National Audit Office

REPORT

Defence inventory management

Ministry of Defence

SESSION 2022-23
13 SEPTEMBER 2023
HC 1793

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National Audit Office

Defence inventory management

Ministry of Defence

Report by the Comptroller and Auditor General

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Gareth Davies
Comptroller and Auditor General
National Audit Office

6 September 2023

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CORRECTION SLIP

Title: Defence inventory management

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Correction one:

The paragraph currently reads:

Page 4, Key facts:

740 million

individual items of inventory held by the MoD

Text should read:

Around 460 million

individual items of inventory held by the MoD

Correction two:

The paragraph currently reads:

Page 5, Summary, paragraph 1:

The Ministry of Defence (MoD) holds more than 640,000 types of inventory and more than 740 million individual items at a net book value of £11.8 billion

Text should read:

The Ministry of Defence (MoD) holds around 520,000 types of inventory and around 460 million individual items at a net book value of £11.8 billion.

Correction three:

The paragraph currently reads:

Page 15, paragraph 1.2:

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Text should read:

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Date of correction: 15 March 2024

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Key facts

£1.5bn

the amount the Ministry of Defence (MoD) spent buying inventory in 2022-23

£11.8bn

the net value of the MoD's inventory at 31 March 2023

£2.5bn

how much the MoD estimates it will spend on the digital transformation of its Support function

89	number of legacy logistics information systems that the MoD currently maintains
75%	approximate proportion of central warehousing space which is full
Around 460 million	individual items of inventory held by the MoD
53	the average age of logistics staff
105,500m^3	volume of items not currently fit for use in central warehouses

Summary

1 The UK's armed forces require a wide range of supplies and spares for immediate and potential use; these are described collectively as 'inventory'. The Ministry of Defence (MoD) holds around 520,000 types of inventory and around 460 million individual items at a net book value of £11.8 billion. It spent £1.5 billion buying inventory in 2022-23. This inventory falls into three categories: Guided Weapons, Missiles and Bombs (GWMB), Capital Spares, such as wheels and windscreens, and Raw Materials and Consumables (RMC). Managing this inventory is a complex and dynamic task, as the MoD must support a wide range of operations and training exercises across the globe and must be responsive to where these may place sudden demands for items.

2 Several organisations contribute to the management of MoD's inventory. The key organisations include:

- **Defence Support**, an organisation within UK Strategic Command, led by the Chief of Defence Logistics and Support (CDLS).
    - Defence Support is responsible for the central policy and coordination of Support activities, which includes the logistics, engineering and equipment support (including inventory management) needed to maintain military capability.
    - It also oversees the Support function – the community of professionals who carry out Support activities across all of MoD's organisations;
- **Defence Equipment and Support (DE&S)**, an arm's-length body of the MoD responsible for delivering equipment and support services to the armed forces.
    - DE&S is responsible for the central warehousing and logistics of MoD's inventory, supported by its industry partner **Team Leidos** through the **Logistics Commodities and Services Transformation (LCST)** contract. Team Leidos also procures some RMC commodities on behalf of MoD.[1]
    - Delivery teams within DE&S carry out demand and supply planning, financial accounting and disposal management, among other activities, for the inventory needed to maintain equipment platforms such as ships, aircraft and armoured vehicles. Delivery teams may contract out certain aspects of this role to industry partners to carry out on DE&S's behalf;

1 Team Leidos is a consortium composed principally of Leidos Europe, Leidos Supply, Kuehne and Nagel and TVS Supply Chain Solutions.

- **Front Line Commands (Commands)**, such as the Army, Royal Navy, the Royal Air Force (RAF) and UK Strategic Command.
    - Commands are responsible for their inventory demand planning, as well as the storage and distribution of inventory within their bases and at deployed locations; and
- other Defence organisations such as the Submarine Delivery Agency, the Defence Infrastructure Organisation and Defence Digital (a business unit of UK Strategic Command) also manage certain types of inventory for their own use.

3 The objective of inventory management is to balance the risk of having insufficient inventory to support operational capabilities with the costs of holding it. The optimal level to hold will change over time, and the MoD is currently reappraising the levels of inventory it holds, as well as how it engages with industry to supply it. In its Supply Chain Strategy, the MoD set out how it believes that its approach to inventory management currently overemphasises attempting to reduce cost over other factors, such as resilience and performance, particularly in light of increasing global instability.[2] Events such as the war in Ukraine and the COVID-19 pandemic have demonstrated that supply chains optimised for cost savings can be vulnerable where sudden surges in demand or disruptions to supply emerge. To address these challenges, the MoD intends to improve its Support function to be "resilient by design" and ensure that it has the people and equipment it needs in the right places, able to deploy quickly and efficiently. It calls this "support advantage".

4 However, the MoD's inventory management has many long-standing weaknesses, which we have reported on before. In our 2012 report, *Managing the Defence Inventory*, we found that the MoD was buying more inventory than it was using and was not consistently disposing of inventory it no longer needed.[3] The MoD's management structures for inventory management did not encourage efficient or effective management of inventory and did not incentivise individual teams to consider the impacts of their decisions across the department. This work built on our 2011 report, *The use of information to manage the logistics supply chain*, which examined the weaknesses in the information the MoD uses to manage its inventory, including the risks posed by its legacy IT systems.[4] These challenges present obstacles to the MoD's ambitions, and while the MoD has acknowledged these issues and put in place improvement initiatives since these reports, many have still not been fully resolved. In the Integrated Review, the government envisaged a greater deployed presence for the armed forces, which will place an additional burden on effective inventory management.[5]

2 Ministry of Defence, *Defence Supply Chain Strategy*, November 2022 (viewed 7 September 2023).
3 Comptroller and Auditor General, *Managing the Defence Inventory*, Session 2012-13, HC 745, National Audit Office, June 2012.
4 Comptroller and Auditor General, *The use of information to manage the logistics supply chain*, Session 2010–2012, HC 1202, National Audit Office, March 2011.
5 Cabinet Office, *Global Britain in a competitive age: the Integrated Review of Security, Defence, Development and Foreign Policy*, CP 403, March 2021 (viewed 7 September 2023).

5 To achieve its future ambitions, the MoD has published a Support Strategy, which sets out its vision for what it wants the Support function to be in the future and why change is necessary.[6] This is supported by a plan of activities across the Support function including organisational and digital transformation programmes. The MoD has identified the characteristics that it wants the Support function to demonstrate by 2035. These characteristics, and how we would expect MoD to demonstrate them in its inventory management, are listed below.

- **'Integrated and interoperable'**: inventory management processes are applicable across the MoD and decisions are made with an end-to-end perspective that meets the needs and aims of the whole service.
- **'Information led'** and **'technology enabled'**: these two characteristics enable inventory management systems to provide access to accurate, timely and relevant management information to support decision-making.
- **'Resilient, effective and efficient'**: the organisation of inventory management across MoD is set up to meet its strategic judgements of what optimal inventory levels are, reflecting the operational balance of these three considerations.
- **'People centric'**: inventory management is supported by enough people with the right skills and training to carry out their roles.

Scope of our report

6 Our report examines whether the MoD is achieving value for money in the management of its inventory, with reference to the issues we have found in our previous work. To do this, we evaluate the extent to which the MoD has addressed its long-standing challenges with its inventory management and assess how well set up it is to achieve its future strategic ambitions set out in its Support and Supply Chain strategies. Our scope includes the work of the whole department, including its constituent bodies, as inventory management functions are carried out by many different organisations.

6 Ministry of Defence, *Defence Support Strategy Overview*, April 2022 (viewed 7 September 2023).

7 Our report is in two parts:

- Part One examines the strategic context and structure of the MoD's inventory management, and the systemic issues and challenges that the MoD encounters across its inventory management. We then examine the transformation initiatives that the MoD has put in place to overcome these challenges and meet its strategic ambitions for inventory management.
- Part Two examines how these issues and challenges affect inventory management in practice, through a series of specific examples, such as the management of the MoD's medical inventory and RMC commodities; how it identifies and disposes of inventory it no longer needs; and the inventory-related challenges of supporting equipment platforms. Through our fieldwork, we have found that these examples most clearly illustrate the consequences of the MoD's approach to inventory management.

Key findings

8 **The MoD has historically taken a siloed approach to inventory management, resulting in a fragmented organisation which is difficult to align to its strategic goals. It has put in place measures to address this, but challenges remain.** The MoD's inventory management is dispersed among many different organisations, with no one individual owner of the end-to-end activity. Individual Commands traditionally managed their own inventories, and separately developed their own policies, processes and ways of working. The MoD's own assessment is that there has been no overarching system design, creating a complex landscape with inefficient working practices. This makes it challenging for the MoD to cohere around strategic objectives or scale up improvements and good practice where they emerge locally. In 2019, the MoD established Defence Support, led by CDLS, to oversee the Support function to introduce a common purpose and standards for Support activities, including inventory management. However, in common with other functions across the MoD, there are conflicting incentives around what the Support function is trying to achieve compared with the individual Commands and other MoD organisations. This means in practice that the Support function does not have levers to direct these organisations and acts only as a representative for these activities, relying on influencing and engagement to achieve its strategic aims (paragraphs 1.9 to 1.12).

9 The MoD has been slow to upgrade its legacy IT estate, and its inventory data still have limitations which undermine its ability to make effective decisions. The MoD manages inventory management information and processes across multiple bespoke systems in different organisations, embedding the variations in working practice between them. Many of these systems are old, increasing the risks of failure and the expense of supporting them. For example, each Command operates its own core inventory management system, two of which are nearly 40 years old. Systems often cannot easily communicate with each other, requiring inefficient manual interventions. This makes data too inaccessible to easily generate an overarching picture of the inventory. While the MoD can account for its inventory with sufficient accuracy to support financial controls and reporting, some aspects of data quality are poor, and system limitations sometimes prevent information from being useful enough to fully understand the inventory and support effective decision-making. For example, the Navy's inventory system can record that an item is damaged but not to what extent, making it difficult to know what could be repaired. The MoD reduced the number of logistics support systems it uses from around 250 to 89 between 2010 and 2022. While this has realised some local benefits, its data remain siloed and difficult to access across the MoD, preventing its inventory management being fully information-led. It is currently seeking to rationalise and modernise its information systems further, such as through its Business Modernisation for Support Programme (paragraphs 1.13 to 1.16, Figure 2).

10 The MoD's outsourcing has generated improvements in its logistics and commodity procurement, including financial benefits. In 2015, the MoD entered the 13-year LCST contract with Team Leidos. The contract covers the central warehousing and distribution of much of MoD's inventory as well as the procurement and management of around £300 million of commodities per year. Through the LCST contract, the MoD has rationalised and modernised parts of its estate and organisation and gained access to industry knowledge and modern information systems. Team Leidos has also responded flexibly to operational demands, such as supporting operations in response to the COVID-19 pandemic and the gifting of items to Ukraine. At the point of awarding the contract, the MoD forecast that it would achieve net cash savings of £467 million over its life through efficiencies in logistics, commodity purchasing and management. Overall, Team Leidos has performed well against contractual performance targets for inventory management, and the MoD acted to protect the financial benefits of the contract through negotiating a reset in 2021. The benefits achieved through the contract are affected by the scope of MoD's activity and demand, and as of May 2023, Team Leidos forecasts that the contract will achieve £403 million of savings over its life, against its current target of £369 million. The MoD's requirements have changed over time, and it is now looking at how it could reinvest savings it achieves into improving resilience and sustainability (paragraphs 1.17 to 1.20).

11 The MoD's design of the LCST contract did not account for the specific needs of medical customers and there have been problems since the contract began in 2015. Within the LCST contract, the measurement of Team Leidos's performance in supplying medical inventory is combined with that of all commodities, as well as the contract's focus on cost efficiency. However, Team Leidos's performance in supplying certain medical inventory has been consistently lower than for other commodities. Medical inventory also requires higher levels of stock availability and performance because the loss of single specific items can prevent treatments going ahead, something that the MoD did not consider when it let the contract in 2015. This means that despite Team Leidos meeting the terms of the contract, Commands have experienced issues such as a lack of availability of items, even for demands placed months in advance, and items without sufficient shelf life being supplied for long deployments. This has led to Commands carrying increased operational risk on deployments and/or sourcing missing inventory items from elsewhere. The MoD did not set up the contract to manage medical equipment approaching the end of its useful life effectively, and it can take years for safety clearances of new equipment to complete. In 2019 the MoD and Team Leidos began implementing improvement initiatives but these did not deliver sufficient change to fully address these issues. In June 2023, the MoD approved a proposal from Team Leidos to segment medical inventory in the contract and increase its number of staff with medical expertise. Team Leidos expects to fully implement this in 2024 (paragraphs 2.3 to 2.7).

12 While the MoD has removed the financial incentives for over-purchasing, weaknesses in its management of commodities remain. Since our last report, the MoD has removed the financial incentives which encouraged Commands to over-purchase commodities, where Commands were charged only for their use. Since our last report, it has put in place a new financial framework, through which Commands are charged for items on purchase. The amount of RMC it purchases annually has fallen from £2.1 billion in March 2011 to £1.1 billion in March 2023, with its RMC holdings falling from a net value of £7.7 billion to £4.1 billion in the same period. However, the MoD told us there is a risk that its financial framework does not incentivise keeping its war reserve items up to date, as it does not provide financial cover where these items expire. We also found that new management arrangements put in place to control the demand and consumption of commodities were not consistently adhered to. This is in part because Command commodity managers lack all the information needed to scrutinise their commodity purchases and stockpiles. This creates inefficiencies where Commands may purchase the wrong type of commodity or must make expensive rapid purchases when shortfalls arise. Defence Support told us that it has not been resourced to perform its intended role of overseeing management arrangements for RMC (paragraphs 2.8 to 2.12, Figure 6).

13 The MoD has identified inventory shortages as one of many contributory factors to a lack of readiness. However, the complexity of its arrangements for supporting equipment platforms makes it difficult to address these shortages. The MoD is not satisfied with the level of readiness across its units and is investigating how it can improve this. Inventory is one of many factors which affect the readiness of a unit, particularly its availability – how many units can be used, and for how long. At present the MoD assesses that a lack of inventory contributes to a small proportion of availability losses compared with other factors, such as pilot or crew shortfalls, and the level and kind of equipment maintenance needed. However, its inventory arrangements are varied and complex and will need to be optimised to contribute to improvements in readiness. Many parts are bespoke and cannot be used interchangeably by different equipment platforms, and where they can be, this can create complex interdependencies between delivery teams relying on each other to secure items. Some platforms also rely on cannibalisation, where spare parts are taken from platforms in maintenance or storage, to meet their required level of availability. This approach will become less feasible if more platforms are put into use. The MoD does not have good management information for understanding how different factors affect readiness and the complex ways they can interact. It has begun work to better understand which factors affect readiness and to what degree, and to generate better metrics for this purpose (paragraphs 2.21 to 2.24).

14 The MoD does not consistently dispose of inventory that it no longer requires and this has resulted in large build-ups of excess and obsolete stock in warehouses. We reported in 2012 that the MoD was not consistently disposing of inventory it no longer required, resulting in large build-ups of surplus and obsolete inventory in warehouses, and this remains the case today. The MoD also holds increasing amounts of items classified as unserviceable – not currently fit for use. While the MoD recognises the problem as significant, it is not able to quantify the scale of the problem across its whole estate. However, in April 2023 its 584,000 m^3 of LCST-managed central warehousing was at 75% capacity, and the MoD held items occupying 115,700 m^3 (20%) which were marked as overstocked, 105,500 m^3 (18%) marked as unserviceable, and 7,200 m^3 (2%) marked as past their out of service date. Not all of this inventory will necessarily require disposal, as understanding what inventory should be disposed of is complex and requires judgement. For example, where the MoD holds inventory from platforms which have gone out of service, these items may have uses for other platforms, or there may be opportunities for sale to other governments. Some overstocked items may also be held as contingent stock and only used in certain infrequent scenarios. Nonetheless, the build-up of potential disposals places pressure on scarce warehouse space and the ability to increase inventory levels where needed strategically (paragraphs 2.13 to 2.15).

15 The MoD has put in place short-term initiatives to improve disposals activity, but it does not have a coherent plan to address disposals across all of its holdings. Delivery teams in DE&S are responsible for decision-making in consultation with the Commands and must identify and authorise disposals for warehouse staff to carry out. DE&S told us that staff resourcing is a challenge for many delivery teams, who prioritise support to the front line over disposals as a result, and limited capacity to action disposals was written into the LCST contract initially. Delivery teams are not incentivised to free up space by actioning disposals, as they are not charged for warehouse storage. This means the MoD has to periodically supplement its disposals activity with short-term projects. The MoD currently has three projects: one through the LCST contract to address the backlog of disposals within LCST-managed warehouses, as well as two others to identify potential inventory disposals within the RAF and the Navy. However, these projects are inconsistent in their scope, methods and duration, and only one has developed into an enduring process. Unless the MoD can create consistent disposals processes across all its warehouses, the need for short-term projects to deal with problems when they arise will persist (paragraphs 2.16 to 2.19, Figure 7).

16 The MoD does not fully understand the people and skills it needs across its inventory management, and staffing pressures are currently posing risks to delivery to the front line. Under-resourcing was cited by MoD staff as a key root cause of many of the specific issues we encountered in inventory management. The inefficiency of working practices and the training requirements imposed by bespoke IT systems exacerbate these challenges. The MoD does not have a comprehensive understanding of the Support workforce, as the MoD's various organisations manage their workforces separately and data were not previously available to analyse centrally. However, analysis of 2022 staff data indicates that the civilian logistics workforce is relatively old compared with other MoD professions, at an average age of 53, compared with 47 in other areas, and 49% of staff who left post did so for retirement. DE&S told us that it has reduced the number of inventory manager posts over time in response to workforce reduction targets, but that it is difficult to understand its true resource requirement as it has not produced definitive data on the level of staffing it might need. Training for inventory managers has also become outdated. Without a more detailed understanding of the roles it requires and where it has gaps, the MoD cannot understand what risks it currently holds in its staffing of the Support function (paragraphs 1.24 to 1.26).

17 The MoD has established transformation programmes to address its challenges, although these face risks from shortages of people at the outset which threaten their success. To overcome its historical weaknesses, and support the delivery of the Defence Support Strategy, the MoD is implementing several transformation and change initiatives, including two transformation programmes. Business Modernisation for Support (BMfS) is a £2.5 billion pan-Defence business change programme which aims to upgrade Support's legacy IT estate and implement a set of standardised processes based on industry best practice. The Future Defence Support Services programme aims to identify the best commercial arrangement to support commodity procurement and inventory management once the LCST contract ends in 2028. There are inherent challenges in delivering large digital and business transformation, which government has struggled with in the past. Both programmes have adopted good principles in understanding the organisational change they wish to achieve, particularly in improving the quality and consistency of working practices and data, and in aligning MoD's commercial arrangements to the same strategic objectives. However, both programmes have staffing gaps at their early stages, which will affect their ability to refine and deliver their scopes. They will also require support from the Commands and other Defence organisations to succeed, as they must change their working practices and train their staff (paragraphs 1.21 to 1.23, Figure 3 and Figure 4).

Conclusion on value for money

18 The MoD manages a vast inventory worth £11.8 billion across a complex and dispersed enterprise. Growing global instability, and the greater deployed presence envisaged in the Integrated Review, are making it ever more important that the MoD has the inventory it needs, in the right places and amounts. While the MoD has taken steps to improve its logistics and commodity procurement, and removed financial incentives for over-purchasing, many long-standing weaknesses with its inventory management remain. These include its inefficient and poorly aligned activities and ageing legacy IT, which it has been slow to address. These weaknesses stand in the way of the MoD's ambitions for inventory management set out in its Support Strategy. As a result, despite some improvements, the MoD is not yet set up to deliver value for money from its inventory management.

19 The MoD has started a number of transformation initiatives which provide opportunities to move towards realising effective, efficient and resilient inventory management. However, the scale of the change needed is substantial. If MoD does not prioritise the required resources to do this, it will frustrate its ability to build resilience and deploy the people and equipment it needs in the right places. It will also lose the opportunity to reduce waste and achieve cash savings or release resources for other priority expenditure.

Recommendations

20 To address its long-standing challenges in inventory management and successfully deliver its transformation initiatives, we recommend that the MoD:

a defines the levels of inventory needed to support its new strategic aims, and develops an understanding of what arrangements are needed to support these, and the barriers to achieving them;

b ensures that a management framework for raw material and consumable commodities is in operation, which controls demand and consumption, incentivises the upkeep of reserve items, and is supported by appropriate management information and tools;

c draws together the best practice from its current projects to identify surplus inventory, supported by a coherent plan covering its whole inventory estate. It must also ensure this approach is brought into its future inventory management outsourcing;

d develops an assessment of the skills and resources its needs across inventory management, whether current resourcing levels are sufficient to meet these, and what resourcing risks it is carrying in its current and future operations; and

e identifies and prioritises the resources it needs within Defence Support and across MoD's constituent organisations to ensure its transformation programmes can be implemented successfully to deliver the available financial and operational benefits.

Part One

Challenges in inventory management

1.1 This part examines the strategic context within which the MoD sits, the structure of the MoD's inventory management, and the systems and data it uses to manage its inventory. We then examine the transformation initiatives that the MoD has put in place to overcome its long-standing weaknesses in inventory management and meet its future strategic ambitions.

Inventory

1.2 The UK's armed forces require a wide range of supplies and spares for immediate and potential use; these are described collectively as 'inventory'. The Ministry of Defence (MoD) holds around 520,000 types of inventory and around 460 million individual items at a net book value of £11.8 billion. It spent £1.5 billion buying inventory in 2022-23. This inventory falls into three categories:

- Capital Spares – these are items used for repairing, enhancing or converting a larger equipment platform, such as wheels, rotary wings, and windscreens. Capital spares also covers other low value items, such as tents or stretchers, which the MoD can issue and then reuse, that is, they are not single-use.
- Raw Materials and Consumables (RMC) – this includes items such as munitions, food, clothing, medical supplies and fuels.
- Guided Weapons, Missiles and Bombs (GWMB) – explosive inventory used in operations and training.

Managing this inventory is a complex and dynamic task, as it must support a wide range of operations and training exercises across the globe and must be responsive to sudden demands for items. **Figure 1** overleaf shows a snapshot, at November 2022, of the training and operational locations the MoD must provide inventory to through its supply chain.

Figure 1

The Ministry of Defence's (MoD's) global supply chain, November 2022

The MoD moves inventory to support operations and training across the globe

Note

1 Locations and movements are indicative.

Source: Reproduction of map from Ministry of Defence Supply Chain Strategy

1.3 In managing its inventory, the MoD must balance the risk of having insufficient inventory to support operational capability with the costs of holding it. The optimal level to hold will change over time and vary between items, based on factors such as frequency of use, the likelihood of surges in demand, and how quickly suppliers can provide more stock. For the MoD the optimum level ultimately depends on its strategic objectives and the so-called 'demand signal' for inventory that these objectives create.

1.4 In its 2022 Supply Chain Strategy, the MoD sets out how it believes that its approach to inventory management currently overemphasises attempting to reduce cost over other factors, particularly in light of increasing disruption to global supply chains.[7] Its previous approaches were appropriate for an environment of relative stability which allowed for 'lean' and 'just in time' approaches to inventory management to become dominant. However, recent events such as the war in Ukraine and the COVID-19 pandemic have demonstrated that these approaches can be vulnerable where sudden surges in demand or shocks to supply emerge. In response, the MoD has changed its strategic objectives for inventory management. Its Supply Chain Strategy sets out its intention to balance objectives of cost reduction alongside those of effectiveness and resilience, while also considering the environmental sustainability of its decisions.

1.5 Realising these goals will require a re-assessment of the optimum level of inventory holdings, as well as how industry is engaged to supply it. While some items may be readily supplied and restocked and can therefore be held in smaller amounts, others require more intensive management to ensure suppliers can manage the lead times needed to resupply them. The MoD may need to increase industry's ability to resupply by investing in its ability to increase its production capacity at pace, as well as take a more collaborative approach with industry to address problems as they arise. The MoD has put in place a Supply Chain Capability programme to improve relationships with industry and provide supply chain monitoring tools for this purpose. The MoD is not alone in considering this; other militaries across the world are also re-examining their inventories, and how to ensure greater resilience in their industrial base. Many are also looking at onshoring supply to secure production when, for example, militaries across the world may demand the same items.

7 Ministry of Defence, *Defence Supply Chain Strategy*, 15 November 2022 (viewed 7 September 2023).

1.6 Generating greater efficiency, effectiveness and resilience also requires an organisation to be more agile and flexible meeting its goals. In 2022, the MoD published its Defence Support Strategy, which sets out five characteristics for its Support activities, including inventory management.[8] These characteristics, and how we would expect the MoD to demonstrate these in its inventory management, are as follows:

- **'Integrated and interoperable'**: inventory management processes are applicable across the MoD and decisions are made with an end-to-end perspective that meets the needs and aims of the whole service;
- **'Information led'** and **'technology enabled'**: inventory management systems provide access to accurate, timely and relevant management information to support decision-making;
- **'Resilient, effective and efficient'**: the inventory management enterprise is set up to meet the MoD's strategic judgements of what optimal inventory levels are, reflecting the operational balance of these three considerations; and
- **'People centric'**: inventory management is supported by enough people with the right skills and training to carry out their roles.

1.7 The MoD's inventory management has many long-standing weaknesses, which we have reported on before. In our 2012 report, *Managing the Defence Inventory*, we found that the MoD was buying more inventory than it was using and was not consistently disposing of inventory it no longer needed.[9] The MoD's management structures for inventory management did not encourage efficient or effective management of inventory and did not incentivise individual teams to consider the impacts of their decisions across the department. This work built on our 2011 report, *The use of information to manage the logistics supply chain*, which examined the weaknesses in the information the MoD uses to manage its inventory, including the risks posed by its legacy IT systems.[10]

1.8 These challenges present obstacles to the MoD's ambitions, and while the MoD has acknowledged these issues and put in place improvement initiatives since these reports, many have still not been fully resolved. In the Integrated Review, the government envisaged a greater deployed presence for the armed forces, which will also place an additional burden on effective inventory management.[11] In this report, we evaluate the extent to which the MoD has addressed the weaknesses we identified, and how well set up it is to meet its new strategic ambitions for its inventory management.

8 Ministry of Defence, *Defence Support Strategy Overview*, April 2022 (viewed 7 September 2023).
9 Comptroller and Auditor General, *Managing the Defence Inventory*, Session 2012-13, HC 745, National Audit Office, June 2012.
10 Comptroller and Auditor General, *The use of information to manage the logistics supply chain*, Session 2010–2012, HC 1202, National Audit Office, March 2011.
11 Cabinet Office, *Global Britain in a competitive age: the Integrated Review of Security*, Defence, Development and Foreign Policy, CP 403, March 2021 (viewed 7 September 2023).

The structure of inventory management

1.9 Several different organisations across the MoD contribute to inventory management:

- **Defence Support**, an organisation within UK Strategic Command, led by the Chief of Defence Logistics and Support (CDLS).
    - Defence Support is responsible for the central policy and coordination of Support activities, which includes the logistics, engineering and equipment support (including inventory management) needed to maintain military capability.
    - It also oversees the Support function – the community of professionals who carry out Support activities across all of MoD's organisations;
    - **DSCOM (Defence Supply Chain Operations and Movements)** is a directorate of Defence Support, responsible for moving inventory and personnel between the UK and overseas deployed forces.
- **Defence Equipment and Support (DE&S)** an arms-length body of the MoD responsible for delivering equipment and support services to the armed forces.
    - DE&S is responsible for central warehousing and logistics of MoD inventory, supported by its industry partner **Team Leidos**, through the **Logistics Commodities and Services Transformation (LCST)** contract. Team Leidos also procures some RMC commodities on behalf of MoD.
    - Delivery teams within DE&S carry out demand and supply planning, financial accounting and disposal management for the inventory needed to maintain different equipment platforms, such as ships, aircraft and armoured vehicles. These teams may also be supported by industry partners who maintain equipment on the MoD's behalf.
- **Front Line Commands (Commands)**, such as the Army, the Royal Navy, the Royal Air Force (RAF) and UK Strategic Command.
    - Commands are responsible for their inventory demand planning, as well as storage and distribution at unit level within bases and deployed locations.
    - Commands also have their own industry partners for logistics and warehouse management for some of their bases.
- Other Defence organisations such as the Submarine Delivery Agency, the Defence Infrastructure Organisation and Defence Digital (a business unit of UK Strategic Command) also manage certain types of inventory for their own use.

1.10 The MoD's inventory management is dispersed among these different organisations, with no one individual owner of the end-to-end activity. Individual Commands have traditionally managed their own inventories, and separately developed their own policies, processes and ways of working. The MoD's own assessment is that there has been no overarching system design, creating a complex landscape with inefficient working practices. The lack of alignment across the MoD's inventory management makes it challenging to cohere around strategic objectives, or scale up improvements and good practice where they emerge locally.

1.11 In 2019, the MoD established Defence Support, led by CDLS, to oversee the Support function and introduce a common purpose and standards for Support activities, including inventory management. This includes the Defence Support Strategy, which sets out the MoD's vision of what the Support function will look like in the future. Its objective is to achieve what it calls "support advantage": having the people and equipment it needs in the right places, able to deploy quickly and efficiently. This strategy is supported by a plan of specific activities as well as a set of longer-term transformation projects and programmes (see paragraphs 1.21 to 1.23).

1.12 However, in common with other functions across the MoD, there are conflicting incentives around what the Support function is trying to achieve, compared with the individual Commands and other MoD organisations. Most expenditure on Support activities is owned and controlled by the Commands and other MoD organisations themselves, and there are no direct management reporting lines within Commands and other MoD organisations to Defence Support. This means in practice the Support function does not have levers to direct these organisations, and acts only as a representative for these activities across the MoD, relying on influencing and engagement to achieve its strategic aims. This makes it more difficult to bring about the changes it is trying to implement.

Systems and data

1.13 The MoD manages inventory management information and processes across multiple bespoke systems in different organisations, embedding the variations in working practice between them (see **Figure 2**). Many of these systems are old, increasing the risk of cybersecurity incidents or operational service failure. Our wider work on government technology demonstrates that these vulnerabilities mean they are increasingly expensive to support, and many use obsolete programming languages known to relatively few individuals. Each Command operates its own core inventory management system, two of which (SS3 and CRISP – used by the Army and Navy respectively) are nearly 40 years old.

Figure 2

The Ministry of Defence's (MoD's) Support information systems

The MoD's Support function uses multiple systems with differing functionalities

Function	Inventory type													
	Air		Land		Maritime			Munitions		Fuels
Engineering Through Life	GOLDesp	LITS	JAMES		UMMS	SCPM		NAWDAS		–
Distributed Inventory	MJDI	SEESUPS	MJDI	SEESUPS	MJDI	SEESUPS		MJDI	SEESUPS	GFMS
Base Inventory	BIWMS		SS3		CRISP			ASTRID		BFIS
Warehousing	BODMS	JDA	BODMS	JDA	WITS	JDA	BODMS CRISP	AMANDA		BFIS
Dispatching	VITAL				RIDELS			VITAL		–
Product Management	ISOPS – Pricing									
	CSIS – Codification									
Management Information	EDW									
	Miranda									

Notes

1 Not all systems which the MoD uses for Support are shown here. This figure highlights the key systems.

2 System names are also acronyms, but for simplicity these are not shown.

Source: National Audit Office analysis of Ministry of Defence information

1.14 The MoD's inventory systems often cannot easily communicate with each other, meaning that inefficient manual interventions are required so that data can be taken from one system and recorded or processed in another. This makes data too inaccessible to easily generate an overarching picture of the inventory. While the MoD can account for its inventory with sufficient accuracy to support financial controls and reporting, some aspects of data quality are poor, and system limitations sometimes prevent information from being useful enough to fully understand the inventory and support effective decision-making. For example, Navy's inventory system can record that an item is damaged but not to what extent, making it difficult to know what could be repaired and what simply requires disposal (see paragraphs 2.13 to 2.20 on disposals).

1.15 While the majority of the MoD's inventory is managed through its inventory management systems, there is some inventory which is managed outside of these systems. One specific example, where the MoD could make improvements, is the management of its shipping containers, which it uses to transport goods. There is no team with overall responsibility for managing these containers and, once the MoD sends a container out to a Command, it can be difficult to track it. Out of around 7,600 containers within its estate, the MoD does not know the location of around 4,500 of them. Commands are also using more than 10% of container stock as additional storage capacity and this means that there are fewer containers readily available for use in transporting goods. In January 2023 the MoD assessed that it would not be able to procure enough containers in the event that it needed to move large quantities of items for a deployment at short notice. It has therefore purchased a contingency stockpile of containers to improve the resilience of its ability to deploy at speed.

1.16 The MoD has made successive attempts over previous decades to reduce the number of systems in use and invest in better IT; between 2010 and 2022, it reduced the number of logistics support systems in use from around 250 to 89. While this has realised some local benefits, its data remain siloed and difficult to access, preventing its inventory management being fully information-led. For example, the MoD recently completed investment in a Digital Decision Centre within DSCOM, which allows it to examine the flows of material between different locations. While this has allowed it to understand how it can structure its logistics networks better, it could not carry out further analysis of the performance of these networks because of the difficulties in accessing the rest of the MoD's legacy IT and data. The MoD is currently seeking to move the Army and Navy onto the RAF's newer core inventory system, and to rationalise and modernise its information systems further through its Business Modernisation for Support Programme (see paragraphs 1.21 to 1.23).

Transformation of inventory management

1.17 In 2012, we reported that the MoD was examining ways to achieve savings through outsourcing some of its inventory management functions. Following a competitive tendering process, in 2015 the MoD entered the 13-year LCST contract with Team Leidos, a consortium composed principally of Leidos Europe, Leidos Supply, Kuehne and Nagel and TVS Supply Chain Solutions. The contract covers the central warehousing and distribution of the MoD's inventory, as well as the procurement and inventory management of around £300 million of commodities per year.

1.18 As with the MoD's broader organisation of its inventory management, its central logistics operations had been developed to service the Commands separately, meaning that staff worked under separate process and staffing regimes, using different information systems and building estates. Through the LCST contract, the MoD created a more integrated and efficient logistics management organisation by rationalising and modernising the estate (including investing in a new Defence Fulfilment Centre in Donnington), reducing staff numbers through a more efficient organisational design, and implementing Team Leidos's modern information systems. Team Leidos has responded flexibly to operational demands, such as supporting operations in response to the COVID-19 pandemic and in the MoD's gifting of items to Ukraine. For example, in the pandemic Team Leidos created additional capacity in the Defence Fulfilment Centre for receiving and storing personal protective equipment, and, with less than a week's notice, moved to 24/7 operations to manage the receipt and storage of ventilators. It also allowed the MoD to draw on industry experience in logistics and commodity procurement and management with the intention of achieving £467 million of cash savings over the life of the contract, net of the investments in new estate and systems.

1.19 Overall, Team Leidos has performed well against the terms of the contract and has been broadly at or near its performance targets for inventory management. It completed the Defence Fulfilment Centre to time and has successfully embedded its new business processes and information systems. The MoD has also acted to protect the financial benefits of the contract. The benefits achieved through the contract are affected by the scope of MoD's activity and demand, and in 2019, MoD forecast that the contract was not going to achieve the level of cash savings anticipated when it was awarded. This is largely because MoD had already realised efficiencies in its commodity holdings prior to the contract's start, and there were delays connecting Team Leidos's systems to the MoD's existing ones. The movement of the Army from Germany back to the UK also meant that the MoD spent less money on global movement services, achieving fewer savings through the contract. As a result, the MoD reduced its savings forecast to £300 million. To ensure that the benefits are delivered, the MoD and Team Leidos negotiated a contract reset in 2021 and Team Leidos is now working to a benefits target of £369 million, above which the share of savings that Team Leidos receive through the contract increases.[12] As of May 2023, Team Leidos forecasts that it will achieve £403 million of savings over the contract's life. The MoD also amended the inventory management key performance indicators to drive more effective commodity management throughout its operations.

1.20 The MoD's requirements have changed over time, from an ambition to reduce costs to an increasing focus on resilience and sustainability. However, following the contract reset, the MoD is now looking at how it can reinvest the savings it achieves into improving resilience and sustainability through the contract. In the longer term, Defence Support is examining how it can best engage with industry partners to support its new ambitions for inventory management once the LCST contracts ends, through the Future Defence Support Services Programmes.

Future transformation

1.21 To overcome its historical weaknesses, and support the delivery of the Defence Support Strategy, the MoD is implementing several transformation and change initiatives through its Support Functional Plan. For example, the Engineering Support Transformation aims to improve the way in which the MoD manages through-life support for its equipment. The MoD has also published a new Sustainability Strategy, which aims to reduce carbon emissions from platform delivery and military operations. Included within its initiatives are two transformation programmes (see **Figure 3**) which are intended to have a significant impact on the MoD's inventory management: Business Modernisation for Support (BMfS) and Future Defence Support Services (FDSS) .

12 The target changes over time through adjustment for inflation – the figure shown is as at May 2023.

Figure 3

Business Modernisation for Support (BMfS) and Future Defence Support Services (FDSS)

BMfS and FDSS are two transformation programmes which will have a significant impact on the future of inventory management

	BMfS	FDSS
Purpose and scope	BMfS is a pan-Defence business change programme which aims to upgrade Support's legacy IT estate and implement a set of standardised processes based on industry best practice.	FDSS aims to identify the best commercial arrangements to support commodities procurement and inventory management once the Logistics Commodities and Services Transformation contract ends in 2028.
Timescale	By 2025 BMfS will deliver a common user platform across the Ministry of Defence's (MoD's) systems and improved data analytics tools. By this time the MoD also plans to have migrated the Army and Navy onto an upgraded version of the RAF's inventory management system. From 2026 the MoD will procure a new inventory management system for use by the whole organisation, which will modernise and align its processes.	The programme is currently at an early stage and is developing its strategic outline business case for approval by the MoD in 2024.
Cost	The MoD estimates the cost of the programme to be £2.5 billion.	FDSS is at too early a stage to provide a clear estimate on costs.
Benefits	Simpler processes and joined-up data will improve productivity and performance. The MoD estimates cashable benefits may be worth between £229 million and £465 million annually.	FDSS will incorporate industry best practice into inventory management. The programme will align the various logistics contracts in place across the Front Line Commands to ensure consistency with the MoD's strategic goals.

Source: National Audit Office analysis of Ministry of Defence transformation programme planning documents

1.22 There are inherent challenges in delivering large digital and business transformation, which government has struggled with in the past. Government often does not fully understand its aims and ambitions or the risks associated with its transformation programmes. This results in a gap between what government intends to achieve and what it delivers, and ensuring that the scope is developed and defined clearly upfront is crucial to narrowing this gap. Both programmes have adopted good principles in understanding the organisational change they wish to achieve, particularly in improving the quality and consistency of working practices and data, and aligning MoD's commercial arrangements to the same strategic objectives.

1.23 However, both programmes have staffing gaps at their early stages, which will affect their ability to refine and deliver their scopes. While the MoD procured an industry delivery partner for BMfS to help mitigate this risk , FDSS is not yet fully resourced. Additionally, FDSS must meet its 2028 deadline (see **Figure 4**), or it risks having to enter contracts which do not meet its needs and which delay its full transformation even further. Achieving stakeholder support from Commands and other MoD organisations will also be vital to the success of these programmes, as they will need to devote considerable effort in supporting governance structures, aiding the development of scope and requirements, changing their working practices and training staff in any new systems that are implemented. Should these programmes fail to deliver successfully, the MoD's inventory management challenges will persist further, and frustrate the achievement of its strategic goals as set out in its Defence Support Strategy.

People

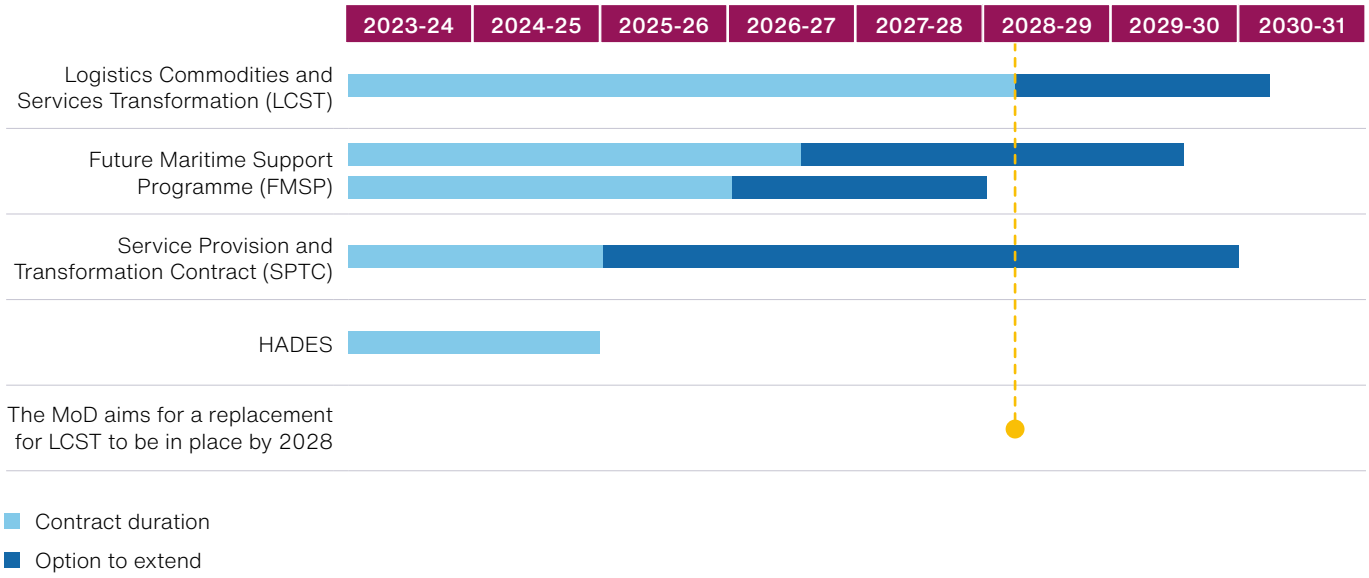
1.24 Under-resourcing was cited during interviews with MoD staff as a key root cause across many of the specific issues we encountered in inventory management. The inefficiency of working practices and the training requirements imposed by bespoke IT systems exacerbate these challenges. While 'People' is one of the key themes the MoD identified within its Support Strategy, it does not have a comprehensive understanding of the Support workforce. This is because MoD organisations manage their workforces separately, and data were not previously available to Defence Support to analyse centrally.

1.25 However, analysis of 2022 staff data by the Support function indicates that the civilian workforce is relatively old compared with other MoD professions; the average age of staff in this area is 53, compared with 47 in other areas, and, of the 270 staff who left a Logistics post in 2022, 49% left due to retirement. Across the civilian logistics workforce as a whole in 2022, outflow of new staff was consistently higher than inflow, at 270 to 198 respectively. Without a more detailed understanding of the roles it requires and where it has gaps, the MoD cannot assess what risks it currently holds in its staffing of the Support function.

Figure 4

The Ministry of Defence's (MoD's) logistics contracts

The MoD wants new arrangements under the Future Defence Support Services (FDSS) programme to be in place for when the LCST contract ends in 2028, and other Command logistics contracts come up for renewal or expiry



Notes

1 In addition to LCST, the MoD holds a number of other logistics contracts which will expire around the same time. These are:
- Future Maritime Support Programme (FMSP) to support and maintain UK Naval Bases;
- Service Provision and Transformation Contract (SPTC) for equipment support for the Army; and
- HADES, which is the name of the contracts which provide engineering and maintenance support for Royal Air Force aircraft.

2 FMSP is composed of multiple contracts. Those relevant to FDSS are shown here.

Source: National Audit Office analysis of Ministry of Defence programme planning documents

1.26 Inventory managers play a key role within DE&S and are responsible for the demand planning, data management and financial accounting needed to manage the MoD's inventory. DE&S told us that, as with other roles across its organisation, it has reduced the number of funded inventory manager posts over time in response to workforce reduction targets. However, it is difficult to understand the true resource requirement for inventory managers because DE&S has not produced definitive data which would allow it to understand the difference between the level of staffing it has funding for and the level of staffing it might need, or assess trends over time. Training for inventory managers has also become outdated and DE&S has recently initiated a training needs analysis review to address this.

Part Two

Inventory management in practice

2.1 This part examines how the systemic issues and challenges set out in Part One affect inventory management in practice through a series of specific examples. These are:

- the management of medical inventory;
- the management of raw material and consumables (RMC);
- how the Ministry of Defence (MoD) identifies and disposes of inventory it no longer needs; and
- the inventory-related challenges of supporting equipment platforms.

2.2 We selected these examples because they best highlight the broader long-standing challenges discussed in Part One. The examples demonstrate how these issues affect inventory management in practice and, in some cases, how they can be resolved. In particular, they demonstrate some of the long-standing issues set out above, including:

- **fragmented organisation**: responsibilities for processes being split between different organisations with different strategic goals and incentives; and
- **systems and data**: accessibility and quality of data affecting the understanding of issues and what decisions can be made as a result.

Medical inventory

2.3 When the MoD outsourced its commodity procurement as part of the Logistics Commodities and Services Transformation (LCST) contract (see paragraphs 1.17 to 1.20), it contracted a commercial consortium called Team Leidos to meet certain performance levels for delivering items on time. Measurement of performance is combined across all commodity categories, meaning that higher performance in one area can mask lower performance in another. Since December 2021 the MoD and Team Leidos have been using different metrics to measure performance (see paragraph 1.19). One of these metrics is First Strike Availability (FSA), which measures whether Team Leidos holds sufficient stock of a particular item to meet an order from the MoD in full.

2.4 For some medical inventory, performance has been consistently lower than Team Leidos's overall commodity performance on FSA (see **Figure 5** overleaf). However, Team Leidos can still meet its contractual target of 92% FSA despite shortcomings in providing medical items by improving performance in the procurement of other items. Although average FSA performance across medical inventory was 88% between June 2022 and May 2023, medical inventory also requires a higher level of performance than other commodities. This is because the loss of single specific items can prevent treatments going ahead. MoD's design of the contract emphasised cost efficiency, which encouraged Team Leidos to rationalise the number of medical specialists it transferred over from the MoD, leading to a loss of medical knowledge.

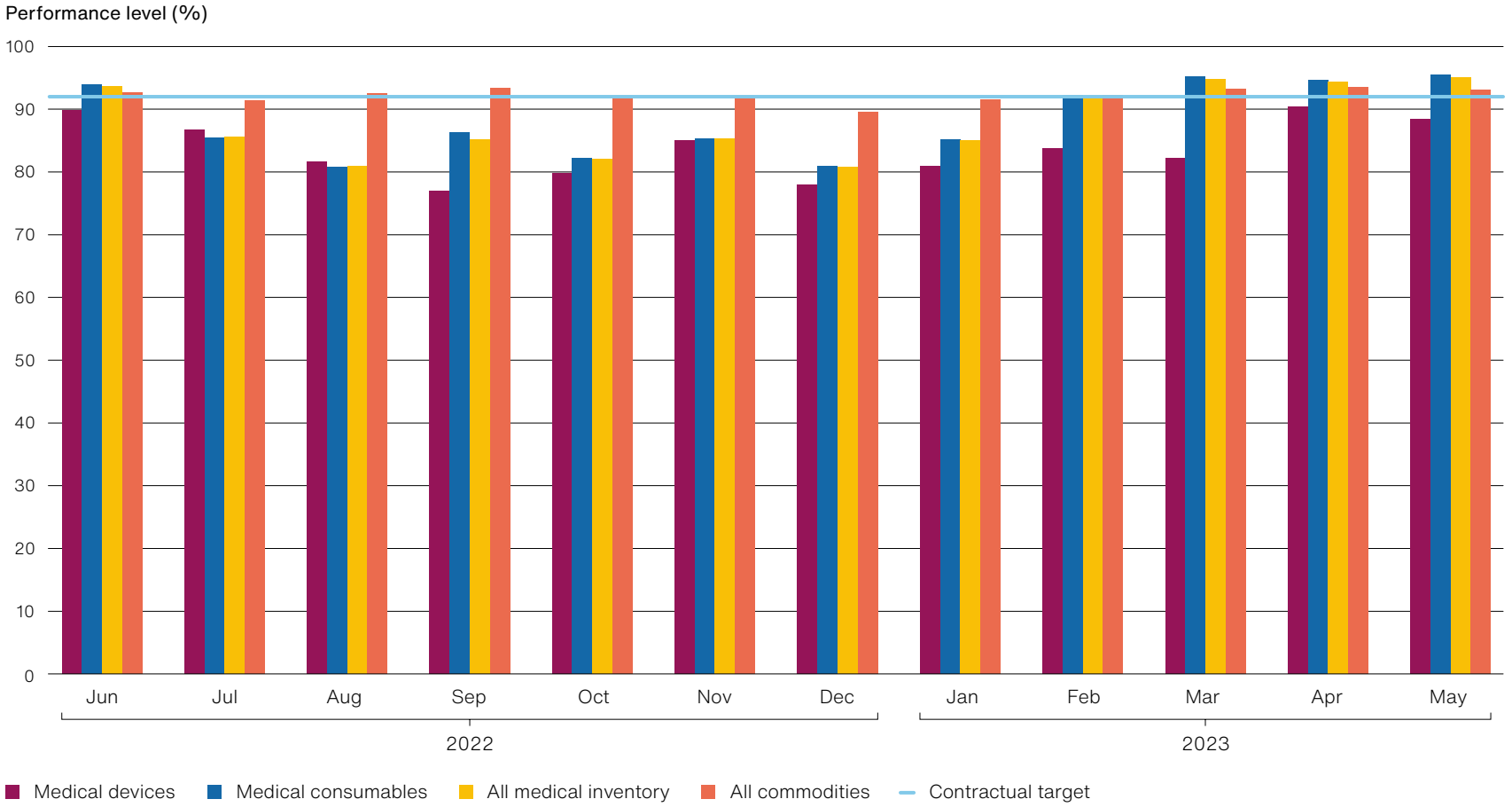
2.5 This has meant that, while Team Leidos has performed well to the terms of the contract, medical teams in the Front Line Commands (the Commands) have not experienced adequate levels of performance. Commands told us they have experienced issues such as a lack of availability of items, even for demands placed months in advance. Commands also frequently receive items with insufficient shelf life, posing challenges where deployments may last several months. This also means that medical staff must spend additional time chasing outstanding demands from Team Leidos and sourcing missing items from other units. In some instances, units have carried increased operational risk because they have had to proceed without the capability to test for and treat certain medical conditions. In 2022 the Navy assessed that, without a resolution, the situation presented a significant risk to life.

2.6 The MoD also did not set up the contract to manage medical equipment approaching the end of its useful life effectively. The MoD did not include any mechanism for holding Team Leidos to account within the contract and did not properly recognise the problems with medical equipment management until the third year of the contract. It was not until 2020 that the MoD put in place the Medical Equipment Replacement Programme which included a mechanism to incentivise better performance from Team Leidos. The Royal Air Force (RAF) told us that when new equipment is needed, it can take years for Defence Equipment and Support (DE&S) teams to complete the necessary air safety clearances, as it must be cleared on all platforms before use. It told us there are instances of new equipment becoming obsolete before it has received clearance. For example, in 2022, the RAF was in the process of completing safety clearances for a blood pressure monitor which had already been declared obsolete by the manufacturer.

Figure 5

Team Leidos commodities performance June 2022 – May 2023

Performance on First Strike Availability for medical inventory has been below the 92% contractual target for eight months out of 12 between June 2022 and May 2023



Notes

1 This chart shows Team Leidos's performance on First Strike Availability for commodities over a 12-month period from June 2022 to May 2023.

2 First Strike Availability measures whether Team Leidos holds sufficient stock of a particular item to meet an order from the Ministry of Defence in full. This does not include demands made through mechanisms known as direct from supply, which are not measured within the contract.

3 Team Leidos is a consortium composed principally of Leidos Europe, Leidos Supply, Kuehne and Nagel and TVS Supply Chain Solutions.

Source: National Audit Office analysis of Defence Equipment and Support reporting of Team Leidos's performance against contractual metrics

2.7 The MoD understands that users of medical inventory have not been well served by the LCST contract since it began in 2015 and, in 2019, the MoD and Team Leidos started to implement improvement initiatives. However, the MoD assessed that, while the situation was improving, these initiatives would not deliver a sufficient level of change to fully address these issues. In response, Team Leidos developed a proposal to increase its medical staff numbers and separate out medical inventory performance from other commodities in the LCST contract. It plans to better meet the needs of end users through various measures, including:

- increasing the FSA target for certain critical items to 98%;
- embedding Team Leidos staff with medical expertise within the MoD; and
- providing improved obsolescence management for medical equipment.

In June 2023 the MoD approved the proposal, which will cost £13.2 million over six years, and Team Leidos anticipates that it will be fully implemented in 2024.

Management of commodities

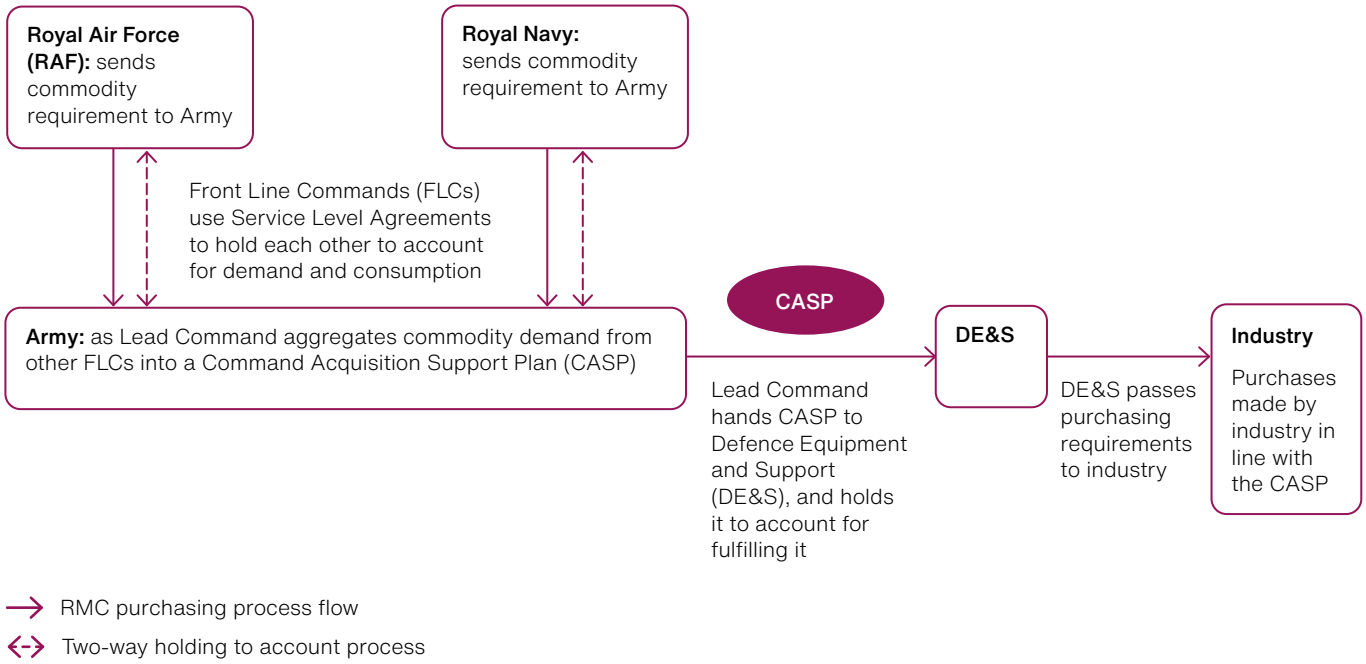
2.8 In 2012, we reported that the MoD was buying more inventory than it was using; between April 2009 and March 2011, the MoD spent £4 billion on raw materials and consumables (RMC) but had not used £1.5 billion (38%) of these. This was in part because Commands were not charged for the costs of purchasing commodities until they were used and so were not responsible for the consequences of over-ordering. Since our last report, the MoD has put in place a new financial accounting framework for RMC to address this. Commands are now charged capital expenditure when purchasing RMC, which is reversed by credits generated by the resource expenditure incurred in consuming or disposing of it. The amount of RMC it purchases annually has fallen from £2.1 billion in March 2011 to £1.1 billion in March 2023, with its holdings falling from a net value of £7.7 billion to £4.1 billion in the same period.

2.9 This change means that Commands now bear the consequences of any over-ordering and are incentivised to accurately forecast their demands each year. However, the MoD told us that there remain issues in the treatment of war reserves. Since these are held as assets outside the RMC framework, credits are not generated to provide financial cover for replacing items which expire and require disposal. Where items are consumed for training, this can be managed through stock rotation, but otherwise Commands must find funding to replace items from elsewhere, and there is a risk that they are not incentivised to keep these reserve items up to date.

2.10 To support the new financial framework, the MoD also put in place a new management model for RMC so that Commands would collaboratively hold each other to account in ensuring commodities were demanded and consumed in a controlled way (see **Figure 6**). Under this model, different categories of RMC are allocated to a 'lead' Command, who is responsible for collecting the demands of the other Commands into a Command Acquisition Support Plan, which is handed over to DE&S for purchasing through industry suppliers. The Commands then also hold each other to account to ensure that commodities are demanded and consumed in line with this plan, as part of a service level agreement between them. However, we found that these arrangements were not being consistently adhered to, with no agreement between Commands in place in some instances.

Figure 6
Raw Materials and Consumables (RMC) management process

The Ministry of Defence put in place a process to demand and consume RMC in a controlled way



Note

1 The Army, Royal Navy and RAF each acts as lead command for different commodities. In this example, the Army is shown as the lead command. UK Strategic Command is also a lead command for certain commodities.

Source: National Audit Office analysis of Ministry of Defence process documents

2.11 This problem exists in part because commodity managers in the Commands lack all the information they need. They can examine commodities purchased, held and consumed by financial value, but not in terms of quantities of specific items. This means they cannot scrutinise the financial performance of commodity purchases or understand what commodities they hold in their stockpiles. This creates inefficiencies in purchasing and disposal as Commands may purchase the wrong type of commodity or must make rapid purchases at a higher price when shortfalls in holdings arise. This does not apply to all commodities; the MoD has more detailed information available on general munitions, for example. The Army has estimated that it could realise additional savings of approximately £23 million per year were suitable information readily available.

2.12 Defence Support was intended to oversee the management arrangements for RMC, including adjudicating disagreements that might occur between Commands. However, it told us that it has not been resourced to carry out this role. These problems set out above have meant that the MoD has not developed more sophisticated ways of managing different categories of RMC through analysing the demand and consumption behaviour of Commands.

Disposals

2.13 When we reported in 2012, we found that the MoD was not consistently disposing of inventory that it no longer required. Today, the MoD is still not consistently disposing of inventory it no longer needs, and this has resulted in large build-ups of obsolete and excess inventory in warehouses. While the MoD recognises the problem as significant, it is not able to quantify the scale of the problem across its whole estate. This is because the MoD's data sets for disposals are disjointed and do not provide end-to-end visibility of the disposals process. For example, it does not routinely track items to establish whether they have been disposed of and how long this has taken, meaning that items can remain stored in warehouses.

2.14 Accurate volumetric data are also not available across all its inventory systems; however, the MoD has recently begun combining data from different systems to better understand what excess stock sits within its warehousing. At present this analysis only covers its LCST-managed central warehousing, which in April 2023 was at around 75% of its capacity. Out of 584,000 m^3 of warehouse space, the MoD held:

- 105,500 m^3 of unserviceable inventory, meaning that the MoD could not issue it for use;
- 115,700 m^3 of over-stocked or over-repaired inventory, meaning that the MoD was holding more than it required;[13] and
- 7,200 m^3 of inventory which had an out-of-service date of 2022 or before.

2.15 Not all this inventory will necessarily require disposal, as understanding what inventory should be disposed of is complex and requires judgement. For example, where inventory is overstocked, this may be because it is held as contingent stock and only used in certain infrequent scenarios. Such items could include some vaccines and protective clothing. Inventory may also be overstocked where a manufacturer has stopped producing an item, and the MoD holds a larger number than it would if those items were still readily available. Inventory classified as unserviceable may require assessment by an engineer to determine whether the MoD can repair it or if it needs disposal. Where the MoD holds inventory from equipment platforms which have gone out of service, these items may have uses for other platforms, or there may be opportunities for sale to other governments. However, some items have been held for so long that the original team which managed them no longer exists, and the MoD lacks the specialist knowledge needed to determine whether and how to dispose of them. Nonetheless, the build-up of potential disposals places pressure on scarce warehouse space and the ability to increase inventory levels where needed strategically.

2.16 Delivery teams in DE&S are responsible for decision-making in consultation with the Commands and must identify and authorise disposals for warehouse staff to carry out. DE&S told us that resourcing is a challenge for many delivery teams, who prioritise support to the front line over disposals as a result. Delivery teams are not incentivised to free up space by actioning disposals, as they are not charged for warehouse storage. There is a further disincentive to dispose of items with certain special characteristics, such as those classed as hazardous or Attractive to Criminal or Terrorist Organisations (ACTO), as they must fund the cost of specialist disposal services from their own budgets. Additionally, limited capacity to action disposals was written into the LCST contract initially.

13 The MoD also holds 19,600 m^3 of inventory which is both over-stocked and unserviceable and 60,000 m^3 of inventory which is both over-repaired and unserviceable in LCST-managed warehousing. These are included within the 105,500 m^3 of unserviceable inventory.

2.17 Staff resourcing issues have particularly affected the increasing build-ups of unserviceable inventory in the MoD's warehouses. The problem is particularly acute within the Navy because its inventory management system cannot record the reason why an item is classified as unserviceable. This means that every item returned from ships requires further assessment to determine whether it can be repaired, and sites may lack engineers to do this. Volumetric data are not available but, according to data from the Navy's inventory management system, it is currently holding a gross value of £1 billion of this unserviceable inventory.

2.18 This means that the MoD must periodically supplement its disposals activity with short-term projects. The MoD currently has three projects to address its build-up of potential disposals: Project JUPITER, Project HERCULES and Project CERBERUS (see **Figure 7**). However, these projects are inconsistent in their scope, duration and performance measurement, and only one, Project HERCULES, has developed into an enduring business-as-usual disposals process. During the planning phase for Project JUPITER, the MoD cited Project HERCULES as a model for best practice in disposals but stated that funding constraints meant it could not roll out the approach more widely.

Figure 7
Disposals management

The Ministry of Defence has to supplement its disposals activity with projects

	Scope and purpose	Duration	Targets and metrics
Project JUPITER	Implements a common disposals process across the central warehousing managed through the Logistics Commodities and Services Transformation contract with Team Leidos.	In place for a three-year period from 2022.	Has annual targets and measures disposals in volumetric terms. There are individual targets for each domain, including the Land, Air and Maritime domains.
Project HERCULES	Facilitates routine and targeted disposal for Air platforms managed on Royal Air Force systems.	Set up as a project in 2010, but has recently become a permanent team.	Delivers annual targets set by Project JUPITER but otherwise carries out business-as-usual disposals.
Project CERBERUS	Aims to clear the backlog of disposals and unserviceable inventory in the Royal Navy.	In place for a three-year period from 2021.	Does not set disposals targets and cannot measure disposals in volumetric terms.

Source: National Audit Office Analysis of Ministry of Defence project documents

2.19 Project JUPITER has developed the most advanced management information, which allows the MoD to measure disposals in cubic metres and to identify items with characteristics that indicate potential disposal. The MoD set a target for Project JUPITER to dispose of 15,600 m^3 of inventory from certain parts of the LCST estate between January 2022 and March 2023. During this time it achieved 4,500 m^3 of disposals against this target. For the financial year 2023-24 the MoD aims to dispose of 20,000 m^3 of inventory from across the LCST estate and, by the end of June, had disposed of 3,400 m^3, primarily from its Land, Air and Maritime domains.

2.20 The MoD has plans to extend this management information to cover other parts of its estate and enable it to track inventory which delivery teams identify for disposal through to Defence Equipment Sales Authority actioning the disposal. However, unless the MoD can create consistent disposals processes across all of its warehouses, the need for short-term projects to deal with problems when they arise will persist.

Availability

2.21 The MoD is currently investigating how it can improve the readiness of its units, such as ships, aircraft and armoured vehicles. Readiness comprises the unit's availability (how many can be used at one time, and for how long), capability (the things it is capable of doing) and sustainability (how long its capabilities can be sustained). At present, it is not satisfied with the level of readiness across its platforms and sees instances where they are not achieving their intended level of performance. It also has ambitious targets for improvement; the Chief of Defence Staff currently has an ambition to double outputs by 2030, and DE&S wants to increase the availability of equipment platforms by 50% by 2025. Readiness is affected by many factors; for example, platforms may have shortfalls of pilots or crew, or the amount of and manner in which maintenance is carried out.

2.22 Inventory is one factor among many which can affect the readiness of a platform, particularly the availability of platforms. At present the MoD assesses that a lack of inventory contributes to a small proportion of availability losses compared with other factors. However, its inventory management arrangements are varied and complex and will need to be optimised to contribute to improvements in readiness. The MoD uses a range of contractual approaches for supporting equipment which vary in their approach for supporting it, and the incentives they use. Many parts are bespoke and cannot be used interchangeably by different equipment platforms. Some platforms also use cannibalisation, where spare parts are taken from platforms in maintenance or storage, to meet their required level of availability, which will become less feasible if more platforms are put into use.

2.23 As an example, Wildcat helicopters demonstrate how complex these arrangements can be, although the factors which affect readiness and how these are experienced vary across different platforms and their support arrangements. The MoD has a contract with Leonardo UK Ltd to manage many of the capital spares used by Wildcat, to a contracted spares availability level of 87%. In 2022, around 21,500 demands for items were placed through this contract, of which 16,500 were for consumable items, and the remaining 5,000 for other items such as capital spares. The Wildcat team must also rely on other delivery teams and Team Leidos for other items, creating multiple dependencies to manage. The Wildcat team often faces a lack of available spares, sometimes for long periods of time. For example, three bespoke window panels, parts which Leonardo manages, have been unavailable since 2018, which Leonardo told us was because the part is no longer made by the original manufacturer. Recently, the MoD has adjusted its contract with Leonardo to improve availability by requiring Leonardo to meet a delivery target in three separate inventory categories. This means that Leonardo will no longer be able to meet its contractual target through high performance for items in any single category. This, however, only addresses availability problems in one part of Wildcat's supply chain. Lack of availability for Wildcat generally has resulted in the need for spares cannibalisation; in 2022 there were 198 cannibalisations of Wildcat parts. Of these, 175 were from aircraft undergoing maintenance and 23 were from aircraft within front line squadrons.

2.24 At present, the MoD does not have good management information for understanding how these different aspects affect the readiness of its platforms, and the complex ways in which they can interact. The MoD is currently exploring these causes to determine how arrangements could be adjusted to improve platform readiness. DE&S has also begun a project to analyse its available data and generate better performance metrics for understanding which key factors affect readiness and to what degree.

Appendix One

Our audit approach

1 We reached our independent conclusions on the Ministry of Defence's (MoD's) management of its inventory following analysis of evidence collected between September 2022 and June 2023.

2 In assessing the value for money of the MoD's inventory management we evaluated the extent to which the MoD has addressed its long-standing challenges with its inventory management and how well set up it is to achieve its future strategic ambitions set out in its Support and Supply Chain strategies.

3 In forming our conclusions, we drew on a range of study methods and a variety of evidence sources which are set out in the paragraphs below.

Document review

4 We reviewed published and unpublished documents to understand the MoD's overall management of inventory within the context of its wider objectives for support and supply chain activity. We reviewed the National Audit Office's back catalogue of reports and good practice guides on inventory management in Defence as well as transformation within wider government. We used these reports to understand the long-standing nature of the problems the MoD faces in managing inventory and to identify good practice.

5 We then reviewed documents to assess the MoD's performance including:

- supply chain and support strategies;
- papers presented to relevant boards and approval committees regarding inventory management issues;
- management information, such as activity and contractual key performance indicator reporting;
- programme documentation such as business cases, investment board approval papers and notes; and
- workforce planning documents.

Interviews

6 We interviewed officials from those organisations within the MoD and the armed forces which lead relevant policy or decision-making responsibility or which hold significant proportions of the Defence inventory to further our understanding of inventory management. These included:

- officials responsible for supply chain and inventory management policy;
- members of Defence Equipment & Support delivery teams;
- commanders and officials from the Support Operations, Support Transformation and Joint Support teams;
- leaders of DSCOM; and
- representatives of the Top Level Budget organisations responsible for managing and using inventory, including the Army, Strategic Command, Air Command and Navy Command.

7 We also interviewed Team Leidos to understand its views of the MoD's challenges and performance.

8 Interviews were used to explore particular subject areas, guide subsequent requests for and review of documentation, as well as support points of detail within the report.

Fieldwork visits

9 Between November 2022 and March 2023, we undertook a series of visits to MoD establishments to understand the challenges faced by those working in warehouses or front-line organisations. We also accompanied colleagues working on the audit of the financial statements on some of their visits to check inventory controls and asset records. The establishments we visited included:

- MOD Donnington
- HQ Field Army, Andover
- HM Naval Base, Devonport
- HM Naval Base, Portsmouth
- RAF Odiham
- Household Cavalry Mounted Regiment, Hyde Park Barracks
- British Forces Cyprus, Akrotiri Sovereign Base Area

10 These visits were used in a similar fashion to our interviews; to explore particular subject areas, guide subsequent requests for and review of documentation, as well as support points of detail within the report.

Financial reporting

11 Throughout the report, except where otherwise stated, we use the net book value of the MoD's inventory, which reflects adjustments for depreciation, impairment, and other factors. To aid comparability with our 2012 report, *Managing the defence inventory*, we provide both the net book values and gross book values below:[14]

- In our 2012 report we reported that the gross book value of MoD's inventory as at 31 March 2011 was £39.7 billion, with a net book value of £17.7 billion.
- We also reported in our 2012 report that as at 31 December 2011, the gross book value of MoD's inventory was £40.3 billion, with a net book value of £16.8 billion.
- As at 31 March 2023, the gross book value of MoD's inventory is £30.4 billion, with a net book value of £11.8 billion.

14 Comptroller and Auditor General, *Managing the Defence Inventory*, Session 2012-13, HC 745, National Audit Office, June 2012.

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