Thumrait, but difficulties arose when personnel, such as tank crews, Royal Marines and military drivers, were deployed in the field and in more remote locations

where elements of the Package were not available. The Department is reviewing its guidance on the Operational Welfare Package in the light of experiences on the Exercise. In particular, pre-exercise literature may have raised the expectations of all exercise participants that they would be able to take advantage of all aspects of the Operational Welfare Package when, as noted above, this would have been unrealistic.

2.11 The provision of food during the Exercise was a success. The Department's food supply contractor, called "3663", was utilised with the majority of food coming from Europe. The contractor was responsible for all provision, warehousing and distribution of food-related items, including bottled water, delivered to specified locations in-theatre. The Joint Force Logistics Component exercised command, control and accounting functions. The contractor was successfully integrated with the Ration Troop and the overall quality of food in theatre was excellent. However, whilst Royal Air Force personnel were provided with disposable plastic eating utensils, Land Component personnel used standard, reusable metal implements. Subsequently, a number of cases of gastro-enteritis occurred amongst Land personnel. As a result, a lesson identified has been the provision for full use of disposable plates and utensils for desert operations and exercises.

Recovery of personnel and equipment

2.12 An in-theatre bio-security operation to decontaminate equipment of potential diseases such as foot and mouth, Peste des Petits Ruminants, and sheep and goat pox, prior to recovery to home bases occurred without any problems.

2.13 The recovery phase tested plans for a medium-scale operation with some 16,000 personnel having to embark by air and sea. The recovery began in mid-October when some vehicles and unused containers were returned to the sea port of embarkation at Salalah. Ultimately, all equipment was recovered to Salalah by the planned date of 18 November. The rear party of the Joint Force Logistics Component was recovered by 15 December. All remaining personnel, for example, engineers, left by February 2002.

Lessons showing room for improvement

2.14 One of the main objectives of the Exercise was to identify lessons that would serve to highlight areas of operational capability where improvements are required to bring elements up to a level where they could perform on an actual operation. As the Department's Final Exercise Report makes clear, "it is only by

8 The Operational Welfare Package

Exercise Saif Sareea II was the first exercise on which the Operational Welfare Package was deployed

- **Mail**: All Service personnel were entitled to send and receive Forces Free Aerogrammes ("blueys") and to have access to concessionary parcel rates.
- **E-blueys**: An "E-bluey" system was deployed to Thumrait and Muscat for onward distribution of e-blueys to theatre.
- **Private Telephone Calls**: All deployed Service personnel were entitled to a weekly 20-minute telephone call to enable them to call home. Telephones were provided on a ratio of 1:50 personnel.
- **E-mail**: Deployed Service personnel had access to E-mail and content managed Internet facilities at all static locations. Internet facilities were provided on a ratio of 1:200.
- **Newspapers**: Publicly funded welfare newspapers were provided to all units on a ratio of one newspaper per day for every 10 individuals.
- **Library Services**: Publicly funded paperback library books were provided to all units deployed on a ratio of one book for every four individuals per month.
- **British Forces Broadcasting Services**: A British Forces Broadcasting Services radio/television broadcasting service was provided in addition to televisions, video recorders and radios. Video cassettes and DVDs were provided on a monthly ratio of 1:30.
- **Combined Services Entertainment**: A Combined Services Entertainment show, which included performances by the singer Geri Halliwell and the band Steps, took place at Camp South and Camp Fairburn on 6 and 9 October 2001 respectively.
- **Expeditionary Forces Institute**: Facilities were established throughout the operational area for personnel to buy refreshments and day to day essentials such as shampoo, soap, tampax, suntan oil, toothpaste and razors, which provide a key sustainment service.
- **Operational Fitness Equipment**: Elements of Operational Fitness Equipment were deployed to all locations but the full scale was only deployed in those locations where personnel were expected to stay for more than four months and on a ratio of 1:120.
- **Rest and Recuperation**: A publicly funded Rest and Recuperation package (up to 13 nights full board in a hotel) for those who completed more than four months.
- **Free laundry**.
- **Free shower bags**.

Source: National Audit Office

undertaking [an exercise] at the medium scale [with] all the accompanying friction and fog of war that true lessons can be learnt".

Problems identified specifically as a result of the Exercise

Some key land equipments suffered from poor availability

2.15 The Exercise provided the Department with an opportunity to test its battle-winning equipment, including armoured vehicles, "B" vehicles, and helicopters. The availability of land equipment varied during the Exercise. **Figure 9** illustrates the position on the last day of the live exercise with unfit equipment shown as a proportion of that originally deployed. Some of the key equipment is highlighted. Availability ranged from 93 per cent for the Land Rover to 45 per cent for Demountable Rack Offloading and Pickup System vehicles.

2.16 Data on equipment availability and performance is of particular interest to the contractors that manufacture equipment. The Department recognises that it needs to consult fully with industry regarding the maintenance and support of equipment, and work with its suppliers to develop solutions in those cases where equipment has not performed to expectation. The attendance of contractor representatives during an exercise can assist here, and contractor comment from the Exercise in Oman suggests that this can be a particularly valuable method of providing feedback.

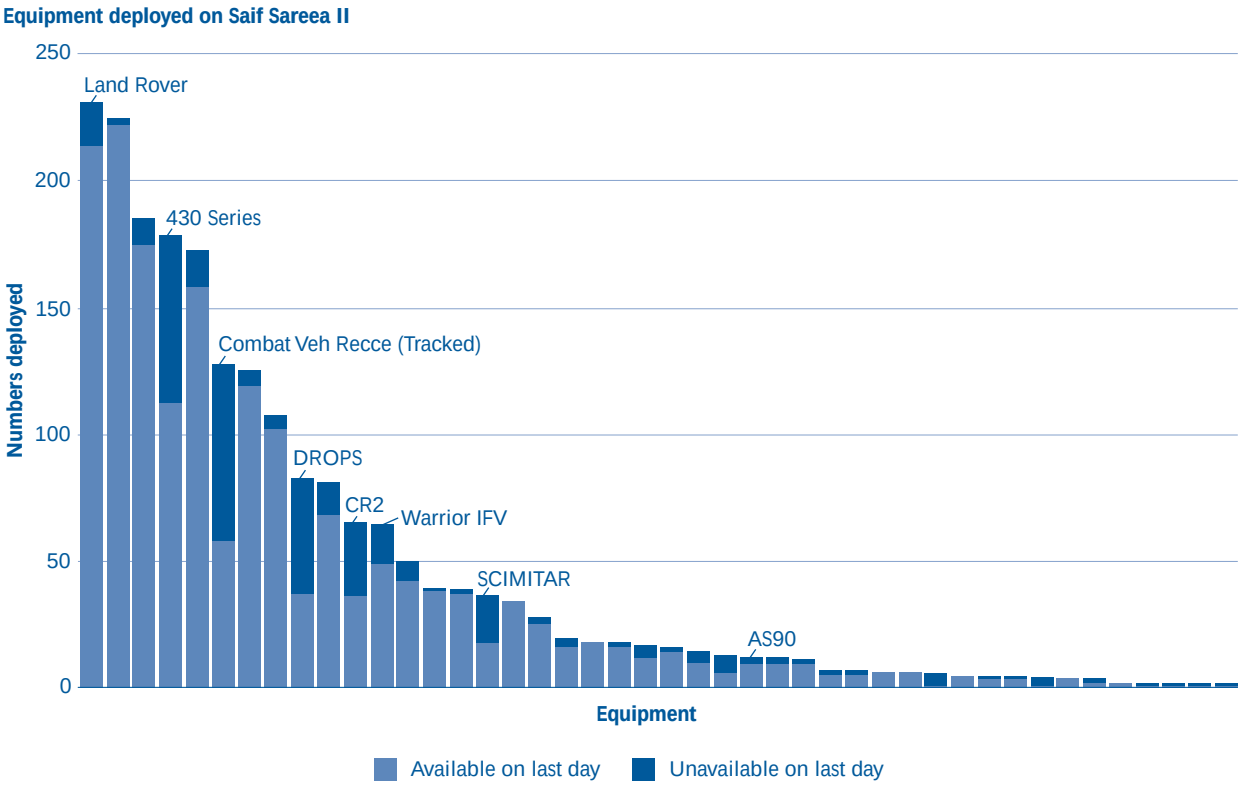
Challenger 2 Main Battle Tank

2.17 Figure 9 shows that just over half of the Challenger 2 Main Battle Tanks deployed to the Exercise were available on the last day of the live exercise. The Challenger 2 fleet experienced particular operational problems during the Exercise due to the desert environment.

2.18 In total, 66 Challenger 2s deployed to Oman. Soon after the beginning of the preliminary exercise phase, Challenger 2 began to encounter difficulties owing to the peculiar characteristics of the fine dust thrown up by the tanks as they manoeuvred in the desert. This led to many engine air filters clogging after only four hours of usage. To ensure the tanks' continued participation in the Exercise, the Department gave top priority to

9 Availability rates for land equipment

Availability rates for land equipment at the end of the Exercise varied across the fleet



Source: National Audit Office

Figure 10 overleaf

10 Difficulties experienced by Challenger 2 in Oman

The Challenger 2 Main Battle Tank was originally designed and procured for use in North West Europe during the Cold War. This decision, taken in 1987 and re-endorsed following the 1991 Gulf War, was taken on the understanding that additional measures (including additional air conditioning and extra cooling systems) would be necessary for the vehicle to be capable of operation in more extreme conditions. The Strategic Defence Review recognised the need for equipment to operate 'globally'. As a result, funding was assigned in 1999 (some £23 million) to include 'desertisation' modifications for some 30 tanks (two squadrons). One of these modifications included the 'Skirt Plate' which involved the incorporation of new seals, dust strips and track guards; this was costed at £464,000 for four battle groups, or 116 Challenger 2s. However, this funding was subsequently delayed and ultimately deleted as part of the Equipment Capability Customer's screening of Equipment Plan 2001 in May 2000. The Royal Army of Oman operates a specially desertised version of Challenger 2.

The Challenger 2 w operate in

1 UK Armoured Div highlighted the pot Challenger 2 for

There were numerous discussions involving Permanent Joint Headquarters the Tank Systems Support Integrated Project Team, Equipment Support (Land) and the Front-Line Command regarding this issue. In July 2001, Permanent Joint Headquarters directed, despite concerns raised by I UK Armoured Division and 4th Armoured Brigade, that the A3 climatic conditions predicted removed the need for Challenger 2 modifications prior to deployment in Oman.

Despite 1 UK recommendations not to mo

Five Squadrons, or 66 to Oman and rapi

The nature and quantity of the dust led to the tanks' air filters becoming clogged at a much faster rate than anticipated. In North West Europe, the air filters are expected to last up to 12 months before requiring replacement in a normal training year. In the event, it emerged that the filters in Oman had an average life of four hours This is compared to the design specification of the filter of 14 hours in zero visibility. The fine nature of the sand, and its tendency to solidify led to significant clogging of the filters. This led to a daily consumption of 46 filters across the 66 vehicles. In addition to the filters, it had also become apparent that an additional quantity of road-wheels and track-pads would be required.

As a result of the Challenger 2 r quantity of ai roadwheels tha

Challenger 2 Roadwheel

Challenger 2 Air Filter

Challenger 2 Trackpads

An additional spares had to

- Delays to B Vehicle fleet spares, resulting in some vehicles being left in Southern Oman during LIVEX.
- Delays to C130K aircraft spares, impacting on availability of in-theatre transport aircraft.
- The need to reduce filter consumption led to the removal of two squadrons of Challenger 2 before the main LIVEX and firepower demonstration. Despite this, 4th Armoured Brigade still met its Collective Performance 5 training standard objective.
- The Exercise requirements effectively exhausted the global supply of air filters, requiring the placement of a new contract to replenish filter stocks.
- The difficulties with Challenger 2 consumables did not impact on the ability of 4th Armoured Brigade to meets its Lead Armoured Task Force readiness obligations in January 2002.
- A significant amount of repair work has been carried out both by Units and ABRO to recover the Challenger 2 fleet. The Department is currently unable to quantify the costs of this work.

These events ha

figure 10

Source: National Audit Office

as not originally designed to
desert environments

ision's reconnaissance report
ential risks of not modifying
use in the Omani desert

As a result of pre-Exercise reconnaissance, 4th Armoured Brigade made a number of recommendations with respect to equipment support in Oman. It is worth quoting directly from the reports of this reconnaissance. 1 UK Armoured Division noted that:

"The issue of desertisation is judged to be important. If the equipment management aspects of desertisation are fudged, battle-winning equipment vulnerable to heat, dust and condensation may fail before the combined LIVEX with the Omanis. There may be longer-term knock on effects too for the high readiness availability of some equipment. Whilst acknowledging the climate data provided by PJHQ, and the comparatively benign temperatures in country at the time of the exercise, this report recommends that a series of minimum modifications be made to vehicles."

A range of desertisation modifications was possible, ranging from the fitting of basic seals and skirts to the extensive automotive re-working of the vehicles similar to that carried out for Omani Challenger 2s.

Armoured Division's
, the Department decided
odify Challenger 2

Challenger 2s, were deployed
dly encountered difficulties

In total, 66 Challenger 2 Main Battle Tanks deployed to Oman (The Royal Dragoon Guards and one squadron from the Queen's Royal Lancers). Soon after the beginning of the first Tier 1 exercise, Desert Warrior, it became clear that Challenger 2 was encountering difficulties in Oman. The problems did not occur as a result of the extreme heat (which exceeded the A3 limits considerably and climbed on occasion to A1) but rather because of the amount of dust being thrown up by the tanks and the peculiar nature of this dust.

environmental conditions,
equired a much greater
r filters, trackpads and
un had been anticipated

Dust and sand ingress

Large quantities of dust and sand are thrown up by the road wheels and track of the tank. This dust and sand enters the air filters of the engine air intake system which are located on the top rear of the tank. If the filters fail, the result is serious engine damage and failure. However, if the filters become blocked the engine is starved of air and stalls. The effect is exacerbated by the air flow behind the tank, with a vortex effect created by the forward movement.

55 tons of consumable
be airlifted into Oman

The urgency attached to these consumables meant that they had to be transferred into theatre by air - the impact of this consolidated load of filters, trackpads and roadwheels, which weighed some 55 tons, was considerable, preventing the supply of spares for other needs such as the support vehicle fleet and the four in-theatre C130Ks.

ad a number of impacts

Challenger 2 Powerpack awaiting repair in Germany

Challenger 2 of the Queen's Royal Lancers in Germany

resupplying air filters and other essential spares. This, in turn, prevented or delayed the supply of spares to the "B" vehicle fleet and the in-theatre C130K Hercules transport aircraft. Furthermore, two squadrons of Challenger 2s were removed from the Exercise and only three squadrons participated in the final live exercise. In many other respects, however, the tank performed well and the problems experienced did not prevent 4th Armoured Brigade from achieving the training standard required for it to assume lead armoured task force status from January 2002.

2.19 Since returning from Oman, the availability of the Challenger 2 has gradually increased so that, by the end of March 2002, availability across the whole fleet was 71 per cent. This remains some way short of the Department's target of 80 per cent. Subsequent post-Exercise impacts on the costs and timing of repairs to the Challenger 2 fleet are not yet quantifiable.

2.20 Difficulties encountered by the Challenger 2 fleet in Oman, and their consequential impacts on other exercise participants became, for a time, the single largest problem faced by exercise planners and the joint force logisticians. **Figure 10** (see fold out) provides a fuller description of the events surrounding the Challenger 2 issue and demonstrates how decisions made about equipment modifications can have far-reaching and unexpected consequences.

AS90 self-propelled gun

2.21 A combination of ambient temperature and intense vehicle usage exposed a flaw in the use of the AS90 self-propelled gun. The Department assessed that the heat shield placed in front of the plastic air intake filter could not prevent filter melt down, which caused two guns to be withdrawn from the Exercise. This was not a design fault because the original design stipulated thermally-stable plastic tubes. The decision to make this change appears to have been made before AS90 was brought into service a decade ago. At that time, the expectation was that the equipment would be used exclusively in Europe and the performance requirements were stipulated to the Design Authority (BAE SYSTEMS) on this basis.

2.22 Engineers modified the AS90s in theatre using an aluminium plate to reflect the heat in an attempt to overcome the problem. This worked when the guns were static but overheating occurred again when the guns were moving. In the event, the AS90 was restricted to a speed limit of 25 kilometres per hour and could only be moved at night. One gun caught fire during the Exercise and is expected to be written off at a cost of some £1 million. The Design Authority is currently investigating the problem with the filters and may carry out a modification as a Post Design Services task. The Department is also undertaking a six months post-exercise audit on the guns that experienced problems in Oman.

The rear of the fire-damaged AS90

Other vehicles

2.23 The Container Handling Rough Terrain system was deployed to Oman to offload the 1,800 ISO containers deployed on the Exercise. The Container Handling Rough Terrain is used to move containers from ships or trains to land transporters or within depots. Contractual support arrangements are in place that enable the Department to call on the contractor, KALMAR, to maintain the equipment when it breaks down in the United Kingdom or Germany.

2.24 Of 13 Containers Handling Rough Terrain in service, eight were deployed to Oman. Unfortunately, the five-year contract to maintain the vehicles only applies to the United Kingdom and Germany. Therefore, the contractor is unable to maintain the vehicles when they are deployed on operations elsewhere. Although, given expeditionary operations, this might be construed as a potential oversight, the Department argues that because it is unable to predict where and when Containers Handling Rough Terrain might be required outside Europe, a global support agreement is not possible as the cost would be too prohibitive.

2.25 To overcome the shortage of functioning Containers Handling Rough Terrain in theatre, 6 Supply Regiment, based at Port Salalah, used cranes and jury rigs to move containers. They estimated that it took them an average of 40-50 minutes to move equipment in this way, compared to around four minutes using a Container Handling Rough Terrain. Other than on operations, usage of Containers Handling Rough Terrain is low and many users therefore do not have experience of operating the equipment once it is deployed on operations. The result is that the equipment can be damaged quite quickly. The demand for spares increases considerably in such situations. The Department is therefore building up a sustainability stock of spares for 10 Containers Handling Rough Terrain in anticipation of operational usage, compared with a normal peacetime demand, which equates to two Containers Handling Rough Terrain.

2.26 Amongst other vehicles, some older vehicles' engines overheated so much that, in order to keep the vehicles running, drivers had to put the "cab" heater on, which meant that they could only drive for very limited periods.

Overall availability of the helicopter fleet was low

2.27 The Joint Rapid Reaction Forces deployed a total of 44 helicopters from the Joint Helicopter Command on the Exercise. These helicopters comprised five different models and were employed on a range of tasks (paragraph 2.4). **Figure 11** shows the availability rates of the helicopters deployed by the Joint Helicopter Command and that overall availability for the fleet was 55 per cent.

Container Handling Rough Terrain at Port Salalah

11 Availability rates of the helicopter fleet deployed to Oman

Average availability for the helicopter fleet during the Exercise was 55 per cent

Type	Numbers deployed	Average availability
Chinook	8	62 per cent
Puma	4	88 per cent
Lynx	12	36 per cent
Gazelle	8	45 per cent
Sea King	12	60 per cent
Totals	**44**	**55 per cent**

Source: National Audit Office

2.28 Drawing on lessons learnt from the Gulf War, the Joint Helicopter Command anticipated certain effects arising from the expected environmental conditions. For example, sand filters were fitted to the engines of the Chinook and Lynx fleets prior to deployment thereby improving levels of availability. Where availability was adversely affected, a number of factors were at work. One of the two Lynx Mk 9 helicopters crashed thus seriously affecting the availability rate for that aircraft. Both the Chinook and Puma fleets were affected by instructions imposing non-exercise related maintenance on a number of airframes. Conditions were also significant. For example, instead of the 500 hours life expectancy of European conditions, the Lynx main rotor blade lasted an average of 27 hours in Oman. The Exercise also confirmed the reduced lift capability of the fleet in such conditions.

Communications systems experienced a range of problems

2.29 Reliable communications are vital to maintaining warfighting tempo during operations. The Department's communications network covers all levels of operation from the strategic to the tactical.

2.30 Thirty-two different communication and information systems were deployed on the Exercise. Few of these were able to interface with the high-level Coalition Joint Operational Command System - designed to allow communications between the Permanent Joint Headquarters and Joint Force commanders. Communication and information systems equipment, much of it commercial off the shelf, is not susceptible to "desertisation", which means that adequate environmental control measures must be in place to minimise potential operating difficulties. We noted several instances during our visits in theatre where communications equipment had been deployed with inadequate protection. For example, a key satellite dish for uplifting Coalition Joint Operational Command System data at Thumrait, known as the Military Off the Shelf Terminal, was supplied from Kosovo without its accompanying radome, which created environmental control problems and the potential for disrupting communications with the United Kingdom. Technicians with the Royal Air Force Tactical Communications Wing were able to overcome the problems through a combination of their own ingenuity and by borrowing an air conditioning unit from a local source.

2.31 The theatre communication and information systems were constructed from commercial off the shelf equipment. The provision of £600,000 for commercial off the shelf equipment for use in Oman was insufficient, leading the Department to conclude that the theatre communication and information systems were only "moderately successful" in supporting the Exercise. If such equipment is to operate effectively in future deployments, it must be provided with sufficient environmental control measures.

2.32 The Coalition Joint Operational Command System cascades down to the different operating environments, each of which has its own information infrastructure and information flows. The Royal Navy has a distinct advantage over the other Services given its discrete platforms. The Royal Navy Command Support System was deployed with maritime elements of the joint force. The Royal Air Force deploys to static deployed operating bases while the Army deploys, then disperses and manoeuvres. The Royal Air Force Command and Control and Information System was successfully deployed during the Exercise. It was controlled and managed by Headquarters Strike Command at RAF High Wycombe and supported in theatre by specially trained Tactical Communications Wing personnel. The system leads across Defence as a network-based command and control system and has become the choice for the Afghanistan theatre of operations.

2.33 The Army deployed its tactical trunk communications system within which PTARMIGAN is the main element. It was designed to operate in European temperatures. While thermal shielding protected it from the Omani sun, it was vulnerable to sand and dust. An important sub-system of PTARMIGAN is Single Channel Radio Access. This provides isolated or mobile voice and data users with access to the full trunk system and all its facilities, in a similar manner to a mobile phone network. This sub-system had generators and air conditioning to enable it to cope with the conditions.

The Military Off the Shelf Terminal at Thumrait

2.34 In Oman, only limited amounts of the PTARMIGAN network were deployed to save shipping space. This had an impact on the Single Channel Radio Access system's coverage, which meant that tactical units were unable to communicate with higher formations for several hours at a time. The Single Channel Radio Access system is being modernised, however. This will improve the coverage of the network by allowing a Brigade Headquarters to communicate directly with its sub-units.

2.35 The well-documented difficulties with the Army's Clansman family of radio systems re-emerged.[2] Whilst the systems remained operational in environmentally controlled conditions such as headquarters units, they proved completely inadequate for field units in the heat and dust of the desert. Tank squadrons, for example, were unable to communicate effectively with each other, and were frequently forced to interrupt manoeuvres in order to consult on orders for ongoing training. Whereas military units were able to use mobile phones as an expedient in Kosovo, the lack of coverage in the Omani desert ensured that this was not an option during the Exercise. Clansman's successor, Bowman, is specified to operate in such conditions, subject to forthcoming trials.

2.36 Whilst units on the Exercise quickly used up their Clansman spares, citing the unreliability of the systems, the Information and Communications Systems Support Integrated Project Team at the Defence Logistics Organisation did not receive any significant numbers of Equipment Failure Reports. Nevertheless, units' post-exercise reports suggest that Clansman is now incapable of providing the required availability for warfighting operations. This capability gap will persist until Bowman is introduced from 2004.

A number of units suffered staff shortages

2.37 The Exercise highlighted difficulties with manning levels and force generation across a range of specialisations. For example:

- The 1st Battalion Royal Electrical and Mechanical Engineers deployed to Oman with only 64 per cent of its strength owing to other commitments.
- Manning shortages in the Royal Signals mean that the Department is unable to meet the Strategic Defence Review's requirement for the Army's two logistics brigades to be capable of acting as Joint Force Logistic

2 These difficulties have been discussed in the Comptroller and Auditor General's Report, Ministry of Defence: Major Projects Report 1999, HC 613, Session 1999-2000 and Forty-Sixth Report from the Committee of Public Accounts, Ministry of Defence: Kosovo - The Financial Management of Military Operations, HC 582, Session 1999-2000. See also Appendix 4.

Component Headquarters, each with its own integral signals squadron to provide communication and information systems, until 2003 at the earliest. Consequently, the current signals unit, 261 Signal Squadron, will remain at a high-readiness level until the establishment of the second squadron.

- The Joint Task Force Headquarters suffered from a shortage of skills in targeteers, intelligence staff, information and media operations staff. In addition, the Exercise identified a need to improve the augmentation process for the Joint Task Force Headquarters in order to meet reaction timescales and the need to match potential headquarters to the scale of the anticipated task. However, arising concurrent operations made it difficult for the Department to draw any definitive conclusions about the residual ability of the Joint Rapid Reaction Forces pool to operate at the Joint Task Force Headquarters level without significant augmentation.

2.38 We visited the 22nd Field Hospital at Thumrait. This comprised a 100-bed unit and was adequately staffed for the Exercise (around 200 personnel) only because of the attachment of 35 nurses from the Dutch Armed Forces. The Department's current planning assumptions for medium-scale warfighting operations entail the need for four 200-bed field hospitals, each consisting of 556 staff. The Department are confident that, by utilising Regular and Territorial Army capability, they can meet this obligation. However, there is currently an acute shortage of qualified medical consultants; the British Army currently has two such consultants, both of whom were deployed on the Exercise.

2.39 The level of medical care provided on the Exercise was of a high standard. A large number of personnel suffered from the heat though few became seriously ill. The 47 field ambulances all lacked on-board communication systems and 15 lacked air conditioning. The Department decided that air conditioning was not required for the evacuation of casualties and that it would be better utilised in treatment areas. Some 250 casualties were evacuated to these rear treatment areas throughout the duration of the Exercise. The Defence Medical Services estimates that this number could have been reduced by around 25 per cent, and troops returned to their units sooner than was otherwise the case, had air conditioning units been available to the medical teams situated nearer the front-line.

Suitable personal equipment and accommodation was in short supply

2.40 **Figure 12** outlines the Department's definitions of climatic conditions relevant to hot desert environments. Following meteorological advice received during planning, the Department classified the conditions in southern Oman during the main exercise phase as A3.

2.41 **Figure 13** shows that, historically, temperatures in the region during September and October have peaked at 39 degrees Celsius. This peak falls within the temperature ranges for all three Departmental climatic categories but is at the upper limit of the A3 - Intermediate category. Figure 13 also shows the maximum temperatures experienced at Thumrait during the main Exercise phases, the high point being 42.3 degrees Celsius. During fieldwork, we encountered temperatures at Camp South (some 30 kilometres north east of Thumrait) of 46 degrees Celsius, and many personnel that we spoke to reported having experienced temperatures as high as 55 degrees Celsius.

2.42 The Department's clothing policy is that the normal combat uniform worn in Europe (Combat Soldier 95) has been designed to be appropriate for use in temperatures far exceeding those experienced in Oman. This was confirmed in medical advice received by the Permanent Joint Headquarters before the Exercise (although this advice did not extend to the suitability or otherwise of temperate boots). There is, however, an expectation that Service personnel will receive "theatre specific" equipment and when they do not it impacts significantly on morale.

2.43 For this Exercise, the Department had insufficient desert combat suits and footwear meaning that a decision was taken to issue only those who would be in theatre for an extended period with such equipment. Later, a pool of kit from maintenance stocks, war stocks and loan pools was identified and issued but some boots, for example, quickly fell apart. These factors generated much adverse comment from Service personnel. We encountered a number of personnel who had purchased suitable footwear at their own expense. Furthermore, under-provision of desert boots resulted in a high usage rate of standard issue temperate boots, which were unsuited to the environment and suffered from a high attrition rate, and thus incurred additional cost. Fourth Armoured Brigade's post-exercise report states that: "the official line that troops deploying in the 'cooler months of the autumn' did not require [desert boots] was disingenuous when temperatures were regularly over 45 degrees, boots were melting and foot rot was a major issue".

2.44 One post-exercise report states that, in the Defence Logistics Organisation's view, desert combat suits are cosmetic and do not perform significantly differently from Combat Soldier 95 equipment in hot climates. Another post-exercise report, however, states that: "Combat 95 [is] not robust enough to deal with desert conditions [and] Combat 95 being a man-made fibre has added to heat stress illnesses…the desert combat [suits] have proved to be cooler and allowed the body to breathe."

12 Definitions of Climatic Categories

The Department categorises climate according to temperature range and humidity range

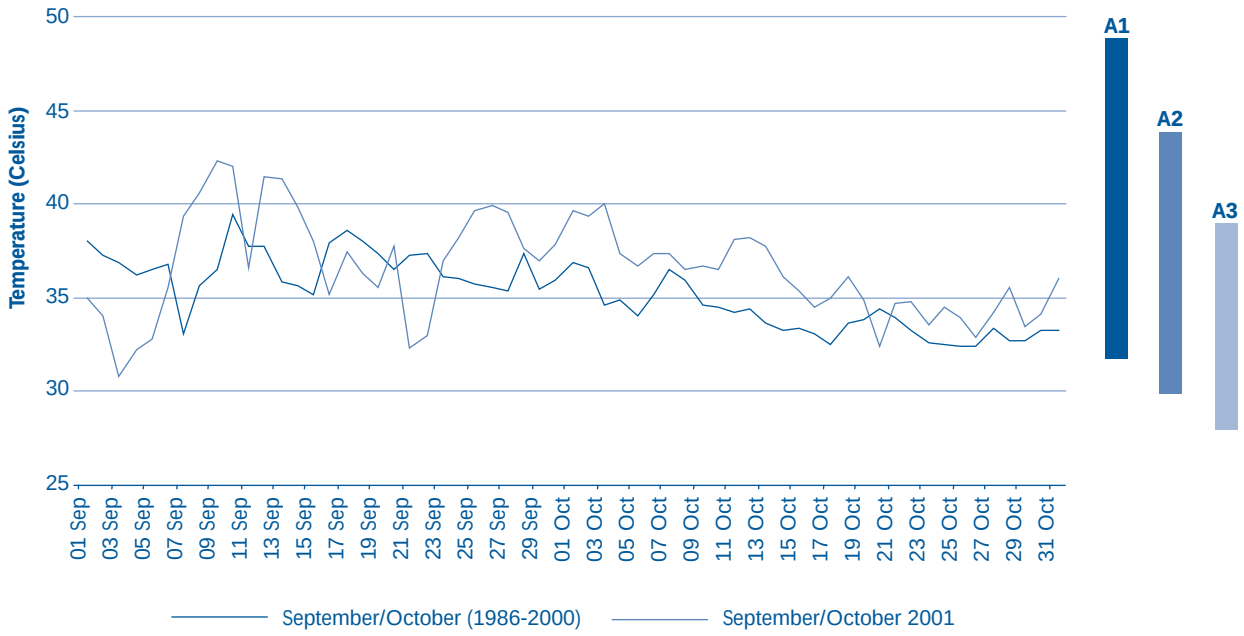
Category	Applies to	Temperature Range (°C)	Humidity Range (%)
A1 - Extreme Hot Dry	Areas which experience very high temperatures accompanied by high levels of solar radiation, namely hot dry deserts of North America, parts of the Middle East, Northern India and South Western USA.	32-49	8-3
A2 - Hot Dry	Areas which experience high temperatures accompanied by high levels of solar radiation and moderately low humidities, namely, the most southerly parts of Europe, most of the Australian continent, South Central Asia, Northern and Eastern Africa, coastal regions of North Africa, Southern parts of USA and most of Mexico.	30-44	44-14
A3 - Intermediate	In strict terms, this definition applies only to those areas that experience moderately high temperatures and moderately low humidities for at least part of the year. It is particularly representative of conditions in Europe except the most southern parts, Canada, the northern USA and the southern part of the Australian continent.	28-39	78-43

Source: Ministry of Defence

13 Temperatures in theatre

Temperatures in theatre were higher than the historical average

Average Maximum Temperatures (1986-2000) and Actual Maximum Temperatures (2001) Thumrait, Oman



Source: Ministry of Defence/The Met Office

2.45 That issue aside, however, given that the Joint Rapid Reaction Forces are intended, in principle, to be able to operate anywhere in the world, it is a concern that the Department does not hold sufficient stocks of desert combat suits to equip the Forces (some 30,000 man sets would be required). By the same token, the Department should also hold, or be able to obtain within required readiness cycles, appropriate combat clothing for other climates - for example, extreme cold weather locations.

2.46 Accommodation for personnel in Oman varied widely across the theatre. At its most basic, it consisted of standard issue tents, designed for use in European climates and therefore not ideal for use in a hot, desert environment. Issues include the ability of tents to withstand high winds and the inability to regulate temperature (particularly for personnel working night shifts and thus sleeping during the day). The Defence Logistics Organisation deployed its available stocks of Interim Expeditionary Campaign Infrastructure, but due to operational deployments this was insufficient. Some tentage issued for the Exercise was subsequently diverted to concurrent operations in Afghanistan. Consequently, the Department does not expect to complete the return, inspection and repair of tentage issued to Oman until September 2002. The resultant costs of their recovery and of any equipment written off will not be known until then.

2.47 The Department is on the verge of approving a new, more flexible Expeditionary Campaign Infrastructure capability for 5,250 Joint Rapid Reaction Forces personnel, designed for early entry forces. The improved capability is planned for May 2004. The Department has identified a number of lessons arising from the Exercise including: the importance of Expeditionary Campaign Infrastructure air deployability; the need for more flexible ablutions options; greater in-theatre mobility; more effective waste disposal; measures to minimise water usage; the need for dedicated maintenance personnel; and durability.

Asset tracking remains weak

2.48 The replenishment of stocks through the Department's logistic supply chain is vital to the continued momentum of any operation or exercise undertaken by the Armed Forces. The precise method of resupply, in terms of the route by which spares are delivered and the speed of delivery, will vary from equipment to equipment and with the urgency of the requirement. For Exercise Saif Sareea II, the Department established expected "pipeline" times, within which units might expect to receive replenishment stocks, for three levels of priority. For the highest priority orders, equipment was to be delivered by the fastest possible means and was dependent on the availability of commercial or military aircraft but could be expected to take between six and 14 days. Units were to expect to receive medium-scale priorities within seven and 17 days while routine demands, which would be sent by sea, were expected to be fulfilled within 29 days.

2.49 The Defence Logistics Organisation issued some £46 million of Equipment Support (Land) managed stock for the Exercise during the period May to October 2001, in addition to dealing with some 20 concurrent operations and exercises. As at 8 July 2002, items worth £27.7 million had been returned from the Exercise. The Department has explained that the difference in volume of returns is due to the fact that items were seamlessly transferred to the concurrent operations in Afghanistan and the fact that returned items are surveyed before being brought back to account. £116 million of Equipment Support (Air) managed stock was issued for the Exercise with £109 million returned. Since Royal Navy vessels are maintained at a given state of readiness, irrespective of where they are deployed, data is not captured against a particular exercise or operation for these units.

2.50 Total Asset Visibility during the Exercise was an important issue, particularly the communications infrastructure for the Global and VITAL systems. Global is an inventory management system for secondary depots. According to users, the Global server routinely crashed during the Exercise, though the formal reporting process to the Defence Logistics Organisation did not acknowledge this. VITAL is a consignment tracking system that was introduced into service as a result of a National Audit Office recommendation following the Gulf War.[3] By 2001, it was operating at 500 per cent of its originally planned capacity. During the Exercise, it took 15 minutes for in-theatre VITAL systems to discover the contents of a single ISO container. The lack of VITAL at the point of exit in the United Kingdom and at the point of arrival in theatre meant that, if sent direct to a first line unit, there was no visibility of the item until it arrived at its destination. Following the completion of the VITAL refresh programme in early April 2002, which has overcome the capacity problem, the Defence Logistics Organisation is, in conjunction with the Permanent Joint Headquarters and the Front-Line Commands, identifying process improvements to enable more effective use to be made of the system. Moreover, units did not exercise any degree of discipline in making demands on suppliers. There is not yet a system in place that can give an accurate indication of achieved pipeline times between the time a unit demands an item and the time it receives it. We were therefore unable to gauge the performance of the Department's supply chain against the stated resupply targets for orders placed by units (paragraph 2.48).

3 *Comptroller and Auditor General's Report, Ministry of Defence: Movement of Personnel, Equipment and Stores to and from the Gulf, HC 693, Session 1992-1993. See also Appendix 4.*

Lessons arising from Saif Sareea II that were identified on previous exercises and operations

2.51 Some lessons identified from the Gulf War of 1991 still remain to be worked through fully. These include:

- the under-funding of some types of spares;
- the lack of reliability of "B" vehicles in the desert, which continues to make demands on resources in terms of maintenance and spares, and the inexperience of drivers in cross-country conditions; and
- insufficient stocks of desert clothing.

2.52 The SA80A1 combat rifle confirmed previous experience. It continued to be susceptible to stoppages due to fouling from the ingress of dust and sand, and was prone to jamming. Although a small quantity of modified rifles (the SA80A2) were available prior to Exercise Saif Sareea II, the Department never intended to issue the modified rifle to troops in Oman. In 2001, the Defence Logistics Organisation put a fielding plan in place to build up a war stock that could be issued whenever an operation ensued. Rifles have been issued from this stock to troops currently serving in Afghanistan.

2.53 It is still too early for the Department to resolve fully many of the issues identified during recent operations in Kosovo and Sierra Leone. However, while lessons concerning Expeditionary Campaign Infrastructure, communications, and personnel remain to be resolved, there were improvements in medical preparedness. Given the problems with malaria in Sierra Leone, the Department had more time to plan ahead for the Exercise and ensured that personnel received all of their necessary inoculations beforehand.

14 Training tiers

Training during the Exercise consisted of three separate tiers

Tier 1 Training at the tactical level that makes individuals and force elements ready to take their place in a Maritime, Land, Air, Special Forces or Logistics component.

Tier 2 Training at tactical and operational levels that makes a Maritime, Land, Air, Special Forces or Logistics component ready to take its place in a joint or multinational force.

Tier 3 Training at the operational and military-strategic levels that makes a joint force ready to conduct national or multinational operations.

Source: Ministry of Defence

The Exercise provided valuable training experience

2.54 A major component of the Exercise was for land, sea, and air forces to conduct their own training in readiness for a joint exercise together, and for a multinational exercise with the Armed Forces of Oman. Figure 14 defines the Exercise's training tiers.

2.55 The training that was conducted during the Exercise had several objectives:

- to practise combined, joint maritime warfighting operations within a maritime task force, including amphibious operations at brigade level and the Joint Force Harrier;
- to practise combined, joint land warfighting operations centred on an armoured brigade and to train that brigade to collective performance level five;
- to practise combined, joint air operations, to develop an air campaign and confirm procedures for the Joint Force Air Component;
- to practise the planning and co-ordination of combined Special Forces operations at the strategic and operational level in support of a combined campaign plan; and
- to prepare all forces to take part in a combined joint task force.

2.56 These objectives were all met: the training tiers were completed on time, with competency being demonstrated in the execution of joint and combined operations, and a successful live firepower demonstration at the close.

2.57 Exercise conditions restricted the realism of the training, however. The conditions in which the Exercise took place were, at best, semi-benign because of the provision of host nation support for the force protection of British forces on Omani soil. And the non-availability of Tactical Engagement Simulation, which can simulate the effects of individual direct fire systems such as Challenger 2 tanks, meant that there was no objective way of having comparable force-on-force training in the Exercise theatre. Scenario-based umpiring was therefore used to determine the conditions under which 4th Armoured Brigade could practise combined arms operations. It was on this basis that the Brigade achieved its collective performance level five - a prerequisite to being able to fulfil the lead armoured task force commitment from January 2002.

2.58 During the Exercise, the umpires sometimes took several hours to determine the results of an engagement. The absence of Tactical Engagement Simulation was significant since it is considered to offer the most realistic training for warfighting. Indeed, many of those who have experienced it believe it to be of more value than live-fire training because the latter requires a high degree of control if undue risks are to be avoided.

2.59 Because of the time available, and the need to carry out environment-specific training, the Department's Director of Operational Capability has noted that Exercise Saif Sareea II included an element of low level training to enable units to achieve a level of performance commensurate with participating in joint operations. This might not always be the case for future exercises of this size, when units might be expected to have achieved such a level of performance prior to arriving in theatre.

2.60 Despite these limitations, the Department believes that the Exercise provided valuable training experience. Training was conducted in a desert environment similar to that in which future deployments might take place. And the Exercise provided training opportunities not available elsewhere and demonstrated the value of Oman as a location for training.

Royal Marines exercising with machine-gun

Part 3

Complexities in the scoping, costing and funding of the Exercise led to difficulties in the planning process

3.1 This Part of the Report examines the financial aspects of the Exercise. Funding and costing an exercise of the nature of Saif Sareea II is a complex business. It shows that changes to the scope of the Exercise and to the funding available impacted on military planning and led to some extra costs. There were also difficulties in accurate budgeting for, and in costing, the Exercise. The Department has identified a number of lessons for the scoping, funding and costing of future exercises.

The many changes to the scope and funding of the Exercise disrupted planning and generated some extra costs

3.2 Initially, the Department had planned that the Exercise would take place in 2000 in the United States, and that only light armoured forces would be deployed. Funds of £32 million were earmarked on this basis. In September 1997, however, the Department decided to hold the Exercise in Oman in 2001 and to include heavy armoured forces. They quantified the funding shortfall for such an exercise as £60 million. Despite not having secured this additional funding by 1999, the Department reaffirmed that an armoured brigade would be deployed to Oman.

3.3 In February 2000, the Department reviewed a number of options, including cancelling the Exercise, and removed the original earmarked monies. In June 2000, it restored funding for the Exercise but at a reduced level. The Exercise aim became to demonstrate the concept of the Joint Rapid Reaction Forces rather than prove it. The Department stipulated an "absolute" cost-cap of £48.1 million.

3.4 Planning resumed on the revised basis after June 2000 but it was soon clear that the actual cost of the Exercise would be higher. It was decided that any increase should be "absorbed" by the eight Top Level Budget holders involved without extra funding from the centre. Only changes in policy, such as the introduction of an Operational Welfare Package budgeted to cost £8.8 million, could claim new monies. There was a debate between the Top Level Budget holders as to how much each would bear of the additional costs. The Chief of Joint Operations, the lead Top Level Budget holder, who was responsible for co-ordinating cost monitoring and capture, agreed to bear a large proportion of the extra costs. But, as part of the consideration of funding options, planning assumptions kept changing. For example, the number of personnel planned to deploy on the Exercise by air and sea fluctuated in the months prior to the Exercise. The problems were mostly resolved by summer 2001. In June, the Department decided that the budget should be £90.3 million, owing to a number of changes to the original planning assumptions including the transfer of other exercise activity to Oman, the impact of revised policy - for example, the Operational Welfare Package, and increases in the costs of airlift and catering.

3.5 Scoping, costing and funding difficulties made exercise planning more complex and, as a consequence, acted against the achievement of maximum value for money:

- Several months were lost in the planning process partly because staff responsible for planning were diverted to discuss numerous cost options, and partly because there was a planning pause between March and June 2000 when there was a strong chance that the Exercise could be cancelled. This delayed some key planning activities.
- Late changes increased transport costs. A late decision to use charter rather than Royal Air Force aircraft was made in order that the latter could be used more cost-effectively on other tasks. When it became clear that smaller numbers of personnel would be deployed on the Exercise than previously assumed (for reasons of manning levels, operational and personnel tempo), the Department rightly decided to cancel aircraft no longer needed. However, the costs of cancellation and premium rate fees for these aircraft amounted to some £1.2 million.

3.6 Planning directives for the Exercise were issued in August 1999, revised in August 2000 and finalised in July 2001. While the Permanent Joint Headquarters had the broad aim of deploying a joint task force to practise a medium-scale warfighting operation, each of the three Services had their own objectives, reflecting their positions with the joint force.

It is difficult to show that the most cost-effective design was chosen for the Exercise

3.7 Unlike equipment or works projects, proposals for exercises are not subject to formal procedures involving an investment appraisal. Given this, it is difficult to determine whether the most cost-effective design was chosen for the Exercise. Changes in scope and funding led to many options being costed but some other decisions were taken without the benefit of robust cost appraisals:

- The decision not to make, at least some, modifications to the Challenger 2 to equip it for desert conditions was not set against the possible logistics costs of supporting an unmodified tank.
- The decision to utilise some locally provided heavy and light equipment transporters to supplement the fleet taken from the United Kingdom was not based on a robust appraisal of which option provided value for money. It was predicated on usage figures provided by the components, which subsequently proved to be considerably understated.
- Because of the review of the Exercise's scope and local sensitivities about the timing of exploratory visits, the definition of the detailed requirement was late. This meant that some contracting processes were rushed. As a result, a premium was paid for some services, such as accommodation at Port Salalah, although this was offset by savings gained from not sending some reconnaissance parties in full strength to Oman.

3.8 Nevertheless, the Department did deploy an In-Country Planning Team to liaise with the Omanis, to identify areas of concern, and to conduct lower-level option appraisals to keep costs down.

Budget holders require certainty earlier in the process

3.9 The long lead-time regarding the scope and funding of the Exercise had a detrimental impact on planning with many budget holders unsure until very late of what was required of their areas. For example, many contracts, including those for food, had to be negotiated with undue haste because the Exercise was fast approaching. The identification of the need for a cross-functional planning team within the Permanent Joint Headquarters should alleviate this problem in future.

Costs were not consistently and accurately identified

Full costs are not yet known

3.10 The final outturn cost of the Exercise will not be known until July 2003, when the 2002-03 Consolidated Resource Account is prepared. This is because some of the costs, for example repairs, will not be incurred until the 2002-03 financial year. In July 2002, forecast outturn costs stood at over £82 million. **Figure 15** illustrates the Exercise budget as apportioned between Top Level Budget holders and the forecast outturn costs.

Additional, rather than full, costs are identified

3.11 In line with longstanding Departmental policy, agreed with the Treasury, only the additional costs of operations, for example any additional transport costs or extra use of equipment, are counted. Other costs, such as the salaries and wages of personnel taking part in the operation, are not. This is on the basis that the military capability represented by the Armed Services, if not deployed on an operation, would be paid for anyway, as they would be deployed elsewhere. The Department extends this argument by analogy to exercises. Clearly it is useful for additional costs to be identified. But, the National Audit Office considers that a case can be made for also identifying the full resources that an activity such as an exercise consumes. The scale of resources

15 Costs of the Exercise

The final cost of the Exercise has yet to be determined

Top Level Budget holder	Final budget (£m)	Forecast outturn (£m)
Defence Logistics Organisation	48.69	44.16
Chief of Joint Operations	21.75	19.34
Fleet Command	8.09	5.61
Land Command	4.78	5.15
Adjutant General	3.15	4.02
Centre	2.63	3.38
Performance and Training Command	0.85	0.85
Strike Command	0.35	0.22
TOTAL	**90.29**	**82.73**

Source: National Audit Office

consumed by any activity is always a factor in deciding whether the activity is worthwhile or not. Without full costing, the scale of resources consumed by an activity is not known. The Department considers that such a practice would be time consuming and costly, and would not provide useful management information to justify the effort. In the case of Exercise Saif Sareea II, full costs have not been identified but are likely to have been significant.

Additional costs are difficult to identify

3.12 There is uncertainty as to what costs are additional and different parts of the Department have adopted different and inconsistent approaches:

- In the Royal Navy, only £388,000 of the £432,000 transit cash costs of warships were included since it estimated that an extra £45,000 would have been incurred if the Exercise had not taken place. The extra £45,000 was subsequently charged to another exercise budget[5]. The same principle was used for fuel costs, where only about half the cash costs were counted. But for Royal Fleet Auxiliary ships - which belong to a different business unit - the full transit costs of £1.36 million have been included. Fuel costs of £593,000 have also been included.
- The Royal Air Force did not include any cash costs for aircraft transit and aviation fuel. The only costs included were for food and a small amount for the charter of lorries in the United Kingdom to compensate for the redeployment of vehicles to Oman.
- The Army included all cash costs, including all the food costs of Army personnel, some £2.46 million. No account has been taken of the savings in food costs made at United Kingdom and German bases where 12,000 Army personnel were absent for over two months, although these savings would have been mitigated by contributions towards the costs of food made by troops at these locations. Food charges are not paid by personnel when in field conditions on operations or exercises.
- Ammunition is included in full (£6 million), although it has all been declared "core" expenditure, that is, it would have been incurred anyway even if the Exercise had not taken place.

Resource Accounting and Budgeting is not yet fully developed

3.13 Given that the implementation of full Resource Accounting and Budgeting was not complete by the time of the Exercise, most Top Level Budget holders captured costs on a cash basis rather than on the basis of resources consumed. The result is that there has only been partial non-cash capture.

3.14 The Defence Logistics Organisation was responsible for over half the budgeted expenditure for the Exercise, and its experience is a good example of the limitations of partial non-cash capture. For example, one part of the organisation, Equipment Support (Land), has charged for the supply and repair of equipment and stores for the Exercise. But other parts such as the Warships Support Agency and Equipment Support (Air) have charged nothing for similar services. However, the non-cash capture in Equipment Support (Land) is limited. No account has been taken of depreciation (wear and tear) or the notional cost of capital of equipment used, although in a fully developed Resource Accounting and Budgeting system, these factors would be recognised in the cost capture exercise.

3.15 Equipment Support (Land) has charged about £20 million to the Exercise, consisting of £14 million for consumable stocks, including ammunition, and repair expenditure of £6 million. The repair cost is mostly a forecast, as it is based on current estimates of repair loop times, which can take up to three years. Consumable stocks cost is calculated by the use of a Special Code to be used when ordering consumables for the Exercise. Under current Departmental practice, consumables are deemed to be consumed when they are issued. All consumables issued during the Exercise have been included, even though some may not have actually been used. Moreover, some consumables might have been used regardless of there being an exercise.

3.16 Among the Front Line Top Level Budget holders, only Fleet has attempted to capture some non-cash costs by including creditors and debtors in its outturn figures. It will produce final figures in July 2002 with the preparation of the Consolidated Resource Accounts. However, the difference this will make to cash expenditure costs is minimal. Land and Strike have only accounted for cash spent.

3.17 Neither the team planning resources for the Exercise nor the Chief of Joint Operations saw a need to supplement Departmental guidance on what constituted additional costs. In practice, interpretations have varied widely, and the principles of Resource Accounting and Budgeting have also been applied inconsistently, resulting in uncertainty and incompleteness of cost capture among Top Level Budget holders.

5 *For the Royal Navy, the Exercise was an extension of its 2001 "Argonaut" deployment.*

Management information needs to be improved

3.18 Many of these cost problems were identified in the National Audit Office's report on the financial management of military operations during the Kosovo campaign published in June 2000.[6] Many of the problems are difficult to resolve because the Department's management information systems and data are inadequate. This affects the Exercise costings in a number of ways:

- According to the latest Departmental Resource Accounts, there are still many legacy systems that continue to give values that may be inaccurate and incomplete.[7]
- There is no reliable way of measuring the relative wear and tear incurred by the equipment used in the desert.
- No financial mechanism is available to quantify the savings made on Operation Veritas in Afghanistan, by having the troops pre-positioned and forward bases set up in advance.
- There is a lack of information on actual costs. For example, the Army still has no information about the cost of its satellite communications. Immature Resource Accounting and Budgeting systems mean that not all debtors and creditors related to the Exercise are known.

3.19 The Department is now taking steps to remedy the shortcomings in funding and costing exposed by the Exercise. A policy paper was produced in November 2001 to put in place a mechanism to improve the costing and the funding of such exercises in the future. The paper acknowledged that the current system has a number of significant weaknesses, including an inability to establish the real cost of an exercise owing to an "immature" process.

3.20 The Department has issued an Exercise Specification Template and Costing Template as part of the Defence Exercise Programme Costing and Funding Policy Paper to ensure that all the cost drivers of a planned exercise are described in sufficient detail to ensure accurate costing.

6 *Comptroller and Auditor General's Report, Ministry of Defence: Kosovo - The Financial Management of Military Operations, HC530, Session 1999-2000.*
7 *Ministry of Defence, Consolidated Departmental Resource Accounts 2000-01, HC443, Session 2001-2002.*

Part 4

The Exercise met foreign-policy objectives

4.1 This Part of the Report demonstrates the extent to which the Department met its key foreign-policy objectives for the Exercise. It shows that the Department's objectives were clear, and that the events unfolding elsewhere in the Middle East and Afghanistan did not impact upon the successful achievement of those objectives.

4.2 Exercise Saif Sareea II was designed to demonstrate the military capabilities that the United Kingdom possesses, and its ability to deploy these at strategic distance. The earlier parts of this Report discuss this issue in more detail.

4.3 An objective of the Foreign and Commonwealth Office is a secure United Kingdom within a more peaceful and stable world. Oman's reliability as an ally in a strategically important part of the world contributes to this objective.

4.4 The Department had two clear aims and objectives that dovetailed with the higher level aims and objectives of the Foreign and Commonwealth Office. These were:

- to demonstrate the United Kingdom's commitment to the Gulf Region and the Joint Rapid Reaction Forces' capability to support that commitment; and
- to develop bilateral relations with Oman and to contribute to the development of the Omani Armed Forces' ability to conduct combined, joint operations.

4.5 The Foreign and Commonwealth Office, in conjunction with the Department of Trade and Industry, has an objective of enhancing the competitiveness of British companies through overseas sales and investment. While there were no explicit aims and objectives for defence sales resulting from the Exercise, the potential for such benefits was recognised.

4.6 The Exercise demonstrated the United Kingdom's ability to conduct operations with allies in the Gulf Region and showed its commitment to peace and stability in the region. Furthermore, it highlighted publicly the capabilities that the United Kingdom is contributing to the European Union's headline goals and the NATO Defence Capabilities Initiative. Although the demonstration of the Joint Rapid Reaction Forces was not region-specific, the Exercise was beneficial in demonstrating the capabilities of the United Kingdom Armed Forces to deploy to the area.

4.7 Whilst coincidental, the presence of United Kingdom forces in the region allowed the United Kingdom to respond quickly and effectively to the need to conduct operations in Afghanistan. The British Embassy in Muscat and the Foreign and Commonwealth Office contributed to the Department's media strategy for ensuring that the arising concurrent operations in Afghanistan were not perceived as being an adjunct to, or rationale for, Saif Sareea II.

4.8 Given cultural differences and sensitivities, the Department instigated a pre-training and proactive information campaign to ensure that cultural differences and local sensitivities were respected by the deployed force. The Department's efforts to minimise potential friction from the presence of a large number of Western troops in a Muslim country succeeded. Moreover, the Foreign and Commonwealth Office contributed funds to a study examining the impact of the Exercise on Oman's marine environment.

4.9 The integration of United Kingdom and Omani officers at higher command levels generated shared understanding which is likely to endure. It may be assumed that the Exercise, enhancing an already strong level of co-operation between the British and Omani defence establishments, will help to maintain a record of successful defence equipment sales to Oman. The effects, however, are difficult to quantify, and in any case will show up only in the longer term. The Omanis will be able to apply lessons learnt from the Exercise in their preparations for the hosting of a combined Gulf Co-operation Council exercise in 2003.

Appendix 1 Methodology

1 This Appendix sets out the methodologies utilised in the course of the study.

Review of Departmental strategy and planning papers

We undertook a wide-ranging review of Departmental documentation. This included papers outlining the Joint Rapid Reaction Forces concept and the progress made in its implementation. In addition we also examined a significant quantity of material relating to the Exercise's planning and execution.

Interviews with key stakeholders in the United Kingdom

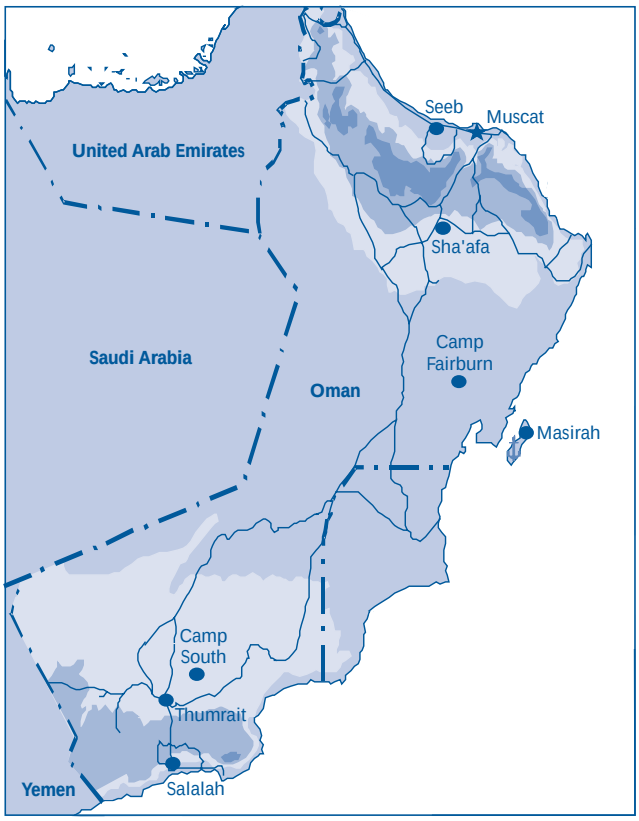
2 Prior to and following the Exercise we consulted with key organisations and agencies involved in the planning and execution of the Exercise. These included:

99 Squadron (Royal Air Force)
Alvis Plc
BAE SYSTEMS
Bowman Integrated Project Team (Defence Procurement Agency)
Chief of Joint Force Operational Readiness & Training (Permanent Joint Headquarters)
Civil Secretariat (Permanent Joint Headquarters)
Defence Resources & Plans (Ministry of Defence Centre)
Defence Supply Chain Operations (Defence Logistics Organisation)
Defence Transport & Movements Agency (Defence Logistics Organisation)
Deployment & Exercise Programmes Commander-in-Chief Fleet (Royal Navy)
Director Equipment Capability Combat Service Support (Equipment Capability Customer)
Director Equipment Capability Direct Battlefield Engagement (Equipment Capability Customer)
Director of Operational Capability (Ministry of Defence Centre)
Directorate Joint Warfare (Ministry of Defence Centre)
Dismounted Close Combat Integrated Project Team (Defence Procurement Agency)
Engineering Systems Support Integrated Project Team (Defence Logistics Organisation)
Equipment Support (Land) (Defence Logistics Organisation)
Field Artillery Systems Support Integrated Project Team (Defence Logistics Organisation)
GKN Westland Helicopters Limited
Headquarters Land Command (British Army)
Information & Communications Systems Support Integrated Project Team (Defence Logistics Organisation)
Joint Helicopter Command (Headquarters Land Command)
Kalmar Limited
Land Component Lessons Learned (Director General Development & Doctrine)
Marconi Plc
Paradigm Services
Strike Command (Royal Air Force)
Supply Chain Operations Centre (Defence Logistics Organisation)
Tactical Unmanned Aerial Vehicles Integrated Project Team (Defence Procurement Agency)
Tank Systems Support Integrated Project Team (Defence Logistics Organisation)
Vickers Defence Systems

Fieldwork Visits to Oman and Germany

3 A key aspect of our fieldwork was the sending of two NAO teams into the Exercise theatre. Each team consisted of three NAO staff and was accompanied by a military liaison officer. Team 1 visited Oman between 28 September and 2 October 2001. Team 2 visited between 24 and 28 October 2001. During these visits, the teams consulted with a wide range of military and civilian personnel on diverse issues such as equipment performance, training value, morale and operational effectiveness.

16 Sites visited by NAO in Oman



Seeb 28.09.01

- RAF Deployed Operating Base - Commanding Officer
- Tactical Communications Wing
- Tactical Medical Wing
- 2 Motor Transport Squadron

Thumrait 29.09.01

- RAF Deployed Operating Base - Commanding Officer
- Tactical Communications Wing
- 22 Field Hospital/Tactical Medical Wing
- UK Mobile Air Movements Squadron

Camp South 30.09.01 - 01.10.01

- Headquarters - 1 UK Armoured Division
- 4 Armoured Brigade - Chief of Staff
- Queen's Royal Lancers
- Deputy Commander British Forces Oman
- Joint Force Logistics Component Headquarters
- 102 Logistics Brigade
- 261 Signal Squadron
- Force Movements Control Centre
- Civil Secretariat Oman (South)
- Equipment Support (Technical & Material)
- Equipment Support (Logistics)

Salalah 01.10.01

- 6 Supply Regiment

Muscat 02.10.01

- Director Joint Communications Component Command

Muscat 24.10.01

- Her Majesty's Ambassador - Oman

Sha'afa 24.10.01

- Exercise Control
- Commander British Forces Oman
- Commander Joint Force Air Component
- Joint Helicopter Command

Camp Fairburn 25.10.01

- Headquarters 3 Commando Brigade Royal Marines
- Commando Logistics Regiment Royal Marines

Masirah 26.10.01

- RAF Deployed Operating Base - Commanding Officer

Offshore 28.10.01

- HMS Illustrious
- HMS Ocean

4 As a follow up to our work in Oman, in February 2002 we visited 1 UK Armoured Division in Sennelager, Germany. During this visit we consulted with, among others, the General Officer Commanding 1 UK Armoured Division and his staff; officers and senior non-commissioned officers from the Queen's Royal Lancers; and 6 Battalion Royal Electrical and Mechanical Engineers. During these meetings we enquired about the value of the Exercise, lessons arising as a result and the downstream impacts on equipment such as Challenger 2 and AS90.

Analysis of the Lessons Identified emerging from the Exercise

5 Following the completion of the Exercise, the Department provided us with copies of various lessons identified reports. We reviewed these reports in order to supplement and confirm the evidence we had already gathered during our fieldwork in Oman, Germany, and in the United Kingdom. Among the reports we examined were the high-level Combined Final Exercise Report, written by the Department in conjunction with the Omanis, and the Department's own Final Exercise Report. We also examined material provided by various stakeholders within the Department to the Permanent Joint Headquarters, which was co-ordinating the lessons identified process. This material consisted of lessons identified papers by:

- the Defence Logistics Organisation;
- the three Services' front-line commands (Fleet, Land, and Strike);
- 1st UK Armoured Division;
- 4th Armoured Brigade;
- the Joint Force Movements Staff; and
- the Combined Joint Communication and Information Systems Component Command.

Appendix 2 UK Forces Participating in Exercise Saif Sareea II

Land Component

Headquarters 1 (UK) Armoured Division & Signals Regiment
Headquarters 4 Armoured Brigade & Signals Squadron
Royal Dragoon Guards
4 Regiment Royal Artillery
21 Engineer Regiment
1 Irish Guards
9/12 Lancers
2 Close Support Regiment Royal Logistics Corps
1 Close Support Medical Regiment
1 Battalion Royal Electrical & Mechanical Engineers
Headquarters 102 Logistics Brigade
Headquarters 12 (Air Support) Engineer Brigade
28 Engineer Regiment
39 Engineer Regiment
45 Field Support Squadron Royal Engineers
14 Geographic Squadron Royal Engineers
Headquarters 11 Signal Brigade
14 Signal Regiment
21 Signal Regiment
30 Signal Regiment
6 Supply Regiment Royal Logistics Corps
7 Transport Regiment Royal Logistics Corps
8 Transport Regiment Royal Logistics Corps
17 Port & Mar Regiment Royal Logistics Corps
23 Pioneer Regiment Royal Logistics Corps
24 Regiment Royal Logistics Corps
80 PCS Squadron Royal Logistics Corps
4 General Support Medical Regiment
22 Field Hospital
84 Medical Support Squadron
6 Battalion Royal Electrical & Mechanical Engineers
1 Royal Military Police Regiment
5 Royal Military Police Regiment
654 Squadron Army Air Corps

Air Component

Joint Force Air Component Headquarters
13 Squadron RAF (Tornado GR4)
617 Squadron RAF (Tornado GR4)
No 1 Air Control Centre
1 Squadron RAF Regiment
26 Squadron RAF Regiment
IV Squadron RAF (Harrier GR7)
5 Squadron RAF (Tornado F3)
7 Squadron RAF (Chinook helicopter)
XI(F) Squadron RAF (Tornado F3)
8/23 Squadron RAF (Sentry AEW)
18 Squadron RAF (Chinook helicopter)
27 Squadron RAF (Chinook helicopter)
33 Squadron RAF (Puma helicopter)
47/70 Squadron RAF (Hercules transport aircraft)
101 Squadron RAF (VC10 tanker aircraft)
201 Squadron RAF (Nimrod MR2 aircraft)
Tactical Communications Wing
Tactical Provost Wing
UK Mobile Air Movements Squadron
Tactical Medical Wing
2 Motor Transport Squadron
5001 Squadron (enablers)
5131(BD) Squadron (Explosive Ordnance Disposal)
Mobile Meteorological Unit
Mobile Catering Support Unit

Maritime Component

HMS Illustrious (Aircraft Carrier)

HMS Cornwall (Type 22 frigate)

HMS Monmouth (Type 23 frigate)

HMS Fearless (Landing Platform Dock)

HMS Ocean (Landing Platform Helicopter)

HMS Marlborough (Type 23 frigate)

HMS Southampton (Type 42 destroyer)

HMS Nottingham (Type 42 destroyer)

HMS Inverness (Mine Countermeasures Vessel)

HMS Cattistock (Mine Countermeasures Vessel)

HMS Quorn (Mine Countermeasures Vessel)

HMS Walney (Mine Countermeasures Vessel)

HMS Beagle (Coastal Survey Vessel)

HMS Roebuck (Hydrographic Survey Vessel)

RFA Fort Victoria (Auxiliary Oiler Replenishment)

RFA Fort Rosalie (Stores Ship)

RFA Sir Tristram (Landing Ship Logistic)

RFA Sir Galahad (Landing Ship Logistic)

RFA Sir Percivale (Landing Ship Logistic)

RFA Sir Bedevere (Landing Ship Logistic)

RFA Oakleaf (Support Tanker vessel)

801 Naval Air Squadron (FA2 Sea Harrier)

815 Naval Air Squadron (Lynx Mk3/Mk8 helicopter)

820 Naval Air Squadron (Sea King HAS Mk6 helicopter)

845 Naval Air Squadron (Sea King Mk4 helicopter)

846 Naval Air Squadron (Sea King Mk4 helicopter)

847 Naval Air Squadron (Gazelle AH1 and Lynx Mk7 Anti-Tank helicopter)

849 Squadron B Flight RN (Sea King AEW Mk 2 helicopter)

Headquarters 3 Commando Brigade Royal Marines

40 Commando Royal Marines

45 Commando Royal Marines

Commando Logistics Regiment Royal Marines

29 Commando Regiment Royal Artillery

20 Commando Battery Royal Artillery

59 Independent Commando Squadron Royal Engineers

131 Independent Commando Squadron Royal Engineers

539 Assault Squadron Royal Marines

6 & 9 Assault Squadrons Royal Marines

Appendix 3 Exercise Chronology

Chronology of Key Events

Date	Event
	1997
22 September	Secretary of State for Defence (Rt Hon George Robertson MP) and His Majesty the Sultan meet in Oman and agree Oman as location for LIVEX 01.
	1998
6-9 September	Initial permanent joint headquarters scoping visit to Oman
	2000
February	In - Country Planning Team (ICPT) established.
16-21 September	1 UK armoured division reconnaissance visit to Oman
	2001
22 March	1st Chief Joint Operations COMBRITFOR planning meeting.
May	Enablers Deploy. HQ BRITFOR/JFLOGC established
6 June	CJO briefing day for Commanding Officers and above.
7 - 11 September	Land component conducts reception, staging, onward movement and integration.
13 - 19 September	Air component conducts reception, staging, onward movement and integration
17 - 18 September	Land component unload shipping.
19 September - 2 October	Land component tier 1 & 2 training (exercises DESERT WARRIOR & DESERT RHINO).
20 - 30 September	Air component tier 1 & 2 training.
24 - 27 September	Royal Marines conducts reception, staging, onward movement and integration
25 - 26 September	Exercise control conducts reception, staging, onward movement and integration
30 September	Maritime component arrives at port salalah.
28 September - 2 October	1st NAO team in theatre
1 October	EXCON and task force HQs established.
2 -14 October	Maritime and air components force integration training. Land component deploys to northern training area.
15 - 17 October	LIVEX shaping operations
18 - 25 October	LIVEX
24 - 28 October	2nd NAO team in theatre
28 - 29 October	VIP demonstrations
30 October	Combined post-exercise debrief (Muscat)
5 November	UK forces out of theatre via sea point of disembarkation/embarkation (Port Salalah) or air point of disembarkation/embarkation (Thumrait).
19 November	UK after action review meeting
22 November	UK First Impressions Report published.
4 December	Combined First Impressions Report published.
	2002
29 January	Combined Final Exercise Report published.
February	UK Final Exercise Report published.
February	Recovery complete.

Appendix 4 Previous Parliamentary Interest

This appendix illustrates some of the Public Accounts Committee's previous recommendations on expeditionary operations, and the Government's response.

Committee of Public Accounts, 46th Report, Ministry of Defence: Kosovo - The Financial Management of Military Operations, HC 582, Session 1999-2000

PAC conclusions and recommendations	Treasury Minute
PAC conclusion (i) "[T]he decision to commit United Kingdom forces to the operation will have been informed by cost estimates, and those estimates should have been communicated to Parliament, stating plainly any assumptions or uncertainties that affect the estimates."	"The Department accepts the Committee's recommendation… Where the classified nature of the assumptions for the operation make discussion in Parliament inappropriate or where there is the possibility of providing misleading or unreliable information, the Department will consult the Committee over any possible delay."
PAC conclusion (ii) "Even allowing for these uncertainties, the cost estimating proved poor, with an 18 per cent variance on an annual forecast made just three months before the end of the year in question. The Department should be able to give a clearer idea of the likely rate of spending."	"The Department accepts that this particular forecast was imprecise. But there were good reasons for it, given the significant changes in force levels and contractual difficulties with major Urgent Operational Requirements, which complicated the forecasting... In future, forward years costings will be published as soon as possible."
PAC conclusion (vi) "There are continuing shortages of personnel in the Armed Services, particularly in specialisms such as logistics, medical support and signalling. The problem is now one of retention, rather than recruitment."	"The Department recognises that good retention is fundamental to a long term sustained manning balance. The Department has… examined the remuneration of a number of key specialist groups and has responded by introducing a range of Financial Retention Initiatives."
PAC conclusion (ix) "There were significant weaknesses in communications in-theatre, particularly in tactical communications, where continuing delays in the Bowman radio system have left our soldiers dependent on the insecure and unreliable Clansman systems."	"The Department accepts that there are limitations with Clansman [and] intends to introduce BOWMAN as soon as possible."
PAC conclusion (x) "The Kosovo operations exposed the Department's lack of adequate heavy lift capability. It was unsatisfactory that they were heavily reliant on Russian registered aircraft which were not available during much of the air campaign."	"The Department accepts the Committee's conclusion and had recognised the need to increase its sealift and airlift capacity in the Strategic Defence Review… [T]he campaign confirmed the need to improve our lift capabilities, given that for other operations where MOD might have less time to prepare, a lack of in-house assets could be a significant constraint."

PAC conclusion (xi)

"[T]he Department had not progressed their procurement of expeditionary accommodation in time for Kosovo… The Department should set clearer accommodation standards to reduce the risk of similar problems in future deployments."

"The Department does not accept the Committee's conclusion that accommodation for expeditionary forces had not progressed. Work was proceeding at speed to provide an accommodation capability but that work had not been completed in time for Kosovo…

"[T]he concept for ECI… has been further developed since deployment [in Kosovo], incorporating lessons learnt."

PAC conclusion (xii)

"There were also weaknesses in the interim measures taken to improve conditions for personnel in theatre. Basic comforts such as camp beds, showers and portable toilets are an important aspect of such expeditionary deployments, as are adequate communications with the United Kingdom."

"The Department is committed to providing suitable facilities for its forces... [R]evised arrangements are now in place to ensure that welfare telephones accompany initial troop deployments… The Department has set clearly defined standards, for ratios of toilets and showers to personnel, that match the best international comparators."

PAC conclusion (xiv)

"The Department have little capacity to monitor the supply chain's performance in theatre, nor the condition and reliability of equipments in theatre."

"The Department recognises that it does not yet have adequate means of measuring supply chain performance. It has established a Tri-Service organisation to measure supply chain performance and recommend improvements…

"[T]he Department recognises the need to improve its ability to track items as they move forward into a theatre of operations. The In-Transit Visibility project is targeted specifically at this need."

Committee of Public Accounts, 26th Report, Ministry of Defence: The Movements of Personnel, Equipment and Stores to and from the Gulf, HC 393, Session 1993-1994

PAC conclusions and recommendations	Treasury Minute
PAC conclusion (i)	
"We note that the Department did not have contingency operational plans to cover an operation like GRANBY. Consequently, complex movements requirements had to be drawn up from scratch, with limited time available to do this."	"Contingency plans did exist for a number of relatively small scale Out of Area Operations... It would have been very difficult to write operational contingency plans in sufficient detail to cover all the eventualities of Operation GRANBY."
PAC conclusion (iii)	
"We accept that there were military imperatives to move equipment to the Gulf quickly [but] are concerned that systems designed to establish movements priorities were swamped."	"A prioritisation system review has developed new procedures which, in conjunction with the new freight IT and supporting numbering systems, will facilitate the proper management of priority freight and improve operational prioritisation including the necessary division between air, land and sea transportation."
PAC conclusion (iv)	
"The Department's systems for movements are still under-developed, and GRANBY served to demonstrate significant deficiencies in them."	"Since Operation GRANBY, the Department has introduced the Services Air Cargo System (SACS), which provides for the management and tracking of air cargo... An electronic link between SACS and the Army's new asset logging system now provides for the automatic transfer of data for Army air cargo between these systems. Links to the equivalent RAF and Navy systems will be effected when they are introduced later this year."
PAC conclusion (v)	
"We are concerned the Department did not have a sound system for tracking freight and that the recovery stage of GRANBY was consequently difficult."	"A new tri-Service freight numbering system is being introduced, and this, in conjunction with the development of interworking IT systems, will allow the necessary flow of freight data to provide the tracing of assets and containers. Automatic data capture of freight consignment will follow as the new IT systems are introduced…"
PAC conclusion (vi)	
"We consider it unsatisfactory that the lack of elementary tracking meant that some operationally critical items were 'lost to view'."	"The systems detailed in the Department's response to [the third] conclusion [above] should ensure that operationally critical items are not 'lost to view' in future."
PAC conclusion (vii)	
"We stress the importance of the Department taking urgent action to improve their management information systems relating to movements."	"Action has been taken to improve both the management of movements and tracking of assets, and the Department has developed for its own use those commercial systems which it considers represent best practice."