



National Audit Office

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COMPTROLLER AND  
AUDITOR GENERAL

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Ministry of Defence

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# Managing the defence inventory

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National Audit Office

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Ministry of Defence

# Managing the defence inventory

Report by the Comptroller and Auditor General

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Amyas Morse  
Comptroller and Auditor General  
National Audit Office

18 June 2012

The armed forces require a wide range of supplies and spares, known as inventory, for immediate and potential use. In December 2011, the Department held over 710 million items of inventory, at a gross value of £40.3 billion. This report examines the Department's approach to managing its inventory.

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## Key facts

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**£40.3bn**

of inventory (supplies and spares) at gross value was held by the Department, at December 2011

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**£2.9bn**

was spent by the Department on purchasing inventory (supplies and spares), in 2010-11

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**£0.8bn**

was spent on consumable inventory in 2010-11 and not yet used

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- £16.8 billion** is the net value of the inventory (supplies and spares) after depreciation at December 2011
- 710 million** items of inventory were held by the Department, as examined by the National Audit Office
- 900,000** different types of inventory were held by the Department, as examined by the National Audit Office
- £4.2 billion** is the gross value of inventory held, which has had no demand in the last two financial years (excluding VAT)
- £277 million** cost to hold and manage inventory items centrally in 2010-11, estimated by the National Audit Office
- £1.4 billion** is the gross value of inventory the Department identified for disposal between 2010 and 2011 (excluding VAT)

# Summary

**1** The UK's armed forces are deployed across the globe on operations, such as in Afghanistan and on standing commitments, such as defending the UK's air space. To conduct these activities, the armed forces require a wide range of supplies and spares for immediate and potential use. These supplies and spares are described collectively as 'inventory'.

**2** The inventory comprises more than 900,000 different types and more than 710 million items. The Ministry of Defence (the Department) splits its inventory into two categories:

- explosive, which is ammunition and missiles; and
- non-explosive, which ranges from clothing and medical supplies to spares for vehicles, ships and aircraft.

**3** The Department's inventory is of significant value. At the end of December 2011, the Department held inventory with a value of £40.3 billion (the gross value without adjustment for depreciation). In 2010-11 the Department spent £2.9 billion on inventory and it forecasts that it will spend between £1.5 billion and £2 billion each year for the next five years. The forecast spend equates to around an additional 3 per cent of the Department's annual spending for those future years.

**4** Inventory management is a recognised professional skill. The objective of inventory management is to minimise the risk of having insufficient stock while also minimising the cost of holding stock, and reducing the amount of money tied up in stock holdings. With a decreasing defence budget, it is increasingly important that the Department manages its inventory effectively and efficiently to achieve this objective.

**5** In 2011 we reported on the supply chain to operations in *Ministry of Defence: the use of information to manage the logistics supply chain* and we qualified the Department's accounts. Both pieces of work raised concerns about the Department's ability to manage its inventory efficiently because of a lack of reliable information about stocks, the risk of failure in the base inventory IT systems in the central depots, and whether the Department was holding inventory that it no longer needed.

**6** During the course of our study, the Department provided data for our analyses from a number of its inventory systems. However, problems in obtaining reliable information have limited the scope of our analysis, for example volumetric data held on the Department's systems are incomplete and inaccurate. The Department is continuing its work to improve the quality of its data and has committed significant funds to improving its IT systems. These limitations, however, further highlight that the Department's ability to manage its inventory is compromised by its current information systems and the data those systems hold.

7 This report examines the Department's approach to managing its inventory. It considers whether:

- the Department is buying and holding the right quantity (Part One);
- the Department has appropriate strategies and structures in place to manage its inventory efficiently and effectively (Part Two); and
- the Department's improvement plans will be successful (Part Three).

8 This report covers non-explosive and explosive items, held by the armed forces and in central depots. The report does not cover inventory managed on IT systems for the nuclear weapons inventory or loan items and war reserves.

## Key findings

On whether the Department is buying and holding the right quantity

9 **Inventory holdings are increasing.** Our examination showed that the inventory held by the armed forces and the non-explosive inventory held in central depots increased in value by 13 per cent from £17.2 billion to £19.5 billion (gross) between the end of March 2009 and December 2011. The quantity of items held by the armed forces and the number of different types of stock have also increased.

10 There are a number of reasons for the increase:

- **There has been increase in operational activity over the last decade.** The Department seeks to ensure adequate support for troops deployed to Afghanistan and to retain sufficient inventory to support operations rapidly such as in Libya in spring 2011. Overall, the Department considers that there are sufficient quantities of non-explosive inventory held in central depots to meet its target levels for meeting demands from the armed forces.
- **The Department has brought in new equipment across the armed forces, for use now and for a range of operational scenarios. However, it has not consistently disposed of inventory it no longer requires.** We found that as of March 2011 significant amounts of non-explosive inventory held in central depots were not being issued and consumed regularly. For example, £4.2 billion (gross) of non-explosive inventory has not moved for at least two years. This represents 10 per cent of the total inventory value as at March 2011. A further £2.4 billion (gross) of non-explosive inventory already held is sufficient to last for five years or more, based on the rate of usage since April 2009. The Department has had to set up central projects to dispose of inventory as a result of inconsistent disposals by project teams. During 2010 and 2011, these central projects identified £1.4 billion (gross) of inventory that could be sold or destroyed.



- **The Department is buying more inventory than it uses.** Between April 2009 and March 2011 the Department spent £4 billion on raw material and consumables, such as clothing or ammunition, but it has not used £1.5 billion (38 per cent). We estimate that the Department spent £12.5 million (gross) in 2010-11 on non-explosive inventory where it already had more than five years' worth of stock in its central depots. These findings indicate that the Department is spending money on unnecessary levels of stock, which could be spent elsewhere in government.
- **The Department is recording more inventory on its IT systems.** This is in preparation for new IT systems and also in response to the qualification of its annual accounts. The Department has not been able to identify the proportion of the increase related to better recording of data.

#### **11 Holding inventory that may not be used imposes a cost on the Department.**

We estimated the costs of storing and managing inventory borne by Defence Equipment and Support, the body within the Department responsible for procurement and support. These were at least £277 million in 2010-11. There is an opportunity cost for the Department if it stores inventory that will never be used. For example the Department may have to pay to create additional storage capacity to house new inventory items.

**12 Future withdrawals from overseas bases will place more pressure on the Department's central depot capacity.** Overall the Department's central depot space is under pressure and has little room for additional inventory. The planned return of the armed forces from Afghanistan by 2015 and from Germany by 2020 will exacerbate this situation when inventory from those locations is returned to the UK.

The Department's strategies and structures to manage inventory

**13 The Department's logistics strategy does not fully address the causes of unnecessary inventory holdings.** The Department's strategy is focused upon providing logistics support for current and future requirements. It does not, however, discourage over-ordering and therefore risks inventory levels increasing despite actions to reduce levels of unnecessary inventory.

**14 The Department has set few efficiency targets for project teams to encourage them to buy and hold inventory in the right quantities.** In line with the strategy, targets are focused on ensuring that there is sufficient inventory to meet requirements, rather than minimising over-ordering or managing inventory already being stored.

**15 The Department has not successfully created incentives for project teams and the armed forces to consider the full impact of their decision-making.**

Inventory management is devolved to a number of teams with different responsibilities, each of which bears only a proportion of the overall costs. Despite departmental projects aimed at changing ordering behaviour there remain no incentives for teams to consider the impact on the Department overall. For example, the armed forces do not incur the cost of purchasing inventory until it is used and are not responsible for the consequences if they over-order. Similarly project teams do not incur the cost of storing the inventory they purchase. From April 2012, the Department has introduced separate budgets on consumable purchases to minimise over-ordering. It has also required project teams to obtain separate approval from the Director of Resources in Defence Equipment and Support for all purchases more than £0.5 million.

**16 The Department does not understand the full cost of holding and managing inventory and does not use known costs as part of its day-to-day decision-making.**

There is no comprehensive analysis of the costs of inventory management available, which makes it difficult for teams to make value for money judgements on whether to buy, retain or dispose of inventory.

**17 The summary management and financial information on inventory that is provided to senior staff within Defence Equipment and Support is not sufficient for them to challenge and hold to account the project teams.**

Within Defence Equipment and Support, the gross and net values of the inventory holding are reported monthly to senior management. The reports do not currently highlight the reasons for changes or include information on the quantity or value of the flows in and out of the stores. In addition the performance management systems do not allow senior managers to review the fluctuations in the level or value of inventory stored and reveal the underlying reasons.

**18 A lack of suitably qualified staff in post may undermine the Department's efforts to improve its inventory management.**

At the end of November 2011, 20 per cent of inventory management posts were vacant, and of those staff in post, 13 per cent had not obtained the appropriate qualifications.

### The Department's plans for improvement

**19 The Department acknowledges that it needs to improve its inventory management and has introduced several initiatives and changes to how teams manage inventory.**

These projects include introducing software to forecast likely demand more accurately and help reduce over- and under-buying. The Department is making considerable efforts to improve and the success of these projects should increase effectiveness and savings. However, most of these projects have not been operating for long enough to realise their benefits.

**20 The Department has not yet put in place an accountability framework to encourage teams to manage their inventory efficiently as well as effectively.**

The Department's strategy and performance reporting do not focus on efficient inventory management. As a result, the Department's improvement initiatives have not yet addressed the lack of efficiency measurements or incentives for teams to consider the full implications of their decisions. Following a critical report by the Department's Internal Audit and our discussions of informal findings from this report, in February 2012 the Department commissioned a review to try to establish and sustain more cost-effective inventory management. By May 2012 the review had made recommendations to improve inventory management and suggested further work necessary to deliver those improvements. With the exception of previously planned changes to the IT systems, the Department plans to implement those recommendations by March 2013.

**21 The Department is making significant changes more widely to how it operates, the results of which may improve its management of inventory.** Following the Strategic Defence and Security Review in October 2010 and Lord Levene's review in June 2011, the Department plans to introduce a new operating model in April 2013. This will set out a customer-supplier relationship between the armed forces and Defence Equipment and Support. The Department's objective is to strengthen decision-making and accountability for providing the armed forces required within budget, by holding the heads of the armed forces to account. The Department has yet to work through the implications for the organisations within it and determine how it will hold organisations to account for delivering to their targets.

**22 The Department is exploring ways to achieve savings by outsourcing its procurement of commodities, such as clothing, and its central warehousing and distribution for non-explosives.** It does not, however, yet have a strategic plan for inventory necessary to set robust requirements for outsourcing. It will only make significant savings if it stops buying more than it needs and disposes of inventory it no longer requires. As part of its internal approval process, the Department has recognised that it is not currently able to outsource and is addressing this in its work to develop the options for outsourcing.

## **Conclusion on value for money**

**23** The Department has a number of appropriate criteria to satisfy, such as supporting long-term operations, when setting inventory levels. However it is clear that, in a number of areas, these criteria have already been exceeded and the Department continues to add yet more inventory. This does not represent value for money.

**24** The Department recognises there are problems with its inventory management, and has introduced projects to improve its practices. However, the root cause of the excess stock is that management and accountability structures fail to provide the incentives to drive cost-effective inventory management. The Department will need to address these weaknesses comprehensively to deliver value for money.

## Recommendations

**25** Our recommendations are aimed at helping the Department achieve value for money from its inventory management.

- a** **The Department should develop a coherent and comprehensive strategy for the size, value and composition of the inventory that it needs to retain, and use this as a basis for setting coherent targets and management approaches.** The Department has made improvements to better manage inventory, but does not yet have a coherent and comprehensive view of the size and value of the inventory it needs to retain. Consequently the Department cannot manage its inventory as a strategic asset or set coherent targets and management approaches. Its strategy should embed good inventory management behaviours as standard business practices, for example ensuring that project teams do regularly review their inventory to identify items for disposal.
- b** **The Department should expand its financial information and use it to improve cost-effective decision-making.** The Department does not collect all the information needed to understand the full cost of managing inventory, nor does it centrally collate and report its cost information. The Department cannot, therefore, make informed decisions and evaluate whether it is achieving value for money from these decisions. The information should be collated in a manner that allows the full cost to be estimated for individual types of stock. Costs should include that of holding and managing stock by the armed forces.
- c** **The Department should reduce the amount it spends each year on inventory where it already holds sufficient stocks.** The Department holds £4.2 billion of inventory that has not moved in over two years and a further £2.4 billion of holdings sufficient to cover five years of use. However it spent £1.5 billion in 2009-10 and 2010-11 on consumable inventory that it has not used.
- d** **The Department should set up management and accountability structures that incentivise good inventory management.** The Department will be introducing a number of significant reforms over the next few years, including new operating models for the Department overall, and for Defence Equipment and Support. The Department should use the opportunity presented by these reforms to set up management and accountability structures that encourage teams to manage inventory efficiently as well as effectively.
- e** **The Department should address its problems in managing inventory before it outsources some of its warehousing, distribution and commodity procurement functions.** The Department is exploring options for outsourcing but there are risks to achieving value for money owing to a lack of a comprehensive top-down strategy, robust information and skilled staff. The Department will need to successfully address these to avoid paying a premium for outsourcing.

# Part One

## Buying and holding the right quantity

**1.1** The UK's armed forces are deployed on a range of operations, including Afghanistan and anti-piracy patrols around Africa. They are also engaged on a number of training exercises and standing commitments, such as defending the UK's air space. Wherever they are based, the Ministry of Defence (the Department) must supply them with a wide range of items. The Department separates its inventory into:

- explosive inventory, which is ammunition and missiles; and
- non-explosive inventory, which ranges from supplies like batteries; items that use munitions, such as rifles; and spares for equipment including engines and ship propellers.

**1.2** The armed forces require inventory for both immediate and potential use. The Department purchases most inventory in advance and stores it until needed. This is to:

- cope with volatile demand. While inventory requirements for standing commitments and training can be predicted, the Department must have sufficient equipment and supplies to deploy rapidly when required, for example on operations in Libya in spring 2011;
- cope with difficulties in transportation to locations outside the UK, for example Afghanistan; and
- provide spare parts at short notice for specialised pieces of equipment that have long lead times to manufacture, or where industry is no longer able to produce the part.

**1.3** The Department's financial systems report the total value of inventory held as £40.3 billion (gross) at the end of December 2011. It splits this into three separate categories: capital spares; guided weapons, missiles and bombs; and raw materials and consumables (**Figure 1**). There are also items such as rifles which are managed as inventory but not included in the £40.3 billion total. These items are instead accounted for and reported as fixed assets.

**1.4** We have used gross values throughout our work because:

- the Department applies depreciation and any reduction for damage (impairment) on an aggregate basis and so none of its systems hold the net value of individual items; and
- when the Department does fully depreciate items so that they have a nil value, they are often still physically held in stores.

Where we could obtain the information at a summary level, we have also quoted the total value net of depreciation and impairment.

**Figure 1**  
Value of inventory by accounting categories

At 31 December 2011, the Department reported that it held inventory at a value of £40.3 billion (gross)

Category	Example items	31 March 2011		31 December 2011	
		Gross value (£bn)	Net value (£bn)	Gross value (£bn)	Net value (£bn)
Capital spares	Engines or ship propellers	25.0	7.9	25.0	7.1
Raw material and consumables	Batteries and clothing or rifle ammunition	9.9	7.7	10.0	7.5
Guided weapons, missiles and bombs	Cruise missiles or torpedoes	4.8	2.1	5.3	2.2
<b>Total</b>		<b>39.7</b>	<b>17.7</b>	<b>40.3</b>	<b>16.8</b>

**NOTES**

- 1 The value of assets, such as rifles, which are treated as fixed assets, have not been included as their value is included within the fixed asset total instead.
- 2 The raw materials and consumables and guided weapons, missiles and bombs categories cover explosive inventory.
- 3 The increase in gross value held between March 2011 and December 2011 includes £275.8 million where the Department revalued the price.
- 4 All figures include VAT.

Source: Ministry of Defence accounting systems

**1.5** To comply with HM Treasury financial reporting requirements, the Department reports the value of inventory differently in its annual accounts. At the end of March 2011, the inventory figure reported in the statement of financial position was £7.7 billion. This was the net value of raw materials and consumables then held by the Department. The remaining inventory items are included under non-current assets and are combined with other figures rather than being separately stated. The Department reports internally the value of its inventory holdings as £17.7 billion at the end of March 2011. This excludes items that are managed on the Department's inventory systems and accounted for as fixed assets.

### **Our previous work on inventory management**

**1.6** Public and private sector organisations use professional specialists to manage supply chains and associated inventory and they draw on well understood principles and inventory management practices.<sup>1</sup> The objective of inventory management is to minimise the risk of not having the stocks to issue while minimising the costs of holding stocks, and reducing the amount of money tied up in stock holdings.

**1.7** We have previously reported on aspects of how the Department manages its inventory in a number of studies and these have raised concerns about the efficiency of its management.<sup>2</sup> In March 2011 we reported that:

- due to a lack of reliable information about stocks, in order to ensure sufficient deliveries are made, the supply chain has to prioritise effectiveness over efficiency when delivering into theatre;
- the business intelligence to support the supply chain fell short of general logistics industry practice, being incomplete, lacking financial information and having management data up to four weeks old; and
- the Department is exposed to considerable risks in the supply chain if its information systems fail.

The Department has acknowledged the information and information systems gaps and committed significant funds to system improvements. However these will not address the risk of failure across all of the inventory systems nor resolve the information shortfall. Subsequent to our report, the Department committed a further £75 million of funding to mitigate the risk of systems failure.

<sup>1</sup> Council of Supply Chain Management Professionals, 2010, *Suggested Minimum Supply Chain Benchmarking Standards*.

<sup>2</sup> These include: Comptroller and Auditor General, *Ministry of Defence: The use of information to manage the logistics supply chain*, Session 2010-11, HC 827, National Audit Office, March 2011 and Comptroller and Auditor General, *Ministry of Defence: Progress in reducing stocks*, Session 2001-02, HC 898, National Audit Office, June 2002.

**1.8** We have identified similar concerns from our financial audit work. Since 2008-09 the Comptroller and Auditor General has qualified his opinion on the Department's annual accounts. This is owing to significant concerns over the accuracy and completeness of some elements of the Department's records on inventory. In July 2011 he qualified the Department's accounts<sup>3</sup> partly because of:

- non-explosive inventory being held in central depots that is not recorded on the depot systems;
- inventory management systems that could not be reconciled with the depot systems; and
- some 44 per cent of non-explosive inventory held at central depots being recorded as not available for immediate use. These items may need repair before they can be used, or disposed of if no longer needed, but the Department has not reduced their value to reflect their condition.

One qualification, on whether items on depot systems existed, was removed in 2010-11 because of improvements by the Department.

**1.9** This part of our report examines whether the Department is holding sufficient stock to satisfy the demands of the armed forces whilst also minimising the level of resources invested in inventory.

### **Our examination of the Department's inventory**

**1.10** With the exception of the value of inventory from the accounting systems, the Department does not bring together in any of its management information any summary information across all of its inventory holdings. We therefore analysed data provided by the Department from more than ten different inventory management systems covering:

- explosive inventory held in central depots;
- non-explosive inventory held in central depots; and
- inventory of both types held by the armed forces in the UK and across the world.

We have not analysed data from all systems, for example those managing the nuclear weapons inventory or the system for loan items and war reserves.<sup>4</sup>

**1.11** Our previous work has noted that there are limitations to the Department's inventory management systems. These limitations impacted on the scope of the analyses that can be carried out. The data from the systems are likely to understate the level of inventory held in the store and not all data is recorded. For example, we could not analyse the volume of storage space occupied by individual types of non-explosive inventory in central depots because the data is incomplete and inaccurate on the systems. The Department is continuing its work to improve the quality of its data.

<sup>3</sup> Ministry of Defence, *Annual Report and Accounts 2010-11*, HC 992, 18 July 2011.

<sup>4</sup> The war reserve has been built up to meet the increase in military demands following the outbreak of a war.



**1.12** All figures in the report drawn from inventory management systems are exclusive of VAT whilst the remainder, drawn from financial systems, are VAT inclusive. VAT exclusive figures are primarily contained in paragraphs 1.13 to 1.26 and in paragraph 1.28. The VAT rates for individual types of inventory vary so that VAT inclusive figures are not simply 20 per cent greater than VAT exclusive figures.

### The explosive inventory held in central depots

**1.13** At the end of November 2011, the Department reported that it held £5.9 billion (gross) of explosive inventory in its central depots. We took one set of data from the explosives systems. This showed that at the end of September 2011, the Department held 1,562 different types of explosive inventory, totalling 487 million individual items.

**1.14** The explosives inventory management systems are real time and do not retain accessible data for past periods for trend analysis. The Department is, however, developing management information on the explosive stores and keeps information on the value, volume and condition of its explosive stockpile. This information shows that the value of the stock holding has remained stable between £5.9 billion and £6.2 billion since August 2010.

### Inventory held by the armed forces and the non-explosive inventory held in central depots

**1.15** The total inventory held by the armed forces, both explosive and non-explosive, and in central non-explosive depots has increased in value by 13 per cent from £17.2 billion to £19.5 billion between the end of March 2009 and December 2011. Of that, the value held by the armed forces has increased by 17 per cent from £8.3 billion to £9.8 billion and the value held in central depots by 9 per cent from £8.9 billion to £9.7 billion (**Figure 2** on pages 16 and 17).

**1.16** The total quantity of inventory held by the armed forces has also increased by 15 million items (15 per cent) to 120 million items between the end of March 2009 and December 2011. However, total quantity of items held in central non-explosive depots decreased by 14 million (12 per cent) to 103 million items as projects to reduce inventory have started to make an impact. Overall the number of different types of inventory with stock holdings has increased slightly by 31,500 (4 per cent) to more than 0.9 million types.

**1.17** The key reasons for the overall growth in value include:

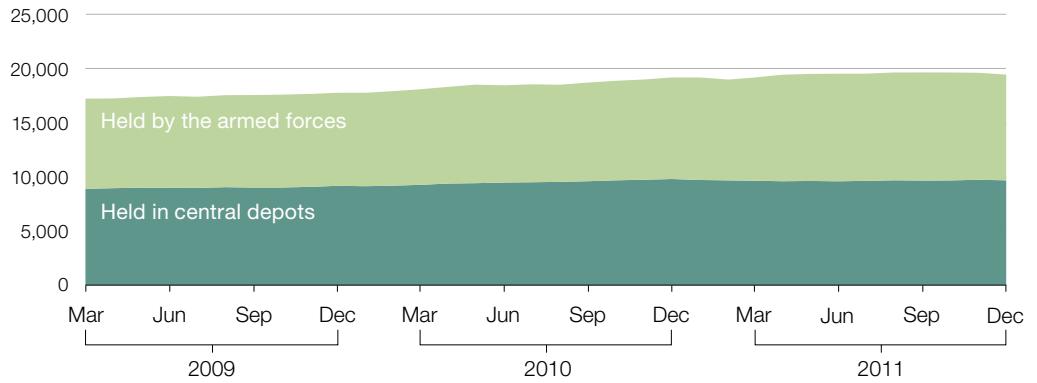
- an increase in operational activity;
- not consistently disposing of inventory no longer required;
- purchasing more than it uses; and
- an increase in the recording of inventory on the systems.

**Figure 2**

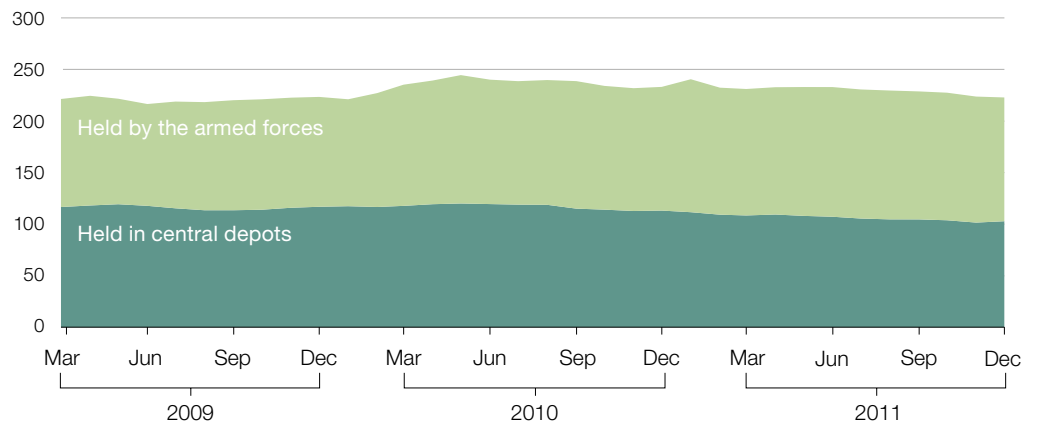
Changes in the Department's inventory

The value of inventory as examined has increased by 13 per cent in under three years

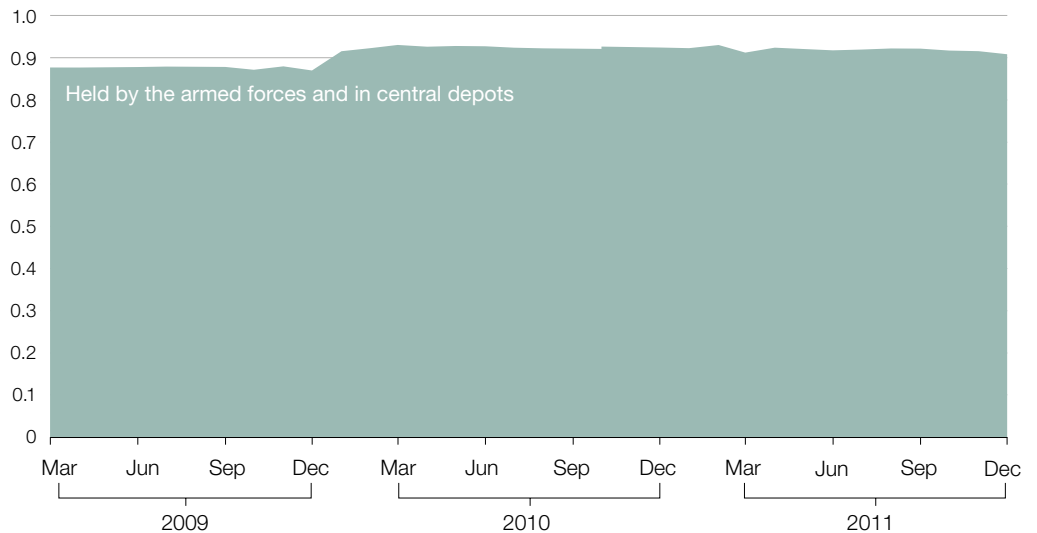
**Value (£ million)**



**Quantity of stock items (million)**



**Types of inventory (million)**



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**Figure 2** *continued*  
Changes in the Department's inventory

**NOTES**

- 1 The trend in value uses prices constant at December 2011, excluding VAT, to remove the impact of inflation.
- 2 The systems hold inventory which is accounted for as fixed assets and so these values do not fully reconcile to those recorded in the accounting systems.
- 3 The analysis excludes data on explosives held by central depots.
- 4 The Department assigns a unique identifier to each different type of inventory. Our analysis on the number of different types counts the number of unique identifiers on the systems with stock held at the end of the month. We have excluded those types of items with no unique identifier. These include items that have been bought locally at army bases but which are recorded on the Department's inventory management systems.

*Source: National Audit Office analysis of data from Ministry of Defence inventory systems*

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**Operational activity**

**1.18** Since 2001, the Department has been undertaking operations where the nature and level of the threat faced by the armed forces has changed. This has required new types of inventory: for example, enhanced body armour and spare parts for the new fleet of vehicles. These items have been bought as urgent operational requirements.<sup>5</sup> Between 2002 and spring 2011 the Department spent £6.8 billion on urgent operational requirements, including inventory.

**1.19** Overall, the Department considers that there are sufficient quantities of non-explosive inventory held in central depots to meet its target levels for meeting demands from the armed forces. These demands are not just for operations, but also standing commitments and training. The Department has a target of meeting 70 per cent of these demands within 24 hours from authorisation on army systems, and 48 hours for air and navy systems. Against this, the Department has consistently met 85 per cent of demands between August 2010 and July 2011.

**1.20** The Department has also set itself a target to ensure that 45 per cent of demands for general stores and equipment support are met immediately from stores in Afghanistan. In March 2011 our report on logistics information stated that the Department has generally met or exceeded this target between January 2009 and November 2010 and this trend has continued to November 2011.

<sup>5</sup> Urgent operational requirements are funded directly by HM Treasury, enabling the Department to respond quickly to new requirements during operations.

### Disposal of inventory

**1.21** In cases where the Department upgrades and replaces existing equipment or it changes its requirements, it can hold inventory that it no longer needs. For example, the *Strategic Defence and Security Review* in October 2010 retired the Harrier and the latest model of the Nimrod maritime patrol aircraft.<sup>6</sup> Their spare parts were no longer required and, for the Harrier, were sold.

**1.22** Within the central stores, some inventory has not been issued recently and is known as non-moving stock. At the end of March 2011 it held £4.2 billion of non-explosive inventory centrally, for which it had experienced no demand between April 2009 and March 2011. This amounted to more than 24 million items, across 428,000 different types (47 per cent of different types) and ranged from bayonet scabbards to aircraft engine components.

**1.23** As the data held on the systems is limited, it is not possible to assess whether the Department needs to retain the individual items in the depots. Only the team or military unit who has the ownership for that item can make that assessment. From our case study work, the Department may be holding these non-moving items because they:

- are large spare parts, bought before the manufacturer stops the production line (known as a lifetime buy). For example, the Department holds six controllable propellers, valued at a total of £1.1 million, for the three remaining Type 42 destroyers scheduled to be in service until 2013; and
- need to be disposed of but action is not yet complete. For example, 25 air conditioning units valued at a total of £135,000 had not been issued since at least March 2007. Out of the 25 units, 12 of these have already been earmarked as not being in a condition for immediate issue but they continue to be held.

**1.24** Within the central stores, there is also inventory that has been issued between April 2009 and March 2011, but the quantity issued is low compared with the total quantity of stock still held. We have calculated the stockturn (the time it would take for stock to be used up, based on past usage) for the stock held in the central non-explosive depots. Past use may not be the best predictor of future demand when demand is volatile. However, stockturn calculated this way indicates the items the Department should investigate.

**1.25** At the end of March 2011 the Department held £2.4 billion of inventory that will take more than five years to consume, based on the previous two years' usage (**Figure 3**). This amounted to 33.6 million items, covering more than 50,000 different types, including the following:

- Fire-resistant coveralls where, for one size, central depots have issued an average of just under 200 per year in the previous two years'. After excluding contingency stock required for the war reserve, central depots hold 10 years of stock for this particular size. For other sizes, the level of stock ranges between 2 and 16 years once contingency stock has been excluded. The Department stopped purchasing these coveralls in 2008.

<sup>6</sup> HM Government, *Securing Britain in an Age of Uncertainty: The Strategic Defence and Security Review*, Cm 7948, October 2010.

- Equipment used to drop bombs from the older model of the Nimrod maritime patrol aircraft.<sup>7</sup> Central depots have issued an average of 43 of these in the previous two years, but still hold 54 years of stock. Following our analysis, the Department confirmed these items should have been disposed of in 2010 when this model was retired from service.

**1.26** Project teams do not consistently dispose of inventory that is no longer required. As a result the Department has had to introduce central projects to identify inventory for disposal. Between February 2010 and December 2011, these projects identified non-explosive inventory valued at £1.4 billion that it could sell or scrap in its central depots. The Department could not give us data on the value of the disposals by the Disposals Services Authority from these projects.

### Figure 3

#### Department's stock value broken down by current rates of consumption

At the end of March 2011 the Department held £2.4 billion of inventory that will take more than five years to consume

##### Value of stock held (£m)



#### NOTES

- 1 Stockturn has been calculated for those types of inventory with stock holdings at the end of March 2011. Our analysis excludes items that were not held at the end of March 2009 to avoid including new types of inventory. New types will not have stable issue patterns and so the stockturn calculated would not be representative.
- 2 The values are at March 2011 prices, excluding VAT.
- 3 The dark green bars are stocks with greater than five years of stock.
- 4 AA non-rechargeable batteries are an example of stock that is consumed in a relatively short timeframe. The central depots had issued on average of more than 730,000 each year for the previous two years and held 24,000 at the end of March. A stockturn of less than a year does not imply that the Department will be purchasing more of those items to meet future demand.

Source: National Audit Office analysis of data from Ministry of Defence inventory systems

<sup>7</sup> The Nimrod cancelled as part of the Strategic Defence and Security Review in October 2010 was the planned replacement for this older model, which last flew in March 2010.

### Quantity of inventory purchased

**1.27** Defence Equipment and Support is the body within the Department responsible for procurement and support. Between April 2009 and March 2011 Defence Equipment and Support purchased 38 per cent more raw materials and consumable inventory than it has yet used, at a value of £1.5 billion (**Figure 4**). It could only provide figures for its own purchases. Other areas of the Department also directly purchase some consumable inventory such as some fuel. Defence Equipment and Support does not expect raw material and consumable usage to match purchases each year but it recognises that purchase levels need to be controlled. It has introduced separate budgets for this from April 2012. It also acknowledges that excess inventory may eventually have to be sold or scrapped if it is no longer required.

### Figure 4

Defence Equipment and Support's raw materials and consumable inventory

Defence Equipment and Support purchased 38 per cent more raw materials and consumable inventory than has been used, at a value of £1.5 billion between April 2009 and March 2011

Financial year	Purchases (£bn)	Used (£bn)	Difference (£bn)	Proportion not used against purchases (%)
2009-10	1.93	1.21	0.72	37
2010-11	2.13	1.32	0.81	38
<b>Total</b>	<b>4.06</b>	<b>2.53</b>	<b>1.53</b>	<b>38</b>

#### NOTES

1 All figures include VAT.

2 The Department spent a total of £2.15 billion on raw materials and consumables in 2010-11. It spent a further £0.72 billion in 2010-11 on capital spares, totalling £2.87 billion.

Source: Defence Equipment and Support financial data

**1.28** We examined whether the Department was spending money on procuring inventory items of which it already held sufficient stock in its central stores. We estimate that the Department spent £12.5 million on non-explosive inventory (both raw materials and consumables and capital spares) in 2010-11 where it already had more than five years' worth of stock (**Figure 5**). Our estimate used the data that was available on the Department's systems and we recognise that there are limitations to this data. For example, through our analysis the Department has found that the key indicators on the navy system showing new purchases are corrupted. As a result, we have had to estimate the level of new purchases on the navy system. Nonetheless, this analysis indicates where the Department should investigate to reduce its inventory purchases.

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### Figure 5

National Audit Office estimate of value of inventory bought in 2010-11 where the Department already held more than five years of stock

**The Department spent £12.5 million on non-explosive inventory in 2010-11 where it already had more than five years' worth of stock**

	<b>£ million</b>
Raw materials and consumables	8.1
Capital spares	4.4
<b>Total</b>	<b>12.5</b>

#### NOTES

- 1 We have calculated the years of stock holding (the time it would take for stock to be used up, based on past usage) using the quantity of inventory held at 31 March 2010 and the usage in 2009-10.
- 2 Our analysis excludes items that were not held at the end of March 2009 to avoid including new types of inventory. New types will not have stable issue patterns and so the stockturn calculated would not be representative.
- 3 The values are at March 2011 prices, excluding VAT.
- 4 Guided weapons, missiles and bombs stored in central depots are recorded on explosive systems and so have not been included.

*Source: National Audit Office analysis of data from Ministry of Defence inventory systems (non-explosive central depots)*

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**1.29** The Department forecasts spending approximately £1.5 billion to £2 billion each year for the next five years on raw materials and consumables and capital spares. For raw material and consumables, this is equivalent to an additional 3 per cent of the Department's annual spending for those years and for capital spares 2 per cent of the annual spend. We consider that the Department could make savings in storage costs by not buying inventory in quantities that it will not use and where it already has several years' supply. In addition, while the public spending framework would not allow the Department to spend the money elsewhere, there would be a saving to the Exchequer from not purchasing inventory that will not be used.

### **Recording of inventory**

**1.30** Another reason for the increase in value and quantity of inventory held by the armed forces is that army units are now recording more of the inventory they hold onto one of the inventory management systems. This is to prepare for this system to be replaced. In some cases, such as the Bowman radios, the Department has also been specifically addressing concerns raised as part of our qualification of the annual accounts. The Department has not been able to identify which proportion of the increase is from better recording of data.

### **The cost of holding and managing inventory**

**1.31** The full costs of holding and managing inventory include:

- employing and training staff;
- the depots, including charges for the use and maintenance of land and buildings;
- running the depots, including utilities, transport and security;
- charges for infrastructure such as IT; and
- the cost of disposals.



**1.32** Without detailed costing by the Department, we estimated the cost of holding and managing inventory. We used those costs that we could readily identify within Defence Equipment and Support, the body within the Department responsible for procurement and support. We estimated the cost was £277 million in 2010-11 (**Figure 6**). We could not estimate the costs of the inventory management activity carried out by the armed forces. This is because the financial systems do not hold data in a way that allows us to identify these activities.

**1.33** The costs of holding and managing inventory may not be significant, but there remains an opportunity cost to the Department if it is spending money unnecessarily. For example, the Department may have to pay to create additional storage capacity to house new items if its holdings continue to grow. At the same time existing storage space is being occupied by inventory that may never be used.

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### Figure 6

National Audit Office estimate of Defence Equipment and Support costs for managing inventory in 2010-11

**We estimate that holding and managing inventory cost the Department at least £277 million in 2010-11**

	<b>£ million</b>
Cost of holding inventory in central depots for explosives and non-explosives	198
Cost of the central support team	34
Estimated salary cost of inventory managers outside the central support team	29
Cost of disposals	16
<b>Total</b>	<b>277</b>

#### NOTES

- 1 All figures include VAT.
- 2 The cost of disposals is the running costs for the Disposal Services Authority. These running costs also cover other activities such as disposal of equipment such as ships or vehicles and not just inventory. The Disposal Services Authority is the team responsible for disposing of non-explosive inventory within Defence Equipment and Support.
- 3 The costs do not include any notional rental costs for occupying the depots or other charge for accommodation as in many cases the Department owns the buildings and the land they occupy. The value of the freehold land occupied by the central depots in the UK is £59 million and the Department estimates that the buildings would cost £1.4 billion to replace.

*Source: National Audit Office analysis of Ministry of Defence financial information*

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### **Capacity within the Department's central depots**

**1.34** The Department has a total covered warehouse capacity of 855,000 cubic metres in its central non-explosive depots. It estimates that its central depots are utilised at around 65 per cent on average. Some, however, are at 80 or 90 per cent capacity and the Department is storing some inventory which is unlikely to deteriorate in the open air. The Department faces difficulties in increasing the proportion of this space that it can use as the variation in the shape and size of inventory items makes it hard to pack them into the space efficiently.

**1.35** On the explosives inventory the management information shows that the volume of explosives stored is increasing while the total storage capacity has remained stable between July 2008 and September 2011. The explosives depots also require a licence from the Health and Safety Inspectorate to confirm them as fit-for-purpose. To maintain its licenced capacity, the Department would need to spend money on its depots or build new ones. The Department is considering options to streamline its procurement and storage of munitions and plans to produce a business case by the end of 2012.

**1.36** The Department plans to return from Afghanistan by 2015 and Germany by 2020. As part of its planning, the Department has to decide how much of the inventory in those countries it should transport back to the UK or alternatively dispose of in location. As the Department returns inventory to the UK, it could put further pressure on the capacity available in central depots.

## Part Two

### How the Department manages its inventory

**2.1** The Department splits the responsibility for inventory management between the armed forces, which act as a customer, and Defence Equipment and Support, which is the body within the Department responsible for procurement and support. The armed forces are responsible for setting out their requirements based on four-year plans that are revised annually. Individual units within the armed forces order the inventory as needed and store it at their bases, including those at the front line. After their activities are complete, they return or dispose of inventory that is not required, or retain it at their bases for future use.

**2.2** Within Defence Equipment and Support there are a number of different teams that purchase equipment, weapons and commodities. There are also teams that provide logistical support services, including storage and distribution (**Figure 7** overleaf). Its head, the Chief of Defence Materiel, is accountable for inventory across the Department as the logistics process owner. In this role he can influence inventory management within the armed forces, which are not under his direct control.

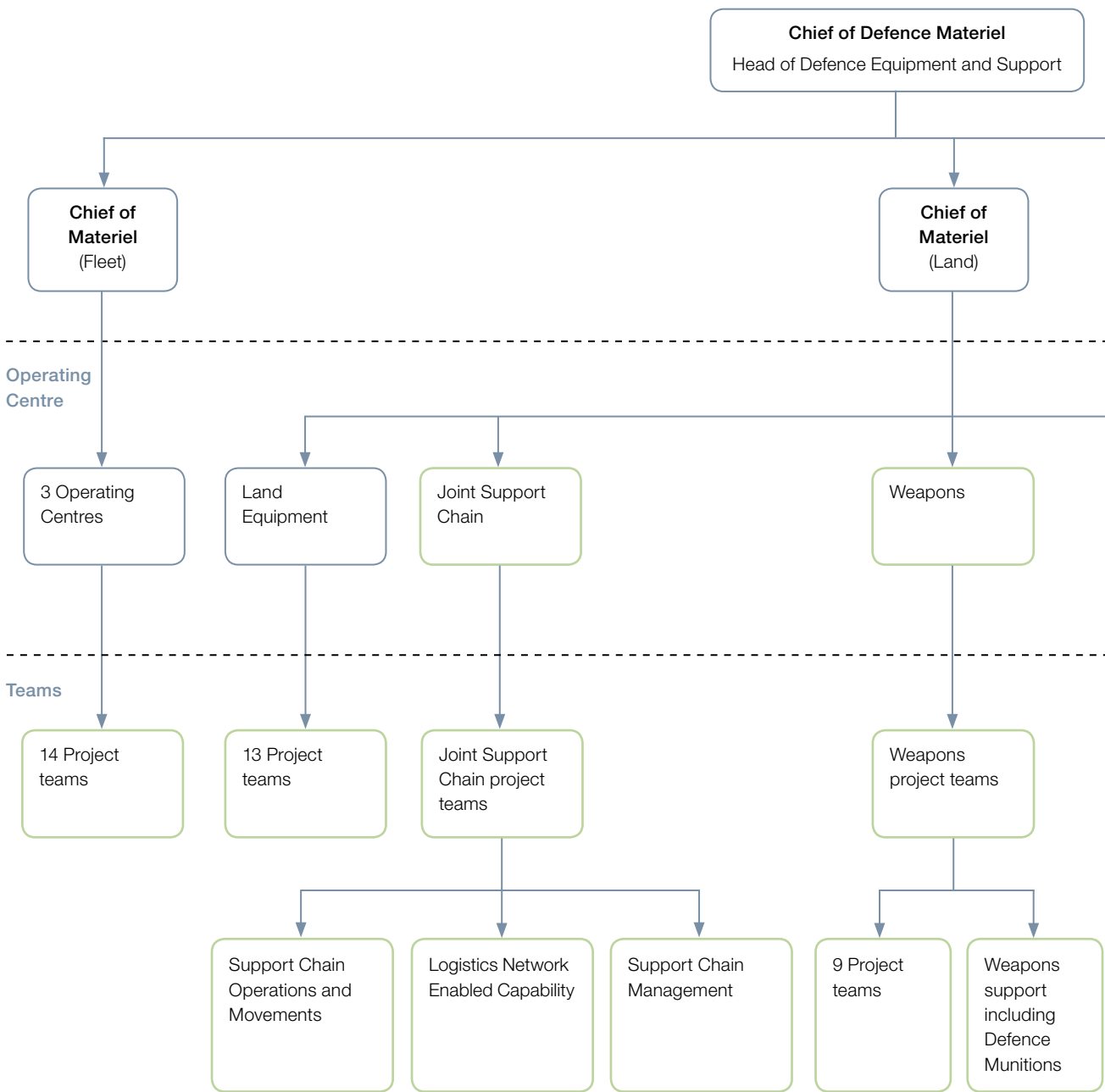
**2.3** There are several key organisations:

- **Project teams** make sure that the inventory is available when needed. They plan, purchase and own it until it is used or designated for disposal.
- **Logistics Services** receives goods from suppliers, stores non-explosive inventory and fulfills orders from the armed forces.
- **Defence Munitions** is equivalent to Logistics Services but manages the explosive inventory depots.
- **The Disposal Services Authority**, within Logistics Services, sells equipment or arranges for contractors to scrap the inventory.
- **The Joint Support Chain Operating Centre** produces the policy on inventory management, provides advice, and monitors the performance of the logistics supply chain. It also manages the information systems and projects to improve inventory management.

**Figure 7**  
Responsibility for inventory within Defence Equipment and Support

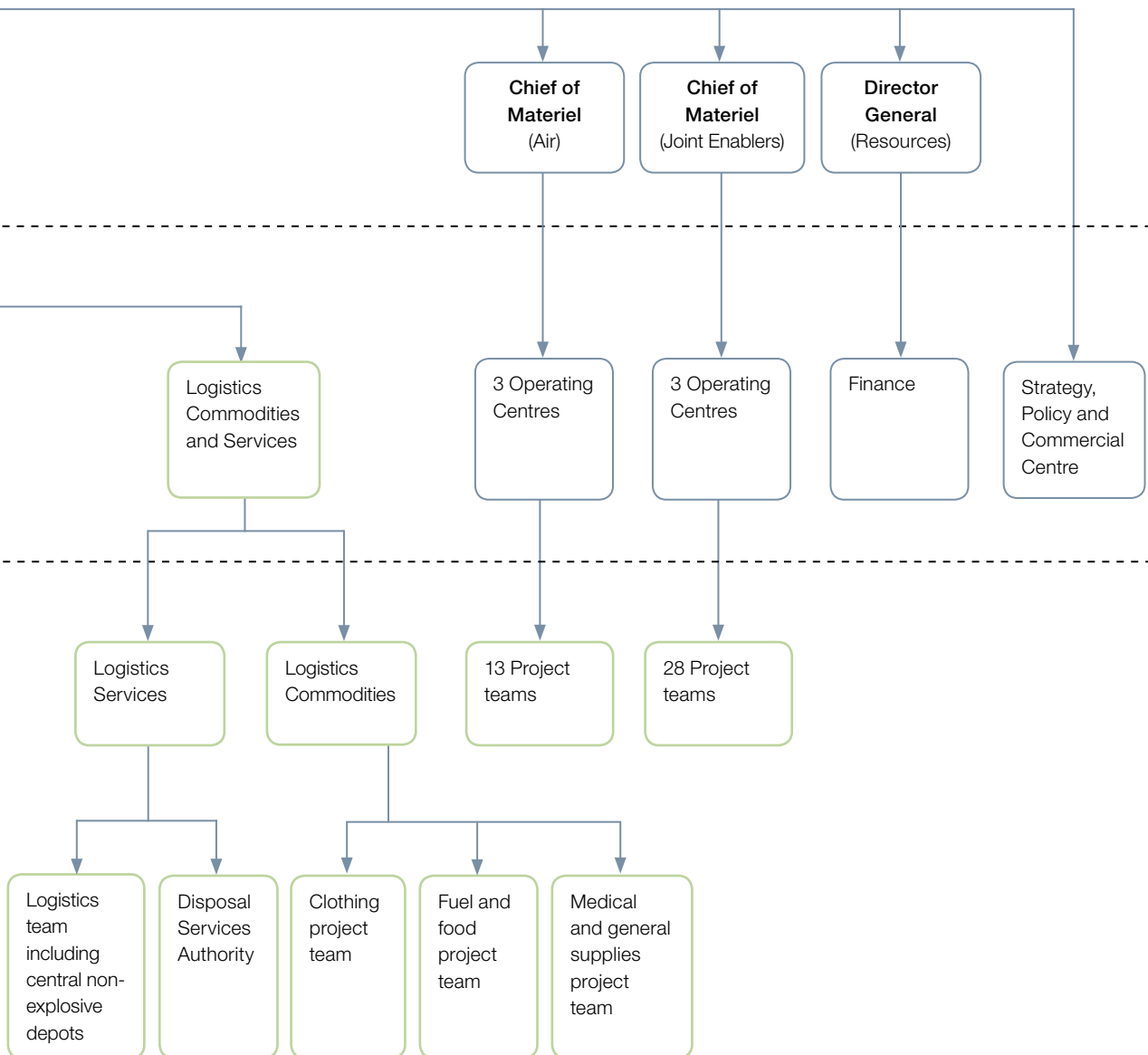
There are a number of teams involved in inventory management

Strategic



Organisations with responsibility for inventory management

Source: National Audit Office analysis of Ministry of Defence documents



**2.4** Industry is also involved with the Department's management of inventory. Traditionally, industry supply and repair inventory items. The Department is, however, increasingly engaging industry to do more, from helping with demand forecasting to being entirely responsible for inventory. These arrangements are being included as part of contractor logistics support contracts, which focus on the support of specific equipment such as the Type 45 destroyer or fast jets and we have reported on some of these contracts in the past.<sup>8</sup> We have not examined contractor logistics support arrangements in detail in this report.

**2.5** This part of our report examines whether the Department has appropriate strategies, targets and support structures to ensure that teams are managing inventory in a coordinated and cost-effective way.

### Inventory management strategy and planning

**2.6** The Department's logistics strategy is focused upon providing support for current and future requirements. It places responsibility for planning and providing those capabilities on the armed forces and on project teams within Defence Equipment and Support. However, there is no overarching assessment that draws together the work of the project teams, and ensures that it is logically coherent and comprehensive, or looks at the overall implications for the size and value of the inventory that the Department needs to retain.

**2.7** The Department's logistics strategy does not directly emphasise that project teams should only buy the quantities required, but this is emphasised within the detailed guidance for project teams. In January 2012 an internal audit report concluded that the project teams focused on short-term risk to asset availability, rather than managing the risk of holding inventory no longer required.

**2.8** The strategy emphasises that the project teams should reduce the inventory holdings where they do not contribute to current operations, standing commitments or defined potential engagements. The strategy adds the constraint that this should only happen where the cost of disposal is not greater than the potential saving. Project teams cannot currently access sufficient robust financial data to allow them to make this assessment.

### Performance targets

**2.9** The Department has set performance targets for each team responsible for inventory management. Defence Equipment and Support and the armed forces agree the targets annually through joint business agreements (**Figure 8**).

<sup>8</sup> Previous reports include: Comptroller and Auditor General, *Ministry of Defence: Providing Anti Air Warfare Capability: the Type 45 destroyer*, Session 2008-09, HC 295, National Audit Office, March 2009; Comptroller and Auditor General, *Ministry of Defence: Transforming logistics support for fast jets*, Session 2006-07, HC 825, National Audit Office, July 2007; and Comptroller and Auditor General, *Ministry of Defence: Management of the Typhoon Project*, Session 2010-11, HC 755, National Audit Office, March 2011.

## Figure 8

### Key targets and costs incurred

**Targets are focused on effectiveness with few targets on efficiency**

Team	Key targets	Costs incurred
Armed forces units	Number of targets on availability of inventory	Storage, distribution and staff costs for the inventory held at armed forces bases.  Cost of inventory that is used.
Project teams	To purchase sufficient inventory to meet armed forces requirements	Purchase cost of inventory and staff costs within the team.
Logistics Services	Delivery to the armed forces, port or airbase within set times depending on priority  Level of inventory available within set times when an item is demanded from central depots	Storage, low-level maintenance, distribution and staff costs for the inventory held at central non-explosive depots.
Defence Munitions	Targets have been defined similar to those for Logistics Services but performance has not yet been reported against them	Storage, low-level maintenance, distribution and staff costs for the inventory held at central explosive depots.  Cost of disposing of explosive inventory, including staff costs.
Disposal Services Authority	Targets focus on contractor performance (e.g. sales and collection times)	Cost of disposing of non-explosive inventory, including staff costs.
Joint Support Chain	Targets for individual improvement projects, for example a 35 per cent reduction in inventory by volume by 2015	Cost of staff within Joint Support Chain, training of staff within Defence Equipment and Support and individual improvement projects.

#### NOTES

- 1 The targets outlined here represent the key measures that are currently being reported in the management information used by Defence Equipment and Support. The Department does have a number of other measures including a stock holding to issue ratio for project teams that are not reported on.
- 2 Defence Munitions report no targets currently as it moved to a new operating centre in April 2011. The operating centre is developing its management information and performance reporting.

Source: National Audit Office analysis of Ministry of Defence documents

**2.10** The targets are focused on ensuring that there is sufficient inventory delivered to the armed forces to meet their demands on a timely basis. The Department has set few targets, however, to monitor how efficiently inventory is being managed. Where these targets do exist, they are not currently reported within the main Defence Equipment and Support management reports on inventory. This encourages over-ordering, as having more inventory is one way to reduce the risk that items are not available when the armed forces need them. A review of munitions in August 2011 recognised that army units deliberately over-order to provide a margin for error. Good performance measures should avoid such perverse incentives, as outlined by the National Audit Office and HM Treasury.<sup>9</sup>

**2.11** Without efficiency targets project teams are less likely to prioritise managing existing inventory, particularly if staff are stretched and the items are not in demand. Consequently the Department has had to set up central projects to encourage project teams to identify items for disposal. Defence Equipment and Support is looking to introduce targets to reduce stock for operating centres and hence project teams.

### Management approach

**2.12** Prior to April 2012, Defence Equipment and Support did not set separate budgets on inventory spending by project teams. Instead inventory spending was included within larger budgets and so there are no specific financial constraints on inventory purchases. Since April 2012, Defence Equipment and Support has introduced separate budgets for inventory expenditure by project teams. This only covers spending on raw materials and consumables. From April 2012 project teams must obtain separate approval from the Director of Resources in Defence Equipment and Support for all purchases more than £0.5 million. Project teams manage the purchases of capital spares or guided weapons, missiles and bombs within a separate budget for capital expenditure.

**2.13** Each of the teams involved with inventory management are responsible for managing only a proportion of the total costs associated with their decisions (Figure 8). There are no incentives for teams to consider the full impact of their decisions across all the other teams. There is a risk that decisions taken by one team may not be the most cost-effective for the Department overall. For example:

- Project teams purchase inventory but do not bear the storage costs. Consequently, there is a risk that they over-order to achieve their targets or negotiate bulk purchase discounts without considering the cost of storage.
- The armed forces may vary their demand during the year from the level specified in the joint business agreement. In 2010-11 the army consumed 18 per cent less ammunition than originally estimated, which equated to a value of £47.6 million. In line with the public spending framework, the Department only charges for inventory that is used, so the armed forces do not bear the additional cost of supplies over-ordered.

<sup>9</sup> HM Treasury, Cabinet Office, National Audit Office, Audit Commission and Office for National Statistics, *Choosing the right fabric: a framework for performance information*, March 2001.



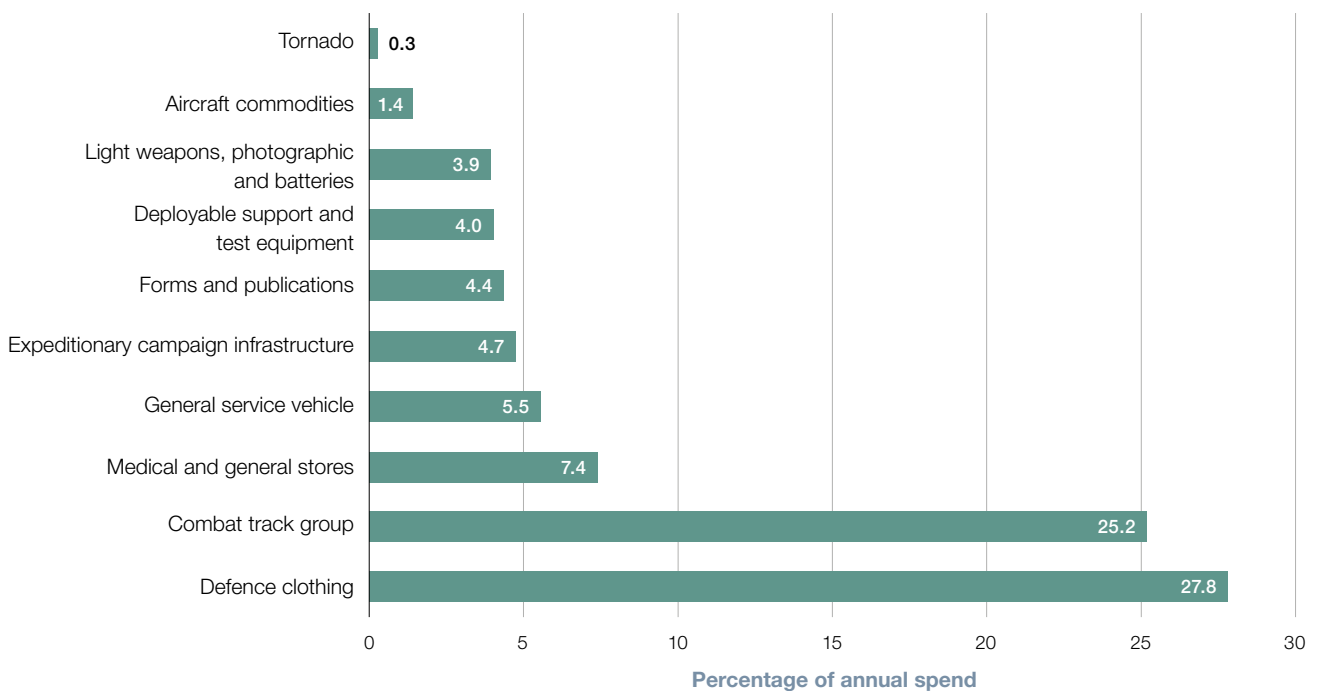
- The armed forces return unused ammunition. It may require inspection and repackaging before it can be re-issued. The cost of this is borne by the central depots. Between April and June 2011, the army returned to the central depot £14.5 million of ammunition needing inspection.

**2.14** Defence Equipment and Support has recently tried to change the purchasing behaviour of project teams by informing them of the cost to Logistics Services of storing the inventory that they order. For this strategy to be effective in influencing behaviour, the costs charged would need to be a noticeable proportion of the project teams' spending. In 2010-11 only two project teams had storage costs equivalent to more than 25 per cent of their spend (**Figure 9**). Other project teams, where storage costs amounted to 7 per cent or less of their overall spending, are not likely to be motivated to reduce stock purchase if charged for storage.

### Figure 9

Costs of storage against total spending, by the ten project teams with the highest storage costs in 2010-11

Project teams may not be motivated to change behaviour if charged storage costs, as they are generally low in proportion to total spend



Source: National Audit Office analysis of Logistics Services invoices to project teams

**2.15** The Department only has information on the costs of inventory management for activities where there are separately identifiable budgets, for example Logistics Services. However, in other cases such as project teams and the armed forces, the inventory management costs are included within larger budgets and not recorded separately. Consequently they do not have access to full cost information, even if they are incentivised to use this in their decision-making.

### Management information and information systems

**2.16** In March 2011, we reported on the shortcomings of the Department's information systems to manage inventory and our concerns over the robustness and availability of the information collated in these systems.<sup>10</sup> We have found similar issues during the course of our work on this report. The Department has acknowledged information gaps and committed significant funds to improving programmes,<sup>11</sup> including:

- the Future Logistics Information Services project, which is intended to bring together and replace a number of legacy inventory management systems; and
- the Management of the Joint Deployed Inventory system which will provide the armed services with a common system for the inventory they hold and manage.

**2.17** Until the Department's projects to improve its information and information systems succeed, the Department's ability to manage its inventory is compromised:

- Senior managers cannot fully understand the inventory position as their information is incomplete. For example, they cannot accurately assess the pressures on storage capacity as volumetric data on systems are inaccurate and incomplete.
- Figures and trends reported may not reflect the actual position (or performance) and so cannot be used without significant caveats, if at all. For example, within Defence Equipment and Support, the monthly management report on inventory includes supplier delivery performance but states that some of the information is incorrect.
- Performance management systems have not been set up so that senior managers can review the fluctuations in the level or value of inventory stored and reveal the underlying reasons.

<sup>10</sup> Comptroller and Auditor General, *Ministry of Defence: The use of information to manage the logistics supply chain*, Session 2010-11, HC 827, National Audit Office, March 2011.

<sup>11</sup> HC Committee of Public Accounts, *The use of information to manage the defence logistics supply chain*, Forty-third Report of Session 2010-12, HC 1202, July 2011.

**2.18** The Department's financial reporting does not help senior management to clearly understand the movements in the value of the inventory holdings. Within Defence Equipment and Support, the monthly senior management report for inventory states the value of the total holdings and the trend for the last 12 months. It does not currently include data on quantity or value of the inventory going into the Department's depots, through purchases and returns, or going out, as issues or disposals. Without such information, senior managers cannot be clear why there are changes in the value of the holdings, and take appropriate action. The Department, however, has introduced bi-annual reviews of the movements in inventory value at the lower operating centre level.

### **Professionally skilled staff**

**2.19** Following a review of inventory management processes in May 2007, Defence Equipment and Support introduced accredited training for its inventory managers. To hold an inventory management post, staff must obtain an appropriate qualification within six months of taking up post. At the end of November 2011, 173 staff (13 per cent of those in post) had not obtained a qualification despite being in post more than six months. A further 348 (20 per cent of posts) were vacant. As Defence staff prioritise supporting operations, the lack of qualified staff, particularly in project teams, means that there may not be scope to improve management practices.

**2.20** There is also a risk that the availability of staff with inventory management skills may be affected by the planned reductions in the Department's workforce. Our recent report on these plans concludes that losing staff with key skills will impact on whether the Department can deliver value for money from its planned savings.<sup>12</sup>

<sup>12</sup> Comptroller and Auditor General, *Managing change in the Defence workforce*, Session 2010–12, HC 1791, National Audit Office, February 2012.

## Part Three

### The Department's plans to improve inventory management

**3.1** The Department recognises the need to improve how it manages inventory and has sought to make changes. This part of our report examines the Department's actions and whether these will be successful.

#### Improvement projects

**3.2** The Joint Support Chain operating centre and the armed forces have initiated a number of improvement projects designed to address weaknesses in inventory management. Most of the projects are designed to improve the management information and information systems, including better forecasting tools, and are still being piloted. Our audit of the Department's annual accounts has confirmed that the stock integrity programme has improved the accuracy of data on inventory, but in the case of the other projects it is too early to see clear impacts. Appendix Two sets out the projects in more detail.

**3.3** Defence Equipment and Support has also made changes to its structure to help improve its inventory management. In 2011, the Department reorganised responsibility for central depot storage within Defence Equipment and Support. For the first time those project teams with the greatest storage requirements have been grouped in the same operating centres as the storage organisations themselves (**Figure 10**). This is expected to improve inventory management, as senior managers in these operating centres will have to plan and manage procurement and storage together. It is too soon for the impact of these organisational changes to be seen.

**3.4** The improvement projects, however, do not address the need to encourage project teams to manage inventory efficiently. Only changes to operating centres and the cost-communication project are designed to change project team behaviour. However, our analysis in Part Two indicates that the cost-communication project is unlikely to be successful in achieving change. Also, the changes in operating centres only cover some of the project teams involved in inventory management.

**3.5** The logistics strategy emphasises the need to reduce current holdings but does not address purchasing behaviour. Without an accountability framework that encourages teams to manage their inventory efficiently, including an appropriate strategy, targets and monitoring arrangements, teams will continue to over-order stock.

**Figure 10**

## Reorganisation of central depot storage teams

Some senior managers are now responsible for both storage and large volume procurement, requiring them to manage both together

Date	New operating centre created	Teams incorporated
April 2011	Weapons Operating Centre	Project teams responsible for procuring munitions. Defence Munitions (storage).
August 2011	Logistics Commodities and Services	Project teams responsible for procuring fuel, medical supplies, clothing and food. Logistics Services (storage).

**NOTE**

1 Before April 2011, Defence Munitions and Logistics Services were together as the Defence Storage and Distribution Agency within the Joint Support Chain operating centre.

Source: Ministry of Defence documents

**3.6** Following a critical report by the Department's Internal Audit and our discussions of informal findings from this report, in February 2012 the Chief of Defence Materiel commissioned a review to address the lack of a strategic plan for inventory management. The review was to set out a plan to prioritise and reduce the inventory held to meet defence priorities and to deliver urgent improvements to establish and sustain more cost-effective inventory. By May 2012 the review had made recommendations to improve inventory management and suggested further work necessary to deliver those improvements. With the exception of previously planned changes to the IT systems, the Department plans to implement those recommendations by March 2013.

**Wider Defence Equipment and Support improvements**

**3.7** Defence Equipment and Support is planning a number of improvements above team level which may address some of the accountability weaknesses. Since May 2011, the Chief of Defence Materiel has been developing a strategy to improve Defence Equipment and Support's effectiveness and efficiency, within the framework set out in Lord Levene's review in June 2011.<sup>13</sup> The strategy sets out possible options for the organisation including managing logistics and the supply chain.

<sup>13</sup> Lord Levene of Portsoken, *Defence Reform – an independent report into the structure and management of the Ministry of Defence*, June 2011.

**3.8** Defence Equipment and Support is already exploring options for more private sector involvement. Outsourcing some or all aspects of inventory management, particularly storage and distribution, is common in the private sector. Its work is in the early stages and considers the activities undertaken by the Logistics Commodities and Services operating centre. The Department will retain responsibility for deciding its inventory requirements. While it has still to carry out a full cost–benefit analysis, the Department expects that outsourcing may deliver savings and improve management of this area. As part of its internal approval process the Department has recognised that it does not yet have a comprehensive approach to enable it to achieve value for money from outsourcing. It has said that the project must demonstrate improved value for money over an in-house benchmark before considering the case further in autumn 2012.

### **Strategic change in the Department and Defence Equipment and Support**

**3.9** In response to the *Strategic Defence and Security Review*<sup>14</sup> in October 2010 and Lord Levene's review, the Department plans a number of transformation projects. These include introducing a new operating model in April 2013. This will set out a customer–supplier relationship between the armed forces and Defence Equipment and Support. The Department's objective is to strengthen decision-making and accountability by holding the heads of the armed forces to account for providing the forces that Defence needs within budget.

<sup>14</sup> HM Government, *Securing Britain in an Age of Uncertainty: The Strategic Defence and Security Review*, Cm 7948, October 2010.

# Appendix One

## Methodology

Methods	Purpose
<p><b>Semi-structured interviews</b></p> <p>We interviewed staff in the Department, armed forces and Defence Equipment and Support responsible for managing inventory.</p>	<p>To collect the views of those involved in inventory management.</p> <p>To identify key issues as well as examples of good practice.</p>
<p><b>Document review</b></p> <p>We reviewed a range of key Departmental documents including strategies and improvement plans.</p>	<p>To examine how inventory management works, to identify key issues and determine the Department's improvement plans.</p>
<p><b>Inventory data analysis</b></p> <p>We analysed the Department's inventory data including inventory holdings and performance against targets.</p>	<p>To determine trends on inventory size and value.</p> <p>To get an overall view of the Department's performance in managing inventory.</p>
<p><b>Case study analysis</b></p> <p>We examined the inventory management practices of project teams for a selected number of items.</p>	<p>To gather examples about how the Department manages its inventory.</p>
<p><b>Site visits</b></p> <p>We visited depots in the UK and Germany.</p>	<p>To develop our understanding of the day-to-day inventory management.</p>
<p><b>Good-practice panel and expert advisors</b></p> <p>We organised a good-practice panel, which included an academic, a consultant and a private sector practitioner.</p>	<p>To confirm our conclusions and recommendations on inventory management.</p>
<p><b>Inventory management good practice comparators</b></p> <ul style="list-style-type: none"> <li>• We commissioned Deloitte to identify good practice in inventory management for organisations with supply chains in difficult environments or volatile demand.</li> <li>• We interviewed Toyota Motor Europe and BAE Systems.</li> <li>• We reviewed literature on inventory management.</li> </ul>	<p>To enhance our understanding on inventory management good practice.</p> <p>To understand what complexities and issues other organisations face when managing their inventory and how they deal with those.</p>

## Appendix Two

### The Department's improvement projects

Project	Intended impact	Reported results to date
New inventory management tools and algorithms	Improve forecasting of future order quantities by project teams through new tools and computer algorithms	New models currently in pilot phase with results not yet reported  Wider campaign to raise awareness of new algorithms and data modelling techniques to project teams
New IT systems	New information systems to manage inventory	Gradual roll out of new systems over the next few years. The Department has contracted a key part, Future Logistics Information Services, with Boeing in December 2010
Stock integrity programme	Improve accuracy of information in the inventory and warehouse systems through means including training warehouse staff and revised processes, governance and stock taking	One of the qualifications of the annual accounts on inventory, on whether items on the inventory systems existed, was removed in 2010-11 as a result of improvements
Cost communication	Make project teams aware of cost of storing non-explosive inventory in the central depots	Cost model developed on the costs of central depots. Pilot run in 2010-11 on charging project teams for storage based on their level of holdings  Costs communicated to all project teams with non-explosive holdings from April 2011 but no hard charging as yet



National Audit Office assessment	Start date	Completion date	Strategy and overarching planning	Management approach and performance targets	Management information and Information Systems
<p>Current forecasting models are not adequate and need replacing. If the new models are effective, they will provide more accurate information on which to base purchasing decisions</p>	May 2007	Ongoing			●
<p>Existing information systems are inadequate. Our previous report found that the Department has initiated a number of IT projects and has since allocated further funding. However the new IT systems will only be effective if they hold accurate and complete information</p>	September 2008	December 2014			●
<p>The Department has made clear progress in improving the accuracy of information required for the annual accounts</p>	April 2009	March 2014			●
<p>The magnitude of the costs communicated to project teams may be insufficient to influence their decision-making on inventory purchases</p>	April 2010	Ongoing		●	●
<p>Some of the costs are also estimates, due to the current limitations on data</p>					

*continued overleaf including key*

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<b>Project</b>	<b>Intended impact</b>	<b>Reported results to date</b>
Joint Support Chain Control Point Project	Control inflow of inventory by improving the quality of information available to decision-makers	A number of exercises being performed including development of a cost model and remeasurement of inventory holdings to improve volumetric data  Data not yet being used in day-to-day decision-making
Optimised Support Planning Pilot	Testing new planning process between the army and project teams to improve equipment availability, including the piloting of new computer tool	Report on pilot was due in March 2012

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National Audit Office assessment	Start date	Completion date	Strategy and overarching planning	Management approach and performance targets	Management information and Information Systems
The project is seeking to improve the accuracy, completeness and availability of information for inventory management. However it is being constrained by the current limitations on the information available and the information systems	March 2011	Ongoing			●
The project has the potential to improve the coordination and planning between the army and project teams, but the Department recognises that associated changes in behaviour are required to achieve success	June 2011	March 2012			●

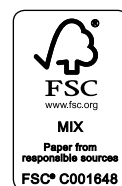
**Key: National Audit Office assessment of projects against the areas they seek to address**

- Project is addressing a known weakness but there are significant concerns over the long-term success of the project
- Project not yet showing clear signs of progress, but approach is addressing a known weakness or there has been clear progress but there are risks to success
- Known weakness is being addressed and there are clear signs of progress

**NOTES**

- 1 The armed forces are also doing work internally, with input from project teams, to improve their planning processes.
- 2 The Joint Support Chain operating centre is also running projects to identify inventory for disposal.

Source: Ministry of Defence documents



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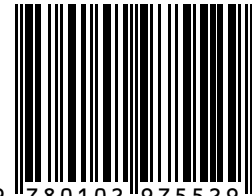
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