NAO
National Audit Office

Report
by the Comptroller
and Auditor General

Ministry of Defence

Military flying training

Our vision is to help the nation spend wisely.

Our public audit perspective helps Parliament hold government to account and improve public services.

National Audit Office

Ministry of Defence

Military flying training

Report by the Comptroller and Auditor General

Ordered by the House of Commons
to be printed on 10 June 2015

This report has been prepared under Section 6 of the
National Audit Act 1983 for presentation to the House of
Commons in accordance with Section 9 of the Act

Sir Amyas Morse KCB
Comptroller and Auditor General
National Audit Office

9 June 2015

This report examines whether the Ministry of Defence can achieve and measure the expected benefits of new core flying training run by an external provider.

Contents

Key facts

£6.8bn	£3.2bn	£143m
2011 forecast cost of the new core flying training over 25 years	current forecast cost of the new core flying training over 25 years	paid to Ascent as training service provider as at 31 March 2015

2008   Ascent signed its contract

2014   original forecast date when the new core flying training would work fully

2019   date for the new core flying training to work fully

480   UK aircrew expected to begin training each year when Ascent signed its contract

250   UK aircrew now expected to begin training each year

19   different roles Ascent will provide training for

Summary

1 The Ministry of Defence (the Department) trains aircrew for each of the armed services. For example, Wildcat helicopter pilots for the Royal Navy, Apache helicopter pilots for the Army, and Typhoon fast-jet pilots for the Royal Air Force. The process involves several stages:

- **Aptitude testing and selection**
  Students are selected based on their performance in a range of tests that measure mental agility, hand-to-eye coordination and situational awareness.

- **Core flying training**
  Student pilots learn the basics of flying and progress on to training to prepare them for their future role (for example, helicopter training). Rear-crew students learn skills such as navigation, surveillance and use of weapons systems.

- **Operational flying training**
  Students that complete core flying training join operational training units. Here they are trained on specific front-line aircraft, such as a Wildcat helicopter, Apache helicopter or Typhoon fast-jet (**Figure 1** on pages 6 and 7).

2 The Royal Air Force manages aptitude testing and core flying training on behalf of the Department. This involves personnel from all three armed services and many contractors. From civilian flying instructors to aircraft engineers and air traffic controllers. Each of the armed services run operational training for their aircrew once they complete core training.

3 Our 2000 report, *Training new pilots*, found:[1]

- existing core flying training was taking too long;

- training costs were increased due to student failure rates and delays in students moving through training; and

- monitoring of training performance was limited.

---

1 Comptroller and Auditor General, Ministry of Defence, *Training new pilots*, Session 1999–2000, HC 880, National Audit Office, September 2000.

Figure 1

Military flying training

Source: National Audit Office

Operational training

Each of the three services is responsible for training its aircrew in this part of training

Input

Fast-jet front-line conversion units

Training on aircraft such as Typhoon, Tornado and in the future Joint Strike Fighter.

Multi-engine front-line conversion units

Training on aircraft such as Hercules transport aircraft and in the future the A400M transport aircraft.

Helicopter front-line conversion units

Training on aircraft such as Apache, Wildcat and Chinook Helicopters.

Multiple front-line conversion units

Training on aircraft such as Merlin Helicopter (Weapons System Operator) and Rivet Joint multi-engine surveillance aircraft (linguist specialist).

Notes

1 **Elementary flying training:** Aircrew who pass aptitude testing (and flying grading for the Army and Royal Navy) begin elementary flying training. Students learn the basics of flying, such as navigation and basic handling in a light aircraft. Successful students progress on to other courses based on flying ability and military need.

2 **Basic jet training:** Prepares students for advanced jet training by teaching more advanced manoeuvring and tactics on more powerful aircraft.

3 **Advanced jet training:** Students learn handling, night flying, low level navigation as well as weapons and tactics training on a jet-driven aircraft. The training prepares them to move to front-line fighter jets, such as the Typhoon.

4 **Multi-engine pilot training:** Students learn how to fly large, multi-engine propeller and jet driven aircraft, such as the Hercules transport aircraft. They learn general handling, navigation and asymmetric flying (where an engine on one side of the aircraft is not functioning).

5 **Helicopter pilot training:** Students learn basic manoeuvring, such as hovering, through to more advanced training such as night flying and mountain flying.

6 **Rear-crew training:** Training for rear crew varies by service and aircraft. Rear-crew do not fly aircraft, but operate weapons systems, navigate or undertake surveillance activities.

7 **Operational training:** Students learn to fly on front-line aircraft such as a Typhoon fast-jet or an Apache attack helicopter. Students learn handling, tactics and weapons systems operation. Once competent, students are declared combat ready and join a front-line squadron.

4   The Department recognised core flying training was complicated, disjointed and inefficient. It concluded that new core training, run by an external training provider, could help it reduce the time and cost of training aircrew. It would also help it replace obsolete training equipment that was leading to greater use of more expensive front-line aircraft in operational training. The external provider would have no role in aptitude testing or operational training.

5   In 2008, the Department contracted an industry provider, Ascent, to develop and manage a new approach to core training. The new approach is called the United Kingdom Military Flying Training System (UKMFTS). The Department's objective is for industry to provide training to meet three high level aims. These are to:

- optimise time in training;

- close the gap between the skills of aircrew finishing training and the skills needed to use front-line aircraft; and

- reduce the overall cost of flying training.

6   Under the new approach, Ascent is responsible for providing aircraft and simulators for training, running training courses and training an agreed number of aircrew each year. The Department remains responsible for many aspects of core training. These include providing military instructors, determining the number of students it needs and setting the training input and output standards. The Department considered that having an external provider would enable it to:

- transfer risk (for example, buying and making available enough aircraft for training);

- increase flexibility to respond to changes;

- promote continuous improvement and innovation; and

- integrate better the different stages of core training.

7   Ascent's contract is for 25 years. The Department is moving from existing core training in phases, through five different training packages, to minimise disruption. In 2011, the forecast cost was £6.8 billion, with the majority of the costs for providing new aircraft to support training. The new core training was expected to be running by 2012 and at full capacity by 2014.

Scope of the report

8   This report examines the Department's progress in implementing new core training (Part One). It also assesses whether the Department is getting the benefits expected from an external provider (Part Two) and how well it can achieve and measure the expected benefits of new core training (Part Three).

Key findings

9   Full implementation of new core training has been delayed by nearly six years. Several events have affected the Department's original assumptions about how its 25-year contract with Ascent would work. These include a substantial reduction in the number of aircrew entering training each year and a decrease in overall funding from a forecast £6.8 billion to £3.2 billion. There were also delays to new helicopter training because the Department thought it owned existing training aircraft when it did not. The Department also designed Ascent's contract assuming that it would finance the costs through the private finance initiative (PFI). This assumption changed, which has challenged overall affordability. The changes have taken time to resolve and the new core training is now scheduled to be running at full capacity by December 2019 (paragraphs 1.13 to 1.14 and 2.19 to 2.36).

10   The Department still controls many factors that affect training, which complicates its ability to manage the contract with Ascent. Ascent is responsible for factors such as training design and availability of aircraft bought through its contract. The Department is responsible for factors such as student selection, providing military instructors, availability of airspace for training and aircraft bought outside its contract with Ascent. It also has wide-ranging approval rights and it has become involved in aspects of Ascent's work, such as courseware design. This undermines the Department's ability to hold Ascent to account for activities it has sought to transfer out. The risk to UK military capability of not training enough aircrew to meet military needs ultimately rests with the Department and cannot be transferred (paragraphs 2.4 to 2.12).

11   The Department has struggled to fully hold Ascent to account for its performance. As at 31 March 2015, the Department had paid Ascent £143.3 million for training services. The Department had deducted just £308,000 from Ascent's payments for it failing to meet its responsibilities. We found that the Department has struggled to apply financial performance deductions, with some agreed only after many months of negotiation. This is despite the Department having significant concerns about Ascent's performance between 2008 and 2012, including its cost and schedule control and the quality of its work. The Department raised these concerns with Ascent's shareholders, who acted to address them. The Department considers that, since 2012, Ascent's performance has improved (paragraphs 2.13 to 2.16).

12   Contract incentives, set by the Department, do not encourage Ascent to improve training quality or reduce overall training time and cost. Incentives for improving core training form only around 1% of potential payments to Ascent. They also incentivise completion of training by number of students, rather than skills when they join operational training units. Greater incentives are available to Ascent for undertaking training work. Ascent's motivation to look for cost reductions has also been affected by reductions in the overall value of the programme to implement new core training. Its potential earnings have reduced while its planning and infrastructure costs have been largely unaffected by the changes (paragraphs 2.39 to 2.43).

13   Contracting with an external provider for fixed training capacity means the Department has less flexibility to respond quickly to changes. Training aircrew takes many years. Rebalancing the infrastructure and personnel required to train them takes time and carries costs. Historically the Department has had capacity to increase or decrease core training and has had full control of training activity. Implementing the new core training incrementally helped the Department avoid buying excess training when it reduced the number of aircrew it needed. However, the new core training has little spare capacity. Once fully implemented, increasing the training needed will take time and add costs. Having a contracted for service also means that any future decreases in the amount of training needed will require contract renegotiations. It could increase the unit cost of training aircrew as the contractor would still need a return on any investment in training infrastructure (paragraphs 2.26 to 2.28).

14   Moving to the new training packages by 2018 will put pressure on the Department's ability to train the right number of aircrew at the right time. The Department needs enough capacity to provide military instructors for both current and new training systems during the move. Equipment, and in some cases the legacy contracts, cannot be extended. Further delays could increase the risk of a gap in training that would result in fewer trained aircrew than needed. The Department is developing plans to create a surplus of trained students to cover training gaps. These plans are at an early stage and cannot be formally agreed until the fixed-wing and helicopter training packages are agreed (paragraphs 1.15 to 1.18).

15   The Department does not use effectively the data it has to understand current training performance. The Department has data on training activity but does not hold it centrally – rather in pockets throughout the Department. The Department does not routinely analyse it and subjects it to limited quality assurance. This means that when the Department contracted for an external provider it had no robust baseline for actual training time and cost, or aircrew ability at each stage of training from selection to combat ready. This lack of robust data limits the ability of the Department to understand performance or set Ascent meaningful performance targets. Without a robust performance baseline it will also struggle to measure the impact of changes to training and to assess whether future performance is better (paragraphs 3.7 to 3.36).

16   The process for reducing the overall cost of flying training is not clear. Staff understand high level responsibilities for getting benefits from new core training. However, many benefits of improved core training will be realised in operational training, which is managed under different funding, accountability and reporting arrangements. It is not clear whether cost and time savings will be identified and used to improve operational training or released to reduce overall costs to defence. It is also unclear how the armed services will be incentivised to seek opportunities to identify and exploit these benefits (paragraphs 3.4 to 3.5).

Conclusion on value for money

17   Implementing the new core training has been complicated by budget reductions, scope reductions and changes in the planned approach to financing. These changes have undermined the Department's original assumptions about how its long-term contract with Ascent would work. The legacy of these changes has understandably taken the Department time to resolve and has resulted in lengthy delays. The new core training has not been fully implemented and there is much to do if the Department is to get the planned benefits of the new approach.

18   Combining military and industry involvement in flying training has been challenging, particularly in relation to ownership of risk. The contracts already let have not effectively incentivised industry to help the Department achieve its aims for new core training. The Department needs to more fully understand training performance and what affects it before it can leverage significant improvements in core training. If the Department does this, and its training requirements do not fundamentally change again, there remains a significant opportunity to improve the value for money of military flying training. If it does not, there is a real risk that moving to the new core training will affect the military's ability to train the right number of aircrew at the right time.

Recommendations

19   **The Department should encourage better performance from Ascent by more effectively incentivising it to work as a partner to achieve the aims of the new core training**. The Department needs to develop contract incentives that better encourage Ascent to improve quality, and reduce time and cost. For example, once it has set a credible baseline, it could explore how it might share with Ascent the benefits of any performance improvements and cost efficiencies achieved.

20   **The Department should assess the cost and time implications of increasing training capacity**. Any extra flying training needed (for example, increases in military needs or international defence training) will affect capacity in the new core training. The Department should work out how much it will cost, and how long it would take, to increase training capacity in response to small, medium and large scale changes in need.

21   **The Department should agree formal contingency plans for covering gaps in training during the move to the new core training**. The Department needs to be able to respond quickly to any gaps in training that affect its ability to train aircrew. The Department is developing contingency plans but these need to be agreed formally across the services. The Department must set out what actions it will take, and criteria for triggering them.

22   The Department should set out and communicate clearly roles and responsibilities across the whole training system. Ascent will run the new core training but the Department is still responsible for many factors that will affect its ability to get benefits. For example, student selection affects time, cost and quality in core training. The Department must ensure that roles and responsibilities are understood by all who can have an affect on training and that it is managed as a single system from aptitude testing to combat ready.

23   The Department should establish a robust baseline to measure, monitor and evaluate performance across the whole training system. Without robust data on training cost, time and quality – from aptitude testing to combat ready – the Department cannot set an accurate baseline to track and challenge performance. It will also be unable to tell if it is achieving its aims for the new core training.

24   The Department should establish a clear process to get benefits across the whole training system and between services. The Department needs to ensure it is clear who is responsible for getting all the benefits, including those outside core training. For example, reducing the number of training flights needed in operational training due to increased aircrew ability following completion of core training. It must ensure there is an agreed approach to getting benefits, and a mechanism which incentivises the services to actively seek time and cost savings that can be released for use between services or elsewhere in defence.

Part One

Moving to the new core training

1.1 In 2008, the Ministry of Defence (the Department) contracted an industry provider, Ascent, to develop and manage a new approach to core flying training. The training, which would begin in phases from 2012 and be at full capacity in 2014, is called the United Kingdom Military Flying Training System (UKMFTS).

1.2 This part explains the problems identified with existing flying training and the planned benefits of new core training. It also reviews progress to date.

How flying training works

1.3 The Department needs to train aircrew for the aircraft flown by each of the armed services. For example:

- Royal Navy fast-jets and helicopters;

- Army helicopters and transport aircraft; and

- Royal Air Force fast-jets, helicopters, and transport and surveillance aircraft.

1.4 Currently, around 250 UK aircrew (150 pilots and 100 rear-crew) begin training.[2] Trainee aircrew may be direct officer recruits, selected serving officers, senior non-commissioned officers or, in the Army, selected non-commissioned officers. The process involves several stages:

- **Aptitude testing and selection**
  Students are selected based on their performance in a range of tests that measure mental agility, hand-to-eye coordination and situational awareness.

- **Core flying training**
  Student pilots learn the basics of flying and progress on to training to prepare them for their future role (for example, helicopter training). Rear-crew students learn skills such as navigation, surveillance and use of weapons systems.

- **Operational flying training**
  Students that complete core flying training join operational training units. Here they are trained on specific front-line aircraft, such as a Wildcat helicopter, Apache helicopter or Typhoon fast-jet (Figure 1).

---

2   In this report the term rear-crew is used to refer to all Royal Navy, Army and Royal Air Force non-pilot aircrew.

1.5 The Royal Air Force is responsible for managing aptitude testing, and core flying training. However, this involves personnel from all three services and many contractors, ranging from civilian flying instructors to aircraft engineers (**Figure 2**). Each of the armed services run operational training for their aircrew once they complete core training.

Figure 2
Organisation of core flying training

Source: National Audit Office
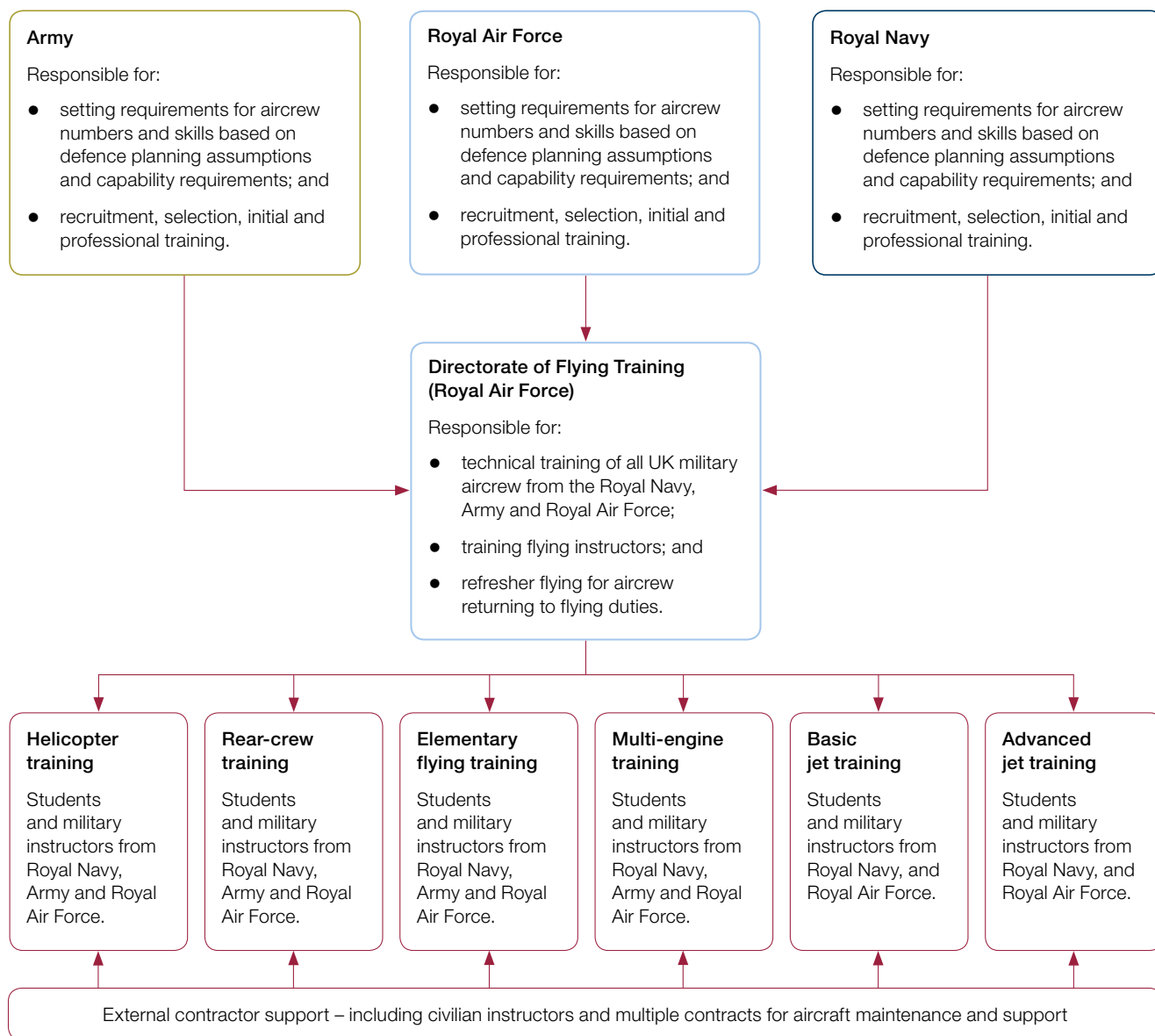
Problems with flying training

1.6 Our 2000 report, *Training new pilots*, reviewed training for fast-jet pilots and identified areas for improvement.[3] Specifically:

- Core training was taking too long due to a shortage of instructors and suitable training aircraft. Reductions in the size of the Royal Air Force had also led to training delays.

- Increased training costs linked to student failure rates and delays in students moving through training.

- Quality targets were poorly formulated and there was no credible mechanism for getting views from operational training units on pilot quality.

1.7 We recommended that the Department:

- improve its information on flying training to inform decision-making;

- develop its understanding of the interactions and dynamics of the training system; and

- refine the metrics and targets used to manage flying training.

1.8 We set out the information and measures the Department needed to improve flying training. A Royal Air Force review of flying training,[4] also in 2000, similarly identified areas for improvement (**Figure 3** overleaf).

1.9 The Department recognised flying training was complicated, disjointed and inefficient. In particular, there were significant waiting times between courses, and obsolete training equipment did not reduce the amount of training undertaken on expensive front-line aircraft. The Department concluded that new core training, run by an external training provider, would bring benefits (**Figure 4** on page 17 and **Figure 5** on page 18). The external provider would have no role in aptitude testing or operational training.

---

3   Comptroller and Auditor General, Ministry of Defence, *Training new pilots*, Session 1999–2000, HC 880, National Audit Office, September 2000.
4   Royal Air Force, *Project 08 – A strategic study into the conduct of flying training from 2008 and beyond*, May 2000.

Figure 3
Findings from previous reviews of military flying training

National Audit Office, Training new pilots, 2000

Issue	Recommendation
Suitability of aptitude testing to predict training success.	Explore how to improve aptitude tests' ability to identify the skills needed for fast-jet, helicopter and multi-engine pilots, to make early and accurate decisions on streaming trainees.
Quality of information on training activity and outcomes.	Collect information on training activity and performance in a standardised way, and make it accessible, to help analyse training activity.
Quality of information on training costs.	Capture training costs, and their major elements, to monitor cost-effectiveness and give sound analysis of possible improvements.
Managing training.	The 'process owner' should actively review training performance overall and set common targets from analysing current and potential performance.

Royal Air Force, Project 08, 2000

Issue	Recommendation
Suitability of aptitude testing to predict training success.	Develop aptitude tests to help identify specific skills needed from future aircrew.
Ability to train pilots effectively, for future advanced aircraft types.	Identify suitable training aircraft to move training from front-line aircraft to less expensive aircraft.
Simulated training.	Explore opportunities for simulated training to complement live flying.

Sources: Comptroller and Auditor General, Ministry of Defence, *Training new pilots*, Session 1999–2000, HC 880, National Audit Office, September 2000; Royal Air Force, *Project 08 – A strategic study into the conduct of flying training from 2008 and beyond*, May 2000

Figure 4
Aims of new core training

Aim	Issue	Solution
Optimise time in training	The existing system is not managed and operated as a single whole and aircrew can experience significant gaps between courses (known as 'holding'). Time spent in training significantly affects costs, in manpower and equipment. Time to train aircrew also affects the time available to fly during their career.	Increasing the productive careers of aircrew could reduce the number of students the Department needs to train and the level of equipment and people required to train them. Reducing holds in training would reduce the costs of refresher training for students that have been in holds.
Close the skills gap	Ageing analogue training aircraft mean that aircrew leaving the training system are less prepared to operate more complex modern aircraft with digital cockpits and aircraft management systems. This means they have to train on front-line aircraft, which is costly.	Using modern training aircraft could enable more training to be done on less expensive aircraft and free up front-line aircraft and crews for use on operations.
Reduce the cost of flying training	Flying training is expensive. Costs increase as aircrew progress through the system and the cost per flying hour of the training aircraft also increases. Ageing training aircraft are unreliable and expensive to maintain. Potential to make more use of simulators in training.	Reducing failures later in the training system (where sunk costs are higher) could reduce unnecessary expenditure. Increasing use of simulated training and use of more advanced, reliable and efficient aircraft could reduce live flying and maintenance costs.

Source: National Audit Office

Figure 5
Role of the external training provider

Aim	Expectation
Risk transfer	New system would transfer risk to a contractor.
	Contractor provides enough aircraft for training, runs an agreed number of courses each year and provides an agreed number of trained aircrew.
Flexibility	Training service provider would help the Department introduce new training incrementally.
	Department could accommodate changes in funding, and number or type of aircrew required, and avoid funding excess training.
	Commercial off-the-shelf aircraft (purchased, leased or disposed of at market rates).
Continuous improvement and innovation	Contractor incentivised to continually improve and innovate.
	Training system aims align with contractor payment and rewards. For example, contractor is incentivised to reduce time taken to train through innovation in training design.
Integration	Single contractor responsible for having aircraft, equipment, facilities, infrastructure and personnel to provide holistic training.

Source: National Audit Office

A new approach to core training

1.10 In 2008, after a competitive process, the Department awarded Ascent a 25-year contract to provide core flying training at multiple sites across the UK (**Figure 6** overleaf). Ascent's responsibilities include:

- training design;

- providing facilities, such as training devices and simulators; and

- selecting new training aircraft.

1.11 Ascent and its subcontractors provide training services. Ascent manages subcontractors for the Department. The Department's responsibilities include:

- student selection and determining the number of students needed;

- providing military instructors, airfields and fuel; and

- setting training standards.

1.12 The Department has approval rights over Ascent's training design, course material and any documentation that launches a procurement for equipment or services.[5] It also manages maintenance and availability of the advanced jet training aircraft, which it bought outside the contract with Ascent under a ministerial direction.[6]

Progress in moving to the new core training

1.13 The Department is moving from existing core training in phases, through five different training packages, to minimise disruption:[7]

- **Advanced jet**: advanced flying training on jet aircraft for Royal Navy and Royal Air Force fast-jet pilots.

- **Rear-crew stage 1**: ground school, introductory flying, elementary navigation and tactically orientated training for Royal Navy Observers.

- **Rear-crew stage 2**: will replace stage 1 and provide rear-crew training for all non-pilot aircrew. Includes intelligence gathering, electronic warfare and weapons systems operation.

- **Fixed-wing**: elementary training, multi-engine training and basic jet training.

- **Helicopter**: basic and advanced helicopter training.

---

5   The Department's approval rights relate to whether training meets applicable standards.

6   A ministerial direction can be requested by an accounting officer when a minister decides to continue with a course of action the accounting officer has advised against. The Hawk T2 advanced jet trainer was bought under a ministerial direction.

7   Each new training package is issued as an amendment to the Department's original contract with Ascent.

Figure 6
Locations for new core training

RAF Valley, Anglesey
Basic jet training,
advanced jet training

RAF Cranwell, Lincolnshire
Elementary flying training,
multi-engine flying training

RAF Barkston Heath,
Lincolnshire
Rear-crew training

RAF Shawbury,
Shropshire
Helicopter training

RNAS Culdrose, Cornwall
Rear-crew training

Source: National Audit Office

1.14 The new core training was to be running by 2012, and at full capacity by 2014. However, there have been delays. Ascent has introduced two training types: advanced jet and rear-crew stage 1. The remaining elements of training are now scheduled to be in place by 2018, and running at full capacity by December 2019 (**Figure 7** overleaf). Delays were due to contractor performance (paragraphs 2.13 to 2.16), changes to funding assumptions (paragraphs 2.31 to 2.34) and substantial decreases in the number of students to be trained following the 2010 Strategic Defence and Security Review (paragraphs 2.19 to 2.28).[8]

1.15 To avoid gaps in training provision the Department must have capacity to provide personnel and supporting infrastructure for both training systems during the change. Military instructors will have to move from the existing system to be trained for their new role about six months before the new core training starts. Any gap in training during the move to the new core training could affect the military's ability to train enough aircrew. For example, without mitigating action, the Department has forecast a 30% to 54% drop in the number of aircrew it can train through fixed-wing training during the change.

1.16 Any delays in setting up the new contracts will increase the risk of gaps in training. Although the fixed-wing training contract is to be awarded in 2015, initial course capability is not expected until late 2017. This is when elementary flying training will start after a three-year construction and service development phase. The Department can extend existing arrangements for fixed-wing training if the new core training is delayed. However, it may not be possible to support some ageing training aircraft for use beyond 2019.

1.17 Even without any further delays in procurement, there may be a three- to six-month gap in helicopter training. This is because of the time it will take to complete the procurement, certify the new aircraft and prepare the infrastructure and personnel required to run the new system. The helicopter training contract is expected to be awarded in 2016. Any delay in this procurement could create a longer training gap.

1.18 The Department is seeking to temporarily increase the number of aircrew trained by using existing core training to create a surplus of aircrew to cover any shortfall during the changes. The plans are at an early stage and cannot be formally agreed until the fixed-wing and helicopter training contracts are agreed. The Department will then have greater clarity on the timing of the change and the surplus of aircrew needed.

1.19 The rest of the report examines how well the Department can achieve and measure the expected benefits of:

- an external training provider (Part Two); and

- new core training (Part Three).

---

8   HM Government, *Securing Britain in an Age of Uncertainty: The Strategic Defence and Security Review*, Cm 7948, October 2010.

Figure 7
Changes to the timetable to introduce the new core training

| 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 |

Training provider contract (25 years)

Rear-crew stage 1

Advanced jet training

Elementary

Fixed-wing

Multi-engine

Basic jet training

Rear-crew stage 2

Helicopter

◼ Original timetable – initial launch
◼ Original timetable – full capacity
◻ Current timetable – initial launch
◼ Current timetable – full capacity
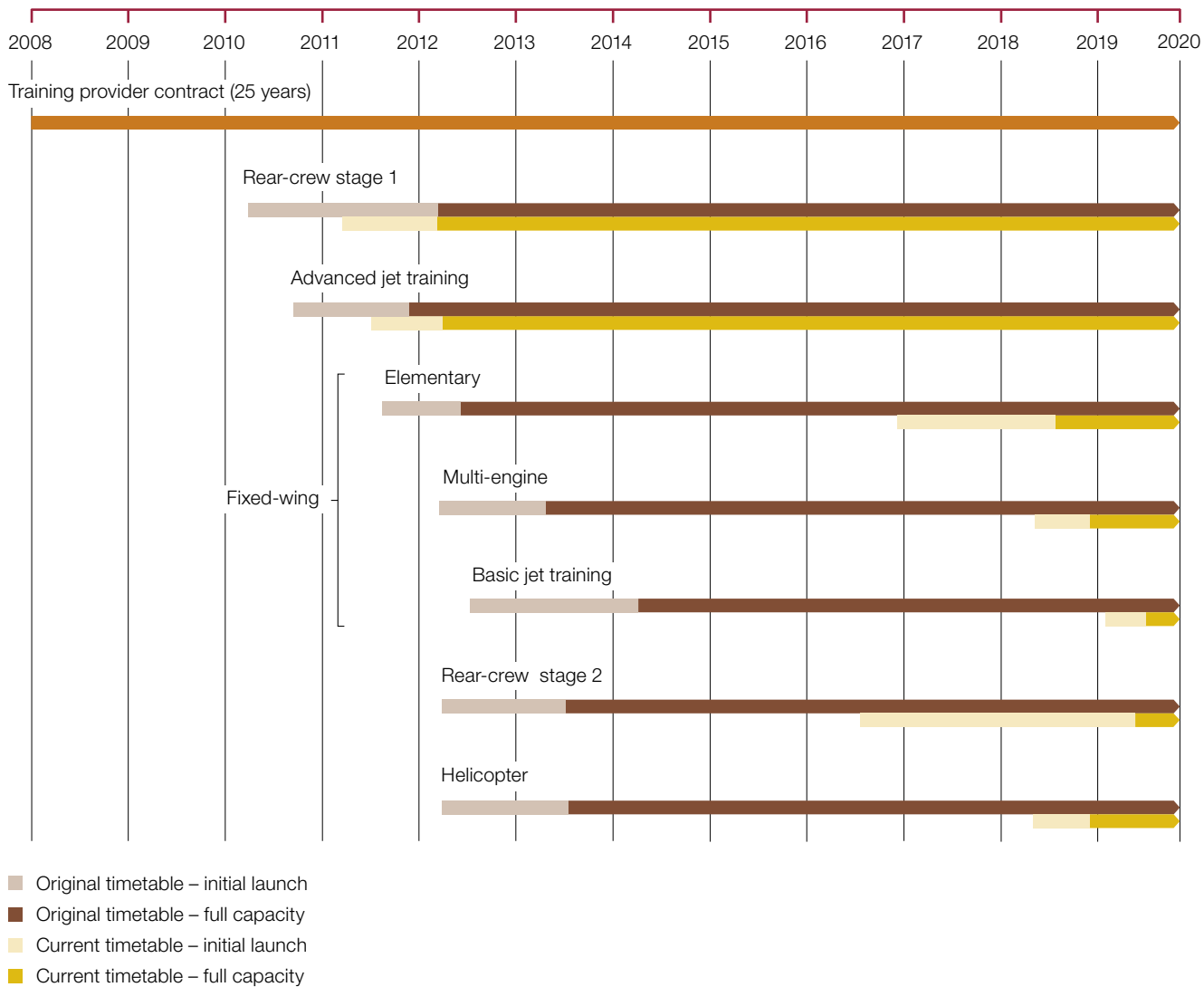
Source: National Audit Office

Part Two

Benefits of an external training provider

2.1 The Department considered several choices to improve core flying training. These included in-house delivery and using an external provider. The Department decided its preferred strategy was to appoint a private sector company, Ascent. The role would require Ascent to work with the Department to provide core flying training for military aircrew.

2.2 The Department identified that introducing a training provider would:

- transfer risk (for example, buying and making available enough aircraft for training);

- increase flexibility to respond to changes;

- promote continuous improvement and innovation; and

- integrate better the different stages of core training.

2.3 This part examines how far the Department's contract with Ascent will enable it to get these benefits (**Figure 8** overleaf).

Risk transfer

2.4 Several factors affect the time, cost and success of flying training. These include aircraft and instructor availability, runway conditions and available airspace. Each may be the responsibility of the Royal Air Force as the lead service for core flying training, the wider military or Ascent. Some factors, such as weather, are beyond anyone's control. The Department has sought to transfer several risks associated with core flying training. These include:

- **Aircraft availability**
  Ascent must make aircraft available to fly a specified number of hours (excluding the advanced jet and rear-crew stage 1 training aircraft already owned by the Department).

- **Running training courses**
  Ascent must run an agreed number of training courses each year.

- **Training an agreed number of aircrew**
  Ascent designs and runs training for an agreed number of aircrew, trained to an agreed standard, each year.

Figure 8
Expected benefits of an external provider

Aim	How this will be met	Assessment of ability to achieve
Risk transfer	Transfer responsibilities of flying training to an external provider.	Limited because the Department retains responsibility for several critical risk factors.
Flexibility	Introduce new core training incrementally to delay making investment decisions until new core training areas are needed.	Incremental procurement has reduced the Department's exposure to over-investment during a period of great change.
	Once in place, new training packages would be able to adapt to later changes in training need.	Contractual restrictions increase the risk of extra costs and delays if programme changes occur.
Continuous improvement and innovation	Performance incentives would reward an external provider for reducing time in training and cost, and improving performance.	Contract incentives are unachievable or do not encourage improvement and innovation.
Integration	Transfer the responsibility for overall design, integration, management and training provision.	Benefits of a single training provider cannot be assessed until all elements of training have been integrated.

Source: National Audit Office

2.5 The Department has transferred risk for core training to Ascent, but it has retained responsibility for several important factors. The Department still provides military instructors, determines the number of students it needs and sets the training input and output standards (**Figure 9**). The risk to UK military capability of not training enough aircrew to meet the military's needs rests with the Department and cannot be transferred.

2.6 The Department's ability to fully transfer risk for core training is subject to several constraints within its contract with Ascent. For example:

● training must be conducted within a military command structure; and

● training must meet Department regulations.

2.7 Ascent also require approval from the Department for:

● training design and course documentation;

● launching procurements for equipment or services;

● annual flying training plans; and

● use of new training equipment and starting new courses.

Figure 9

Responsibilities for flying training

Testing and selection
Controlled by Department

Core training
Controlled by Ascent

Operational training
Controlled by Department

Providing training

Number of students entering training

Aptitude testing and selection

Number of recruits needed

Students available for training

Course design and scheduling

Airspace

Aircraft availability (including number of aircraft and maintenance)

Flying hours

Weather

Civilian instructors

Number of students that complete training

Ground facilities – including simulators

Aircraft selection

Military instructors

Aircrew needed by military

Aircrew length of service

Aircrew combat ready

Operational training intake dates

Number of students entering operational training

□ Controlled by or requires approval by Department

○ Controlled by Ascent

△ Outside of control of Department and Ascent

Note

1   An orange circle within a red rectangle represents areas which are controlled by both the Department and Ascent.

Source: National Audit Office

2.8 To achieve the benefits of the new core training, the Department must understand the factors that affect flying training, their relative impact and who can best control them. It must also understand the risks it has transferred to Ascent. The Department has faced issues during the implementation of advanced jet training that demonstrate the challenge of combining military and industry involvement in core flying training.

Quality of training materials

2.9 When introducing advanced jet training, the Department rejected some elements of Ascent's course materials as not fit for purpose (paragraphs 2.13 to 2.14). The Department provided military training experts to help Ascent to redevelop them. This requirement undermines the contract's aim and risks the Department straying beyond the role of approver into the role of contributor. Such work could affect the Department's ability to hold Ascent to account for risks that it had sought to transfer, as it helped design the training.

2.10 In response, the Department and Ascent have agreed a new approach for developing future training materials. It is intended to give the Department greater visibility as the materials develop. Both parties hope this approach will avoid the need for the Department to get involved in designing training in the future. The approach has been used to develop content for rear-crew stage 1 training, which is a relatively small training area. The new approach will be tested further when course materials for the larger fixed-wing and helicopter training packages are developed.

Availability of military instructors

2.11 Flying training depends on having enough civilian and military instructors. The Department is responsible for providing military instructors. Ascent is responsible for training them to instruct on its selected training aircraft. In late 2013, the Department and Ascent agreed to pause advanced jet training for between three and six months to focus on increasing instructor numbers. Ascent did not have a specific incentive to train instructors and there were not enough instructors to train the aircrew needed. The Department and Ascent first identified the likelihood of there being a shortage of instructors in late 2012. It took until late 2013 for them to agree a solution.

2.12 Any increase in instructors affects the availability of pilots for military operations. With fewer pilots overall following the 2010 Strategic Defence and Security Review (paragraphs 2.19 to 2.23), any movement of pilots from front-line duties will have a greater impact.[9] Further pressure on the availability of qualified military instructors comes from demand for such instructors abroad. The Department understands this risk. It is examining whether it can increase the proportion of civilian instructors to reduce the burden on services to provide instructors, or whether it can offer incentives to retain pilots.

---

9 HM Government, *Securing Britain in an Age of Uncertainty: The Strategic Defence and Security Review*, Cm 7948, October 2010.

Reduced payments

2.13 As at 31 March 2015, the Department had paid Ascent £143.3 million. Ascent is paid for syllabus design, procuring new aircraft and managing the system. It is also paid a separate availability payment when training work is provided (paragraph 2.39). Ascent's contract lets the Department apply financial deductions if Ascent does not meet its responsibilities. For example, if training courses overrun. We found that the Department has struggled to apply performance deductions, with some agreed only after many months of negotiation. Since the contract began in 2008, the Department has deducted £308,000 from payments to Ascent.

2.14 Between 2008 and early 2012, the Department considered Ascent's performance to have been poor. The Department had concerns about cost and schedule control, the quality of core provision, and governance and leadership within the Ascent team. The Department was also concerned that Ascent was showing corporate and individual behaviours that undermined its partnering abilities.

2.15 The Department raised these concerns with Lockheed Martin and Babcock, the shareholders of Ascent, in late 2011. Ascent's shareholders and board accepted these concerns and acted to address them. For example, it:

● introduced a new senior management team;

● restructured Ascent to encourage clearer accountability for programme management, training design and commercial direction;

● agreed to work with the project team and the Royal Air Force to improve the approach to partnership working; and

● committed to recruiting staff to address its lack of subject-matter expertise.

2.16 The Department considers that, since early 2012, Ascent has improved its performance. It has noted an improvement in the quality of its work and a more constructive working relationship with the project team and the Royal Air Force. The performance of all parties will be tested more fully due to the challenging timetable for implementing the remaining training packages (paragraphs 1.14 to 1.18).

Flexibility

2.17 Military needs change in response to the external security environment. This makes it difficult for the Department to manage its investment in infrastructure and equipment for core flying training as the number of aircrew it needs can change frequently. The training system also takes time to respond due to the length of time it takes to train aircrew.

2.18 The Department expected an external provider to give it extra flexibility to minimise the impact of any changes needed. It also contracted Ascent to implement the new core training incrementally. That would give the Department flexibility to make investment decisions to meet future needs when training was needed, rather than setting everything initially. Several events have affected the Department's original assumptions about how its contract with Ascent would work. They have also affected the Department's ability to get the benefits of the new core training.

Reduction in aircrew needed

2.19 The Department sets the number and quality of aircrew needed in two documents: a 10-year forecast of aircrew needed and a specification of required skills. The Department can only amend these through consultation with Ascent. If the required changes affect training packages already contracted for they must be agreed through the contract's change process.

2.20 After the October 2010 Strategic Defence and Security Review, the government reduced the size of front-line flying squadrons. It also planned to remove certain aircraft types from service, such as the Harrier and Tornado fast-jets, earlier than previously expected. The changes resulted in a substantial fall in the number of aircrew needing to be trained each year (**Figure 10** and **Figure 11** on page 30).

2.21 Retiring the Harrier and phasing out the Tornado early meant that the greatest reductions were in the numbers of pilots the Royal Air Force needed to train, which fell by 50%. In comparison, the number of pilots the Army needed to train was reduced by only 19% because of the number of helicopters then needed to support operations in Afghanistan. Reductions in the number of rear-crew that needed to be trained were also greater for the Royal Air Force.

2.22 The changes the government made to its aircrew requirement were made as part of a wider review of defence expenditure. One of the main objectives was to reduce the estimated gap between planned government funding and the forecast cost of defence over ten years. The government planned to do this by reducing spending on equipment and its support, and the size of the armed forces. The changes were to help the Department make the savings it needed to balance its budget.

Figure 10

Changes in number of pilots expected to start and finish core training

The 2010 Strategic Defence and Security Review resulted in a substantial fall in the number of pilots needing to be trained each year

Number of pilots

- ▬ Total UKMFTS input
- ▬▬ Total UKMFTS output
- ▬ Royal Air Force (pilot input)
- ▬▬ Royal Air Force (pilot output)
- ▬ Army (pilot input)
- ▬▬ Army (pilot output)
- ▬ Royal Navy (pilot input)
- ▬▬ Royal Navy (pilot output)
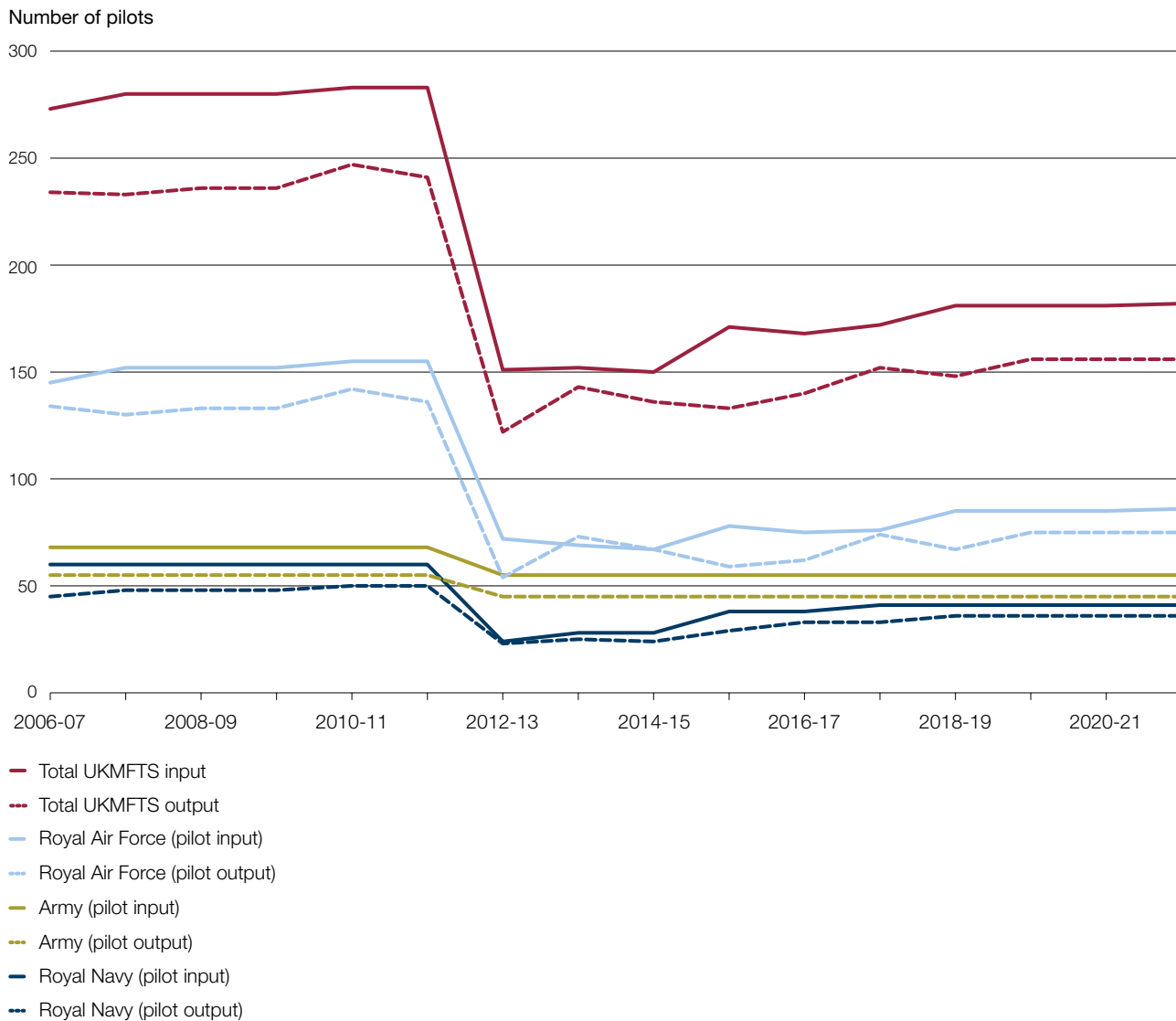
Source: Ministry of Defence

Figure 11

Changes in number of rear-crew expected to start and finish core training

The 2010 Strategic Defence and Security Review resulted in a substantial fall in the number of rear-crew needing to be trained each year

Number of aircrew

- Total UKMFTS input
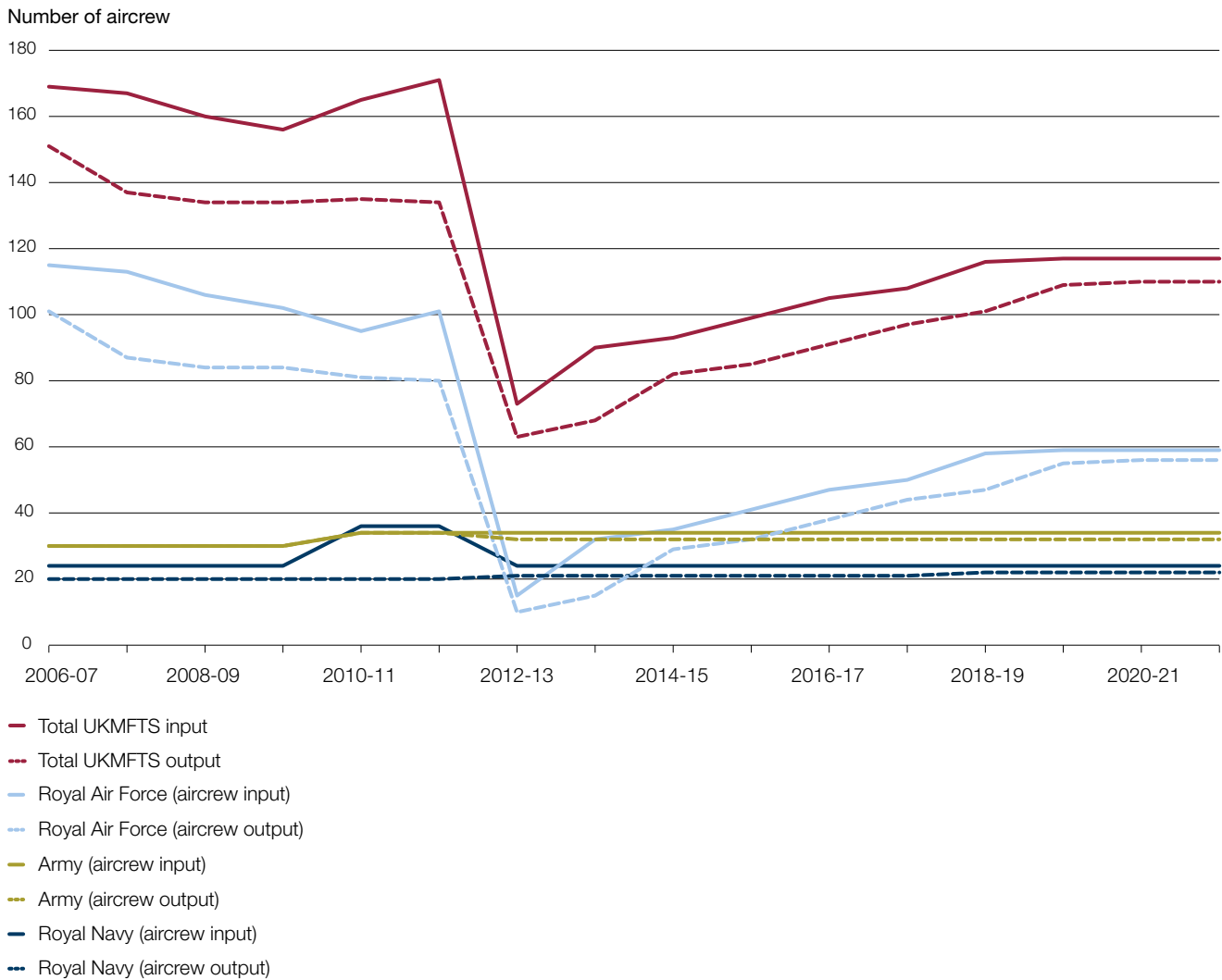- Total UKMFTS output
- Royal Air Force (aircrew input)
- Royal Air Force (aircrew output)
- Army (aircrew input)
- Army (aircrew output)
- Royal Navy (aircrew input)
- Royal Navy (aircrew output)

Source: Ministry of Defence

2.23 The reduction in aircrew needed affected existing core training and the introduction of new core training. For example:

- **Existing core training**
  In 2011, the Department announced it would remove around 170 newly trained or partially trained Royal Air Force pilots from training for redundancy. It retained around 150 of the highest performing pilots but had to stagger their progression through training against a reduced requirement for pilots at the front line. This led to an increase in the number students in training 'holds'. It took around three years to reduce the number of training holds to previous levels (**Figure 12** overleaf).

- **New core training**
  The Department and Ascent had invested in the infrastructure for advanced jet and rear-crew stage 1 training based on pre-2010 aircrew requirements. The Department therefore invested in excess training capacity. The Department can reduce the aircrew it asks Ascent to train each year but fixed infrastructure costs (for example, the cost of classrooms built) cannot decrease and training cost per pilot will therefore increase. The government had also already directed the Department to buy 28 Hawk T2 advanced jet trainers (paragraph 1.12). The reduced training need will result in extra aircraft capacity in advanced jet training.

2.24 The reduction in aircrew needed has also affected industry interest in providing services for the new core training. Two bidders withdrew from the fixed-wing procurement competition. The Department told us this was because of the bidders' inability to meet the affordability targets set for the programme and the impact that would have on potential earnings. This adversely affected the level of competition and the tendering process became a single bidder process.

2.25 Ascent's potential earnings have also been reduced because:

- implementation of new core training has been delayed and much of its payments are linked to training being available for use;

- the incentives it can now earn are lower (paragraph 2.42); and

- the overall value of the programme to introduce new core training has reduced significantly, while planning and infrastructure costs for implementing new core training are largely unaffected by reductions in student numbers.

2.26 The flexibility of training in response to changes in need is constrained, as aircrew training takes many years. This lag between aircrew beginning and finishing training, and having to rebalance the infrastructure and personnel required to train them, means the system requires time to respond to changes.

Figure 12

Impact of changes on Royal Air Force pilot training

The number of students in training 'holds' increased following the 2010 Strategic Defence and Security Review

Number of Royal Air Force pilots

Students in 'holds' (non-productive periods between courses)

Students on courses
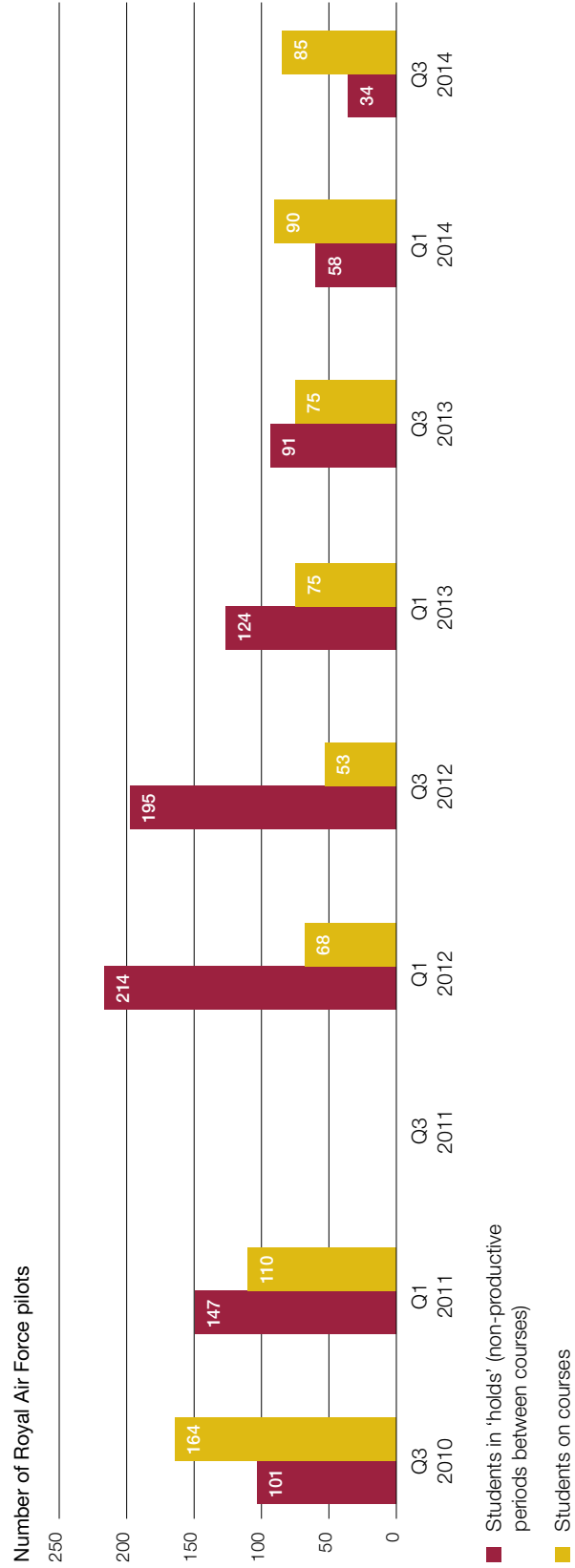
Notes

1   Data are taken from Air Pipeline Management Group (APMG) meetings which occur around every six months.

2   Data are unavailable for quarter three 2011.

3   Consistent data are not available for earlier dates.

Source: National Audit Office analysis of Ministry of Defence data

2.27 The Department benefited from not having contracted for training aircraft and infrastructure for other training – fixed-wing, helicopter and rear-crew stage 2 – because of its incremental procurement strategy. The Department is working to reduce the likelihood of over-investing in the fixed-wing and helicopter contracts before the next strategic defence and security review (scheduled for late 2015).

2.28 The Department plans to buy training on the assumption that the number of aircrew it needs to train will be lower following the next strategic defence and security review. It can buy more training if needed using the contract change process. This approach carries a cost if capacity needs to be increased beyond the limits of existing equipment and infrastructure, but mitigates the risk of over-investment. Any decrease in the number of aircrew needed will require renegotiations using the contract's change mechanism as it would affect Ascent's return on any investment in training infrastructure.

Change in legislation

2.29 The Department originally expected new core training aircraft bought through Ascent would be registered as civilian aircraft under Civil Aviation Authority regulations. The new training aircraft will now need to be registered as military aircraft due to changes in military airworthiness regulations. The new Military Aviation Authority (MAA) will regulate safety. The Department has not yet bought the new fixed-wing and helicopter training aircraft. Therefore those contracts can pass on any risk linked to meeting applicable MAA requirements to the contractor. However, the Department has to certify the aircraft.

2.30 The Department may not have enough time and staff to certify all of the new core training aircraft in time for the planned start of training. There is expected to be a shortfall of staff in the Department's airworthiness authority area to support the certification of the aircraft.[10] The extent of the shortfall will not be fully known until the fixed-wing and helicopter contracts are agreed. The Department currently plans to recruit subject-matter experts into five extra posts. Two of these posts are as yet unfunded.

Change in financing

2.31 Most planned expenditure for the new core training is for buying and maintaining aircraft. The Department designed Ascent's contract assuming that it would finance these costs through the private finance initiative (PFI). This assumption changed, which challenges overall affordability. Overall funding for the new core training was also reduced from a forecast £6.8 billion to £3.2 billion.

---

10 Responsibility for the air safety and, consequently, the airworthiness of military aircraft rests with the Secretary of State for Defence.

2.32 Although the amount expected to be spent on the new core training was reduced, a change in accounting rules for PFI caused funding issues.[11] Funding from central government is allocated as either capital or resource. The Department's original funding was based on using PFI resource funding to procure and support fixed-wing and helicopter training aircraft. However, changes in the accounting rules for PFI mean the Department is now buying the remaining training aircraft differently. Aircraft for helicopter training will be bought through conventional procurement. Fixed-wing training aircraft will still be bought through PFI but will be paid for over a shortened, five-year repayment period.

2.33 Before the changes in financing, the Department forecast the costs of the new core training would be spread over its 25-year contract with Ascent. The changes mean that a large amount of unplanned capital funding is now needed up front to finance aircraft procurements. For example, the Department had assumed that capital expenditure would be around £200 million over the 25-year life of Ascent's contract, compared to resource expenditure of £6.6 billion. Capital expenditure for the fixed-wing contract alone will now total £345 million between 2015-16 and 2020-21 (**Figure 13**). It has taken the Department time to identify the extra capital funding required.

2.34 The requirement for the Department to fund training aircraft using capital funding meant that it faced particular challenges with funding for the new helicopter training package. In 2012, it identified a £496 million capital funding shortfall. Further work by the Department to reduce costs then decreased this shortfall to £388 million. It then explored options to address the remaining shortfall, including delaying the start of the new helicopter training until 2025. However, it could not do this when it found it did not own the training aircraft it uses. The existing provider also did not wish to sell the aircraft. The Department has instead had to extend the existing helicopter training contract by six years to 2018. No further extensions of the contract are possible without breaking EU procurement law. A solution to address the funding shortfall was agreed between the Department and the three services in early 2015. Helicopter training is now expected to start in April 2018.

---

11   PFI deals use private sector funding to spread much of the cost of large capital projects (such as introducing new core flying training) across the duration of a contract. Previously, PFI deals were not always recorded on balance sheet. In such cases, no up-front public sector capital budget cover was required. In April 2009, the introduction of International Financial Reporting Standards changed the rules on the balance sheet treatment of PFI. The change means that much of the costs of introducing new core training now has to be on balance sheet. This means that public sector capital expenditure on the new training has to be managed within the Department's capital spending allocations.

Figure 13

Capital versus resource expenditure for the fixed-wing training contract

The Department had to identify a large amount of unplanned capital funding between 2015-16 and 2020-21 to finance aircraft procurement

Forecast expenditure (£m)

- Resource expenditure
- Capital expenditure
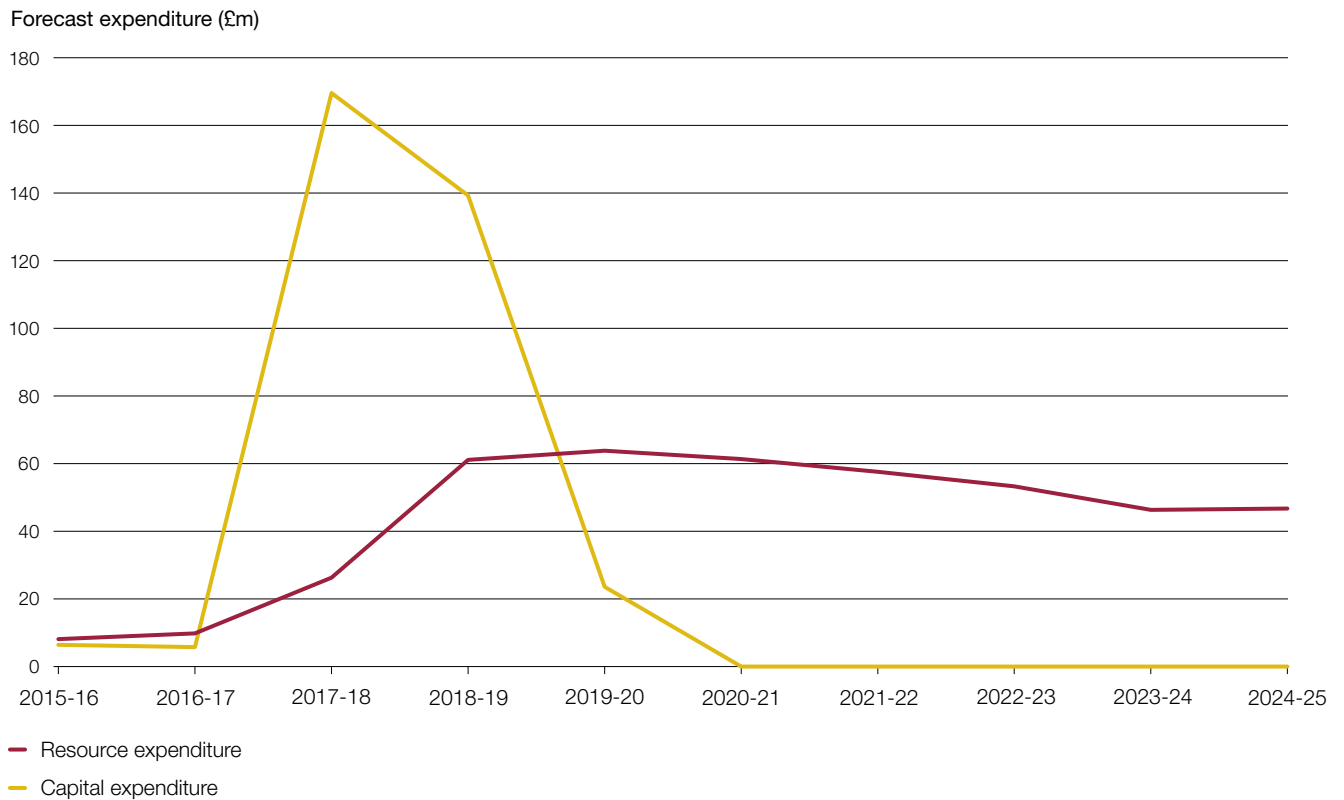
Note

1   Resource expenditure of £424.2 million is forecast between 2025-26 and 2032-33 but is not shown on this chart.

Source: Ministry of Defence

2.35 As well as postponing the start of the new fixed-wing and helicopter training, the funding challenges have led to extra costs. These include:

- costs for staff and external advisers to manage the extended procurement of the fixed-wing and helicopter contracts;

- a cost of £300 million to extend the existing helicopter training contract, although some of this cost is offset by the Department not paying for the new helicopter training until its 2018 start; and

- having to continue using ageing fixed-wing training aircraft that are increasingly unreliable and costly to support.

2.36 The Department still faces cost pressures and is seeking to identify further opportunities to reduce new core training costs. Ascent has agreed to work with the Department to look for savings but the contract does not effectively incentivise Ascent to do so, particularly as its earning potential has already been greatly reduced.

International defence training

2.37 As well as training UK military aircrew, the Department trains international students. The Department does this to:

- create financial income;

- build relationships with other nations; and

- increase foreign buyers' interest in UK military equipment.

2.38 The new core training has been designed to meet UK needs. It will contain no capacity to train international students. There are too few instructors and aircraft throughout the system to meet any future international defence training requirements beyond 2018. Extra international defence training would require more military instructors and, potentially, more airspace, aircraft and associated infrastructure if there is to be no impact on the Department's ability to train UK aircrew. Ascent would also need more funding to provide international training as well as its contracted UK requirements.

Continuous improvement and innovation

2.39 Ascent's contract has four main payment mechanisms (**Figure 14**). Two pay Ascent for designing and providing training. The others offer incentives to improve Ascent's performance in providing training.

2.40 As at 31 March 2015, the Department had paid Ascent £143.3 million. Only around £1.7 million of this was through incentive payments. This is partly because new core training has not been fully introduced (paragraphs 1.13 to 1.14). However, our review suggests the contract's incentives do not sufficiently encourage Ascent to achieve the objectives of new core training.

2.41 The whole system incentive fee seeks to reward Ascent for achieving the three aims of the new core training. These are to:

- optimise time in training;

- reduce costs; and

- close the gap between the skills of aircrew finishing training and the skills required to use front-line aircraft.

Figure 14
Payments to Ascent as at 31 March 2015

Payment/incentive type	Purpose of payment	Payments to date
Training system design fee	Syllabus design, procuring new aircraft and managing the system.	£75.2 million
Training service availability payment	Availability of the training services, such as simulators and aircraft.	£66.4 million
Course completion incentive fee	Providing an agreed number of training courses.	£1.7 million
Whole system incentive fee	System performance, with payments linked to training numbers and course duration.	£6,300[1]
Total		**£143.3 million**

Note
1   Single payment of whole system incentive fee for rear-crew training in April 2014.

Source: National Audit Office analysis of Ministry of Defence data

2.42 However, the fee does not incentivise Ascent to achieve these aims because:

- the fee mechanism assumes a volume of advanced jet training Ascent cannot meet, because fewer aircrew are needed (paragraphs 2.19 to 2.23);

- the fee forms only around 1% of potential payments to Ascent, which is insufficient as an incentive for it to innovate;

- Ascent cannot claim mitigating factors if the Department's actions prevent it meeting whole system incentive fee performance targets; and

- the fee offers an incentive for completing training by number of students, rather than student ability when they join operational training units.

2.43 The course completion incentive fee rewards Ascent for providing an agreed amount of training work on time. This fee is taken from a fixed, annually agreed amount that is based on the number of courses the Department asks Ascent to provide that year. If the Department chooses not to run a course (for example, because it decides to vary the flow of students during the year) the total amount available to Ascent is not reduced. Ascent earns its fee on course completion regardless of how many students attend, complete or pass the course.

2.44 When the Department decided to contract with an external provider, it expected them to challenge how training was done and to innovate. Our interviews with the Department identified little innovation. Interviewees noted that:

- although training will be done with fewer aircraft and more simulators, there will be no significant changes to training design;

- reductions in training time are forecast to be marginal (against the best-case baselines); and

- Ascent's training design team includes a number of ex-military employees whose awareness of front-line demands is increasingly out of date, leading to training materials of poor quality (paragraph 2.9) or that are in some cases similar to existing materials.

2.45 The Department has also retained significant control over core training because it approves the design and provision of many of Ascent's services. This ensures the Department can influence training. However, it risks losing potential innovation, particularly if the armed services resist radical changes to training. Ascent noted that many existing training materials were adequate and did not require radical change. It also stated that proposed training design innovations had been rejected by the Department. The training system now planned is the result of a compromise with the Department, where a more conservative approach to change has been taken.

Integration

2.46 Existing training is based on disparate contractual arrangements. Ascent's role in the new core training includes integrating everything that is needed to design, acquire, manage and provide training. By managing the whole of core training, Ascent is expected to ensure a consistent approach. It is also expected to sequence courses better to avoid training gaps. However, it has only introduced advanced jet and rear-crew stage 1 training. The Department will not get the benefits of a single provider until Ascent integrates all parts of new core training.

Part Three

Benefits of the new core training

3.1 The Department's aims for new core training are to:

- optimise time in training;

- close the skills gap between aircrew finishing training and skills needed to use front-line aircraft; and

- reduce the overall cost of flying training.

3.2 The Department needs to set a performance baseline and the right measurement methods to contract effectively for improvement and to track progress. It also needs to clearly define responsibilities for realising benefits.

3.3 This part examines how well placed the Department is to get the benefits of new core training (**Figure 15**).

Responsibility for getting benefits

3.4 Flying training involves many stakeholders across several lines of funding and accountability. Getting benefits will require the Department to assign clear responsibility for identifying, quantifying, achieving and measuring them. The benefits expected from new core training are qualitative (improving aircrew skill) and quantitative (reducing time and cost). The Department's August 2014 benefits strategy set out roles and responsibilities for getting benefits (**Figure 16**).

3.5 Organisations understood these roles. However, they needed more clarity about the process to get benefits. For example, it is unclear how:

- the Royal Air Force's Training Group will release any cost savings from front-line conversion units not under its control;

- the armed services will be incentivised to seek opportunities to get benefits and release cost and time savings for use elsewhere in defence;

- the Royal Air Force's Training Group will work with the Royal Navy and Army to get benefits across lines of funding and accountability; or

- Ascent will be held to account for achieving benefits without a robust baseline for existing performance (paragraphs 3.7 to 3.36) or effective performance incentives (paragraphs 2.39 to 2.45).

Figure 15

Expected benefits of new core training

Aim	How this will be achieved	Assessment of ability to achieve and measure
Optimise time in training	Refine training content to reduce length of training.	No robust baseline data on actual time in training.
	Reduce 'holds' (non-productive periods between courses).	No readily available data tracking changes in time in training or their cause.
Close the skills gap	Introduce modern training aircraft more like front-line aircraft.	Advanced fast-jet trainer bought. Plans to update rest of training aircraft.
	Improve student ability through improved course content.	No consistent applied approach to measure improvement in pilot ability throughout training.
Reducing costs	Increase proportion of simulated training.	There are plans to increase use of simulators and decrease flying hours and instructors. No accurate baseline data on current costs, so difficult to measure impact.
	Move training from expensive front-line aircraft to cheaper training aircraft.	Some evidence of front-line training being moved to cheaper training aircraft for advanced fast-jet training. No data collected to measure whether training costs reduce at the front line.
	Reduce number of training aircraft.	Plans in place to significantly reduce the number of training aircraft.
	Reduce student failure rates.	Limited understanding of what affects student failure rates.

Source: National Audit Office

Figure 16

Responsibility for getting benefits

Organisation	Responsibility
Project team	Stakeholder engagement, introducing new core training that meets project milestones, performance, time and cost targets agreed with the Royal Air Force.
	Plan, assure and oversee plans for getting benefits.
Royal Air Force Training Group	User acceptance and assuring quality of new training.
	Manage and achieve benefits.
External provider	Achieve benefits through effective, fully integrated flying training.

Source: Ministry of Defence

3.6 To explore how well placed the Department is to identify and get the planned benefits, we examined the Department's:

- data on flying training;

- understanding of flying training performance; and

- readiness to realise and measure benefits when the contractor, Ascent, is running the system at full capacity.

Optimising time in training

Quality of information

3.7 Information on time in training aids understanding of the factors that affect how long it takes to train aircrew. It is also critical for planning when students need to begin training if they are to be ready to meet military needs.

3.8 The Department does not routinely analyse data on training time, nor monitor or report it systematically, to enable comparisons or guide decision-making. This is because there are no agreed and complete central data on students progressing through training. Each of the three services has its own information. The Royal Air Force manages flying training but only has detailed information on the progress of its students. Detailed data on Royal Navy and Army students must be requested when it is needed.

3.9 Analysis is sporadic, or reactive before specific meetings (such as quarterly air pipeline management meetings), or in response to requests. Any analysis is often labour intensive and much data is manually collated because data are not stored in a way that makes analysis easy. The quality of the data is also open to challenge. The data are neither collected consistently nor subject to a common quality assurance process.

3.10 The data do not help analysis of the relative effects of the complex factors that affect training time. Time in training can be affected by course sequencing, weather and availability of aircraft, instructors and even students themselves. Understanding the relative effect of factors, and how to influence them, is critical in trying to reduce time in training. It is also important in helping the Department understand risk and dependencies it is transferring to its training provider, and those it retains. For example, whether efforts to increase availability of training aircraft would be undermined by a shortage of military instructors.

Performance baseline

3.11 When the Department decided to contract an external provider, it had no robust baseline on training time. As part of its work on the fixed-wing training contract, it sought to establish the time to train multi-engine and fast-jet pilots, to compare against the forecast training time in Ascent's system. It lacked readily available data (paragraphs 3.7 to 3.10) and struggled to develop a baseline reflecting actual training time. The Department also said it was difficult to set a baseline as training had evolved as it had tried to improve it since 2000.

3.12 Instead, the Department has developed 'best-case' comparisons that compare the time taken to train multi-engine and fast-jet pilots. It developed these scenarios by assuming courses ran sequentially with minimal gaps in between. The Department's analysis includes 2008 and 2014 baselines, which it compared with Ascent's training. Ascent's model is also 'best-case' and assumes no gaps between training courses.

3.13 The Department's analysis indicates that potential training time has been reduced by the military since 2008 (**Figure 17** on pages 44 and 45). It also indicates that further marginal improvements could be made once Ascent is running the system at full capacity. Sequencing training completion with front-line intake requirements, the timing of which Ascent does not control, will be critical to reducing training time.

3.14 The Department's baselines indicate potential performance, but they assume constant performance and do not reflect actual training time which varies significantly between students. We explored factors that may affect training time. We asked the Royal Air Force to analyse a random selection of 30 pilots from the 224 who had completed training in the past two years. The analysis showed wide variations of many months in the time to train aircrew in the same training streams. Actual training time can be much longer than the Department's baselines show. For example, the Department's 2014 baseline for training a fast-jet pilot is 48 months (Figure 17) compared to actual training time of between 55 and 83 months (**Figure 18** on page 46).

3.15 The Royal Air Force pointed to some likely influencing factors, such as course overruns and issues with aircraft availability. It also noted that the 2010 Strategic Defence and Security Review had affected training time during the period covered by the sample (paragraphs 2.19 to 2.23).[12] However, it could not quantify the actual impact of these factors on training time or explain all the variations in training duration.

3.16 Without understanding performance and what affects training, the Department cannot be certain what level of performance it is contracting for. It assumes that training time will reduce. However, its current approach to assessing reductions in training time may lead to it underestimating the benefits of new core training. For example, by assuming there is less scope for improvement. Or it may lead to Ascent having difficult time-in-training improvement targets, with limited incentives (paragraphs 2.39 to 2.43).

---

12 HM Government, *Securing Britain in an Age of Uncertainty: The Strategic Defence and Security Review*, Cm 7948, October 2010.

Figure 17
Expected reductions in training time

Training time and return of service for a fast-jet pilot

Legacy model 2008

8 months   54 months   12 months

Combat ready

| IOT | EFT | BJT | AJT | Front-line conversion unit |

← 6 years 2 months to combat ready →   ← 5 years 10 months productive life →

Legacy model 2014

8 months   35 months   5 months

9 months

8.5   13   13.5

| IOT | EFT | BJT | AJT | Front-line conversion unit |

Combat ready

← 4 years 9 months to combat ready →   ← 7 years 3 months productive life →

Ascent model 2019

8 months   28 months   5 months

9 months

5   12   11

| IOT | EFT | BJT | AJT | Front-line conversion unit |

Combat ready

← 4 years 2 months to combat ready →   ← 7 years 8 months productive life →

Figure 17 *continued*
Expected reductions in training time

Training time and return of service for a multi-engine pilot

Legacy model 2008

| 8 months | 19 months | 6 months |
| | 9 months | |

IOT   EFT   MEPT   Front-line conversion unit   **Combat ready**

◄——— 3 years 6 months to combat ready ———► ◄——— 8 years 4 months productive Life ———►

Legacy model 2014

| 8 months | 20 months | 6 months |
| | 8   12 | 9 months |

IOT   EFT   MEPT   Front-line conversion unit   **Combat ready**

◄——— 3 years 7 months to combat ready ———► ◄——— 8 years 3 months productive Life ———►

Ascent model 2019

| 8 months | 14 months | 6 months |
| | 5   9 | 9 months |

IOT   EFT   MEPT   Front-line conversion unit   **Combat ready**

◄——— 3 years 1 month to combat ready ———► ◄——— 8 years 11 months productive Life ———►

Note

1   IOT = Initial officer training; EFT = Elementary flying training; BJT = Basic jet training; AJT = Advanced jet training; MEPT = Multi-engine pilot training.

Source: Ministry of Defence

Figure 18

Analysis of aircrew training time

	Maximum training time (months)	Minimum training time (months)
Royal Navy		
Fast-jet	59.2	55.6
Helicopter	50.0	22.0
Army		
Helicopter	14.5	11.5
Multi-engine	11.6	8.3
Royal Air Force		
Fast-jet	83.4	53.6
Helicopter	55.0	45.3
Multi-engine	45.6	35.8

Notes

1　Based on a random selection of 30 aircrew (from a total population of 224) who had completed their training during the last two years.

2　Sample contains a minimum of 2 aircrew within each training category.

3　Training times are not comparable between services as course content and duration varies.

Source: National Audit Office analysis of Ministry of Defence data

Closing the skills gap

Quality of information

3.17 The Department aims for new core training to reduce the training gap between the skills of aircrew finishing training and those needed to use front-line aircraft. This gap is to be closed progressively as students pass through training. For example, by introducing them to digital cockpits and aircraft management systems earlier in their training. To measure progress in reducing the skills gap, the Department will need an agreed and measurable way to assess quality. As well as qualitative assessment of student ability, this could include analysing:

●　changes in first-time pass rates for training;

●　volumes of re-fly rates or refresher training needed; and

●　overall student failure rates.

3.18 We sought to establish how the Department monitors quality as students pass through training. We found that the Department was not systematically monitoring quality throughout training in a measurable way to identify which factors affect it, or to prioritise investment. The focus of training is to train aircrew to the required standard by the end of each stage. There are periodic reports and discussion of student performance, but there is no consistently applied approach to assess quality overall and no tracking of overall student performance over time.

3.19 Operational training units can provide feedback on student quality through the Royal Air Force's customer executive boards, where operational training units and representatives of flying training discuss training system performance. We found evidence of student performance and course suitability being discussed at these meetings.

3.20 Ascent attend customer executive boards covering those areas of training for which they are responsible. It is unclear what status these meetings have in contractual terms and whether the feedback is considered to be formal. For example, Ascent is required to give quarterly performance reports for training it undertakes (currently, advanced jet and rear-crew stage 1 training). The reports have sections for data on student performance in operational training, which they undertake after leaving Ascent-run core training. These reports state that Ascent has had no formal feedback from these units on its students so far.

Performance baseline

3.21 Without a consistently applied approach to assess student quality, the Department has no baseline against which to assess whether the skills gap is closing. It cannot set measurable targets for reducing the skills gap at each stage of training.

3.22 For fast-jet pilots, the Typhoon operational training unit has tracked the relative performance of students trained in the existing advanced jet training course, and the new advanced jet training course as it builds to full capacity. The Department did not record these data and did not hold it centrally for tracking benefits.

3.23 Using data from the Typhoon operational training units, there has been little change in capability between fast-jet pilots who have graduated via the new core training and those who graduated via existing core training (**Figure 19** overleaf). However, it is difficult to draw definite conclusions because few pilots have graduated through the new core training.

Figure 19

Average fast-jet pilot scores at front-line conversion units

Pilot training type	Training area					
	Convex (learning to fly the aircraft)	Combat	Attack	Quick Reaction Alert	Defensive Counter Air	Overall
Existing system training	3.4	3.3	3.6	3.2	3.3	**3.4**
New core training	3.5	3.3	3.6	3.2	3.4	**3.4**
Difference	**0.2**	**0.0**	**0.0**	**0.1**	**0.1**	**0.1**

Notes

1   Pilots are given a score out of 5 for the training activities they undertake.

2   Twenty individual pilot scores (5 from existing core training, 15 from new core training) covering a period between July 2013 and February 2015.

3   All figures are rounded to one decimal place. Figures of 0.0 represent less than 0.05.

Source: National Audit Office analysis of Ministry of Defence data

Reducing costs

Quality of information

3.24 Robust information on costs is critical to identifying opportunities for cost reduction. The Department needs this information to decide what to stop, change or continue.

3.25 We found no evidence of the Department tracking costs of flying training to identify which activities affected cost, and to focus work on reducing costs. We have seen high-level estimates for different aircrew, such as the cost of training a fast-jet pilot or an Apache helicopter pilot. However, these estimates were one-off exercises for business cases or isolated reviews.

3.26 The Department has no common approach to costing. It lacks a robust and agreed methodology for costing main training aspects (for example, the cost of a flying hour on each of its aircraft). It has also not clearly defined which costs should be included.

3.27 The Royal Air Force is reviewing its assumed flying hour rates for each aircraft. The review has identified errors and inconsistencies in the assumptions applied to historic rates. The Royal Air Force is revising its methodology and understanding of its cost base. It aims to:

- identify fixed and variable costs more accurately;

- allot overheads more efficiently; and

- make it easier to update rates more often.

3.28 Ascent will run core training in the future, but the Department will still be responsible for factors that affect cost. The Department must understand the costs of different parts of flying training to challenge Ascent's performance and reduce costs through the areas it still controls. For example, the Department selects students, and student failure is a major contributor to cost. We found no evidence of the Department tracking quality either to:

● identify the causes of any failures; or

● identify those most likely to fail.

3.29 The Department must predict success and failure quickly to avoid unnecessary sunk costs, particularly towards the end of training where costs are higher.

Performance baseline

3.30 The Department expects to reduce the cost of flying training by decreasing the number of:

● training aircraft;

● live flying hours; and

● instructors.

3.31 In its business case for the fixed-wing training contract, the Department set baseline figures and expected performance figures in each of these areas (**Figure 20** overleaf). The Department could not provide complete data for us to test its assumptions around expected changes in performance. For example, Ascent plans to reduce costs by decreasing the number of training aircraft. Availability should increase with more modern aircraft. However, fewer aircraft mean less capacity to absorb lower than planned availability or loss of aircraft to damage. Ascent carries the financial impact of this risk but the Department carries any risk associated with the impact it has on Ascent's ability to train aircrew. The Department has raised concerns about the number of basic flying training aircraft Ascent plans to provide. But we have seen no analysis by Ascent or the Department exploring the potential impact on training output of lower than planned aircraft availability or aircraft loss.

3.32 The Department has also developed a 'best-case' comparison for the cost of core training for a fast-jet pilot (**Figure 21** on page 51). It compares the assumed lowest cost of current training against the planned cost of new core training. The analysis indicates that the cost of training a fast-jet pilot will be reduced by £0.75 million. Our review of the Department's calculations indicates that both the current and forecast cost figures include inaccuracies that may affect their validity.

Figure 20

Expected changes in training equipment and activity

	Existing core training	New core training	Change
Elementary flying training			
Aircraft	40	23	-17
Live flying (hours)	15,058	12,861	-2,197
Simulated training (%)	0	35	35
Military instructors	44	35	-9
Civilian instructors	17	23	6
Basic flying training			
Aircraft	40	10	-30
Live flying (hours)	7,500	5,142	-2,358
Simulated training (%)	33	46	13
Military instructors	48	15	-33
Civilian instructors	1	5	4
Multi-engine training			
Aircraft	7	5	-2
Live flying (hours)	5,000	3,305	-1,695
Simulated training (%)	35	58	23
Military instructors	25	14	-11
Civilian instructors	0	6	-6

Source: Ministry of Defence

Figure 21

Expected changes in core training for fast-jet pilots

Training type	2014 'best-case' baseline	Expected new core training performance
Live flying (hours)	300	245
Simulated training (hours)	112	193
Training duration (years)	3.6	3.0
Cost (£m)	2.25	1.5

Note

1 Information covers elementary flying training to completing advanced fast-jet training.

Source: Ministry of Defence

3.33 Most training costs occur at operational training units when training aircrew on front-line aircraft types rather than in core training. The cost of operational training is unknown. However, an Army estimate in 2011 suggests that £3.2 million of the estimated £3.6 million it costs to train an Apache attack helicopter pilot are outside of core training. Therefore, the greatest potential cost savings are likely to be after this phase of training and fall under a different area of responsibility.

3.34 Extra activity within core training will incur costs, even if it reduces costs overall. If training transfers from expensive front-line aircraft to less expensive aircraft in core training, the Department must either:

- reallocate funding from operational training (for example, by renegotiating support contracts to recognise reduced flying hours) into core training to fund the extra activity; or

- provide extra funding for core training and use the flying hours in the operational training for more advanced training.

3.35 The Department has so far been unable to identify specific cost savings in operational training. It cannot get significant financial benefits until it does this, and decides how to reallocate funding or use extra flying hours.

3.36 For example, the Typhoon operational training unit has altered its training programme to reflect the new approach to core training for advanced fast-jet pilots. It now flies fewer training flights to achieve the same pilot quality. This has helped to reduce training time from 24 to 18 weeks, which has made aircraft available for more front-line duties. However, the Department has not measured this increased availability and the front line has not quantified the benefit.

Appendix One

Our audit approach

1 This report examined whether the Ministry of Defence (the Department) can achieve and measure the expected benefits of new core flying training run by an external provider. It also looked at progress to date. We reviewed:

- the rationale and aims for the new core training;

- how well the Department is managing the move to the new core training; and

- the progress the Department has made towards achieving its aims.

2 Our audit approach is summarised in **Figure 22**. Our evidence base is described in Appendix Two.

Figure 22

Our audit approach

The Department's objective	To provide more efficient training that will: ● optimise time in training to increase the productive life of aircrew; ● close the gap between the skills of aircrew finishing training and the skills needed to use front-line aircraft; and ● reduce the overall cost to the Department of flying training.
How this will be achieved	By introducing new core training that will use modern training aircraft that better represent front-line equipment, increasing the amount of simulation flying training and improving the sequencing of training. The Department appointed a private sector company to provide the new core training over 25 years. Transition to the new training requires the Department to coordinate the move from the existing system in phases to minimise disruption to the number of students trained each year.
Our study	We examined how well the Department can achieve and measure the expected benefits of new core training run by an external provider. We also examined the progress to date and the main risks to moving to the new core training. Until the new core training is implemented fully, and students have passed through it, we cannot assess whether it has gained the expected benefits.

Our key questions	Was there a clear rationale for the new core training and the chosen approach to providing it?	Is the Department on track to get the intended benefits of the new core training?	Is the Department identifying and managing the key risks to moving to the new core training?
Our evidence (see Appendix Two for details)	We assessed the Department's rationale for the programme by: ● reviewing and analysing official documents including the new training planning documents and decision documents; and ● interviewing key staff responsible for developing the new training.	We assessed progress by: ● reviewing and analysing official documents and data used in assessing performance against the Department's aims; ● reviewing contract documents between the Department and its external provider, Ascent; ● assessing how training is managed by the Department and Ascent; and ● interviewing key staff responsible for implementing and monitoring the new core training.	We assessed the risks by: ● reviewing and analysing official documents and data including planning documents; and ● interviewing key staff responsible for providing training and managing the move to the new core training.

Our conclusions	Implementing the new core training has been complicated by budget reductions, scope reductions and changes in the planned approach to financing. These changes have undermined the Department's original assumptions about how its long-term contract with Ascent would work. The legacy of these changes has understandably taken the Department time to resolve and has resulted in lengthy delays. The new core training has not been fully implemented and there is much to do if the Department is to get the planned benefits of the new approach. Combining military and industry involvement in flying training has been challenging, particularly in relation to ownership of risk. The contracts already let have not effectively incentivised industry to help the Department achieve its aims for new core training. The Department needs to more fully understand training performance and what affects it before it can leverage significant improvements in core training. If the Department does this, and its training requirements do not fundamentally change again, there remains a significant opportunity to improve the value for money of military flying training. If it does not, there is a real risk that moving to the new core training will affect the military's ability to train the right number of aircrew at the right time.

Source: National Audit Office

Appendix Two

Our evidence base

1   We reached our independent conclusion on how well the Department can achieve and measure the expected benefits of flying training run by an external provider by analysing evidence that we collected between January and April 2015. Our audit approach is outlined in Appendix One.

2   We considered the context for the Department when developing its plans to work with industry to develop new core training, such as the financial environment and for UK defence needs. We reviewed official documents that showed why the Department made key decisions and how it assessed value for money.

3   We assessed the Department's aims for the new core training. We also examined its understanding of the complex factors involved in training aircrew and how it has sought to transfer risk to its external provider.

4   We conducted semi-structured interviews with officials responsible for recording data on training and for getting the benefits of the new core training. We assessed the robustness of management information available and whether the Department had a clear understanding of the factors which affect flying training.

5   We independently assessed the management information which the Department holds on the current flying training and how the data was being used to measure improvements against the aims of the new core training.

6   We assessed whether the Department is on track to introduce new core training to time and cost.

7   We reviewed the contract between the Department and Ascent to determine the suitability of the contract to encourage Ascent to achieve the aims for new core flying training.

8   We looked at the flexibility of the contract and the Department's ability to make changes to training in response to changes in military need.

9   We undertook semi-structured interviews with senior management from Ascent, in order to determine the Department's performance from a contractor perspective and to assess the level of risk transfer.

10   We undertook semi-structured interviews with staff at operational training units who receive newly-trained aircrew to understand whether their needs were being met and their level of interaction with the core training system.

11   We visited locations where training is conducted, and performed semi-structured interviews with staff in order to get their views on how training operates and to determine the risks involved in providing training.

12   We undertook document review of the business cases for each area of new core training in order to assess whether the Department had a clear understanding of its requirements for training and whether it had clearly defined the responsibilities of the contractor.

13   We conducted semi-structured interviews with senior officials within the Department with responsibility for the existing and new core training. We discussed how flying training is run, the risks to running it effectively, the development of the new core training and the expected benefits of an external provider.

NAO

National Audit Office