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Defence Committee

The work of the Defence Science and Technology Laboratory and the funding of defence research

Eighth Report of Session 2006–07

Report, together with formal minutes, oral and written evidence

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Summary

The Defence Science and Technology Laboratory (Dstl) was established as an MoD Executive Agency on 1 July 2001 and has operated as a Trading Fund since that date. Dstl exists to provide independent, high quality scientific and technological services to the Ministry of Defence (MoD), the UK Armed Forces and other Government Departments, in those areas considered inappropriate for the private sector.

The services provided by Dstl to the MoD and other parts of Government are wide-ranging and include support for current military operations in Iraq and Afghanistan. It is regarded as a world authority in many fields of defence research.

Since it was established, Dstl has been successful in meeting the financial targets set for it and has paid an annual dividend to the MoD. It has also demonstrated a good track record against its Key Targets. As a Trading Fund, Dstl is allowed to retain profit for future investment: it is making a major investment in rationalising Dstl sites from 15 to three. The cost of building and refurbishment on the remaining sites has a target price of £92 million. It will be important for Dstl to draw on outside project management expertise to monitor closely the progress against cost and time targets for this work.

The Defence Technology Strategy launched in October 2006 will have a substantial impact on Dstl's future work. Dstl will need to align its expertise, programmes and capabilities with the MoD's requirements as set out in the Strategy.

The UK spending on defence research is just over a tenth of what the US spends and the gap appears to be widening. UK operations in Iraq and Afghanistan are having an impact on the UK's defence research, as there is a focus on short-term research to support these operations. The MoD is seeking greater investment by industry in defence research. However, to maintain the UK's global position in defence research further investment by the MoD and Government is required. Without such investment the UK's long-term military capability will be substantially reduced.

1 Introduction

1. The Defence Science and Technology Laboratory (Dstl) was established as a Ministry of Defence (MoD) Executive Agency on 1 July 2001 and has operated as a Trading Fund since that date.[1] The overall objective of Dstl is to

> deliver value to the UK taxpayer, by using its assets and capabilities to deliver timely advice and solutions to the Government's most important defence and national security-related problems in the most efficient and effective manner. Value is created and delivered by focusing Dstl efforts on the following areas:
>
> - meeting the requirements of the MoD;
> - meeting the defence and national security-related requirements of other governmental customers; and
> - exploiting Dstl's intellectual property, in line with government policy for technology transfer in order to generate value for money for the taxpayer.[2]

2. We announced an inquiry into the work of Dstl on 7 September 2006 as part of our scrutiny of the MoD's executive agencies.[3] In undertaking our inquiry, we took oral evidence on 28 November 2006 from Dstl management: Dr Frances Saunders, Acting Chief Executive; Mr Peter Starkey, Future Business Director; and Mr Mark Hone, Finance Director.[4] To cover wider issues relating to defence research and defence research funding we also, following the oral evidence session with Dstl management, took oral evidence from MoD officials: Professor Sir Roy Anderson, Chief Scientific Adviser (CSA); Mr Trevor Woolley, Finance Director; Mr Mark Preston, Director of Business Delivery; and Dr Paul Hollinshead, Director Science and Technology Policy.[5] We received written evidence from the MoD.[6] We are grateful to all those who contributed to our inquiry including our specialist advisers.

3. In our recent inquiry *The Defence Industrial Strategy: update*, we received evidence about defence research and the Defence Technology Strategy which was launched on 17 October 2006.[7] We have drawn on this evidence for this inquiry.[8]

1 Dstl Framework Document, November 2006, p 6

2 Ev 23

3 Defence Committee press notice, *Scrutiny of the Defence Science and Technology Laboratory*, 7 September 2006

4 Ev 1–12

5 Ev 12–22

6 Ev 23–42

7 Ministry of Defence, *Defence Technology Strategy for the demands of the 21st century*, October 2006

8 Defence Committee, Sixth Report of Session 2006–07, *The Defence Industrial Strategy: update,* paras 57–64 and evidence

2 The role of Dstl

4. Dstl's role is "to provide independent, high quality scientific and technological services to MoD, the UK Armed Forces and Government, in those areas inappropriate for the private sector".[9] MoD's memorandum states that Dstl does not directly compete with industry in any of its activities unless specifically requested to do so by the MoD. Also, Dstl only undertakes commercial work when specifically requested to do so by the MoD. [10]

5. Dstl's work for the MoD can be broadly separated into four areas:

- support functions, consisting mainly of the development of military capability for the MoD's Chief Scientific Adviser (CSA), but also including work commissioned from the Defence Estates Agency and the Defence Intelligence Staff;
- work in support of military operations for the three Services and Command Headquarters;
- supporting the acquisition and maintenance of military equipment for the Deputy Chief of Defence Staff (Equipment Capability), the Defence Procurement Agency (DPA), and the Defence Logistics Organisation (DLO); and
- carrying out a range of tasks relating to policy for the MoD's Policy Director.[11]

A breakdown of Dstl's major areas of work is set out in Table 1.

Table 1: Breakdown of Dstl's major areas of work

Area of work	Value £ million	% of total value
Acquisition	82	24.1
Equipment Capability	167	49.1
Policy	15	4.4
Intelligence	18	5.3
Operations	18	5.3
Commercial	19	5.6
Government Departments other than the MoD	21	6.2
Total	**340**	**100**

Source: MoD[12]

9 Dstl Framework Document, November 2006, p 6

10 Ev 23

11 *Ibid.*

12 Ev 24

6. Dstl employs some 3,400 people.[13] We asked how Dstl's staff were apportioned to the broad areas of work that Dstl undertook. Dr Saunders, Dstl's Acting Chief Executive, told us that

> if you think about the three sorts of work we tend to do, some is associated with supporting systems work—the higher level concept of development, support to policy development and support to the early stages of procurement—and probably about a third of our people are involved in that kind of work. The second third are looking more at the technology, so actually developing technology solutions that will be deployed in future equipments, particularly supporting things like urgent operations requirements (UORs)…. The final third is doing rather longer-term research of a strategic nature which uses the deeper end of Dstl's research base into areas such as biomedical counter measures, detection of chemical agents in the field, biological agents and explosives.[14]

7. The Defence Evaluation and Research Agency (DERA) was split up in July 2001 into Dstl, an Executive Agency of the MoD, and QinetiQ, then a Government-owned company. A quarter of DERA's staff were transferred to Dstl, the remaining three-quarters to QinetiQ.[15] In our report on the MoD Annual Report and Accounts 2004-05, we reported on the flotation at the start of 2006 of QinetiQ.[16] Our predecessors undertook inquiries into DERA[17] and Dstl.[18]

8. We sought clarification on how Dstl's role differed from the roles of QinetiQ and the universities. Dr Saunders said that Dstl was retained in government to do

> those things that are best done in government…. particularly, of a sensitive nature or where we need to work very closely with industry and need to deal with proprietary information in areas such as support to operations or counter-terrorism…. where it would not be appropriate for some of that work to be done in the private sector.[19]

Dr Saunders said that Dstl tended to do more applied research than academic research. Dstl worked closely with universities so that they had a better understanding of what the MoD's requirements from science and technology might be in the future. She added that "then we can work with them to pull through their ideas into our more applied research".[20]

9. We examined Dstl's work in three key roles: counter-terrorism; support for operations; and equipment acquisition.

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13 Q 6

14 Q 7

15 National Audit Office, *The Management of Defence Research and Technology*, HC 360, Session 2003–04, pp 37–38

16 Defence Committee, Sixth Report of Session 2005–06, *Ministry of Defence, Annual Report and Accounts 2004-05*, HC 822, paras 96–101

17 Defence Committee, Ninth Report of Session 1999–2000, *The Future of DERA*, HC 462

18 Defence Committee, Fifth Report of 2000–01, *The Draft Defence Science and Technology Laboratory Trading Fund Order 2001*, HC 289

19 Q 5

20 *Ibid.*

Counter-terrorism

10. The MoD's memorandum states that Dstl "has made a major contribution, both in terms of technology and expertise, to the fight against international terrorism both in the UK and abroad".[21] The MoD has decided to bring together its counter-terrorist activities into a dedicated facility: the Counter-Terrorism Science and Technology Centre, at Porton Down in Wiltshire, operated by Dstl on behalf of the MoD.[22]

11. Dstl also operates the Forensic Explosive Laboratory (FEL) at Fort Halstead, Kent, which is funded by the Home Office. Each year, Dstl provides forensic and scientific support and advice to more than 300 police investigations involving the criminal misuse of explosives. For example, it provided support to the Metropolitan Police in July 2005 when London's transport infrastructure was attacked.[23]

12. More recently, Dstl has been involved in the investigation into the death of Alexander Litvinenko.[24] Dr Saunders told us that Dstl had been asked by the Health Protection Agency to support them by providing its radiological detection team, whose primary role was to respond to accidents at military establishments.[25] The CSA also referred to Dstl's role in the Litvinenko investigation and in detecting polonium-210 as illustrative of its importance to the UK, not just in defence but in many security areas. He told us that Dstl provided deep technical expertise and that this was "something we need to nurture and sustain and look after".[26]

Support for military operations

13. Dstl is called upon to provide scientific support to military operations. The MoD's memorandum states that Operation TELIC (UK military operations in Iraq) saw the largest number of scientists being deployed to support operations since the Second World War and more than 100 Dstl staff have received medals "in recognition of their contribution to Operation Iraqi Freedom".[27] Dstl's involvement in Operation TELIC has covered: support to campaign planning; the delivery of equipment as part of the Urgent Operational Requirements (UOR) process; and on-going post-conflict support. The attack in New York of 11 September 2001 and the subsequent operation in Afghanistan saw Dstl staff permanently deployed to the Permanent Joint Headquarters (PJHQ) in London and to Afghanistan.[28]

14. A vital area in which Dstl has provided support is in responding to the threat from Improvised Explosive Devices (IEDs). The MoD's memorandum states that Dstl has developed "expedient armour" which, when fitted to armoured vehicles, has provided

21 Ev 24

22 Ev 32

23 *Ibid.*

24 Alexander Litvinenko, a former Russian security officer, died in a London hospital in November 2006 after being poisoned with radioactive polonium-210

25 Q 8

26 Q 168

27 Ev 32–33

28 Ev 33

enhanced protection against the specific threats being faced in Iraq and Afghanistan.[29] We asked Dr Saunders why the work Dstl undertook in relation to IEDs could not be undertaken by commercial organisations. Dr Saunders told us that in this area of work, there were sensitive security and intelligence issues which the MoD would not want to communicate widely to industry.[30] Dr Saunders added that Dstl "actually do some of the design work…. So we are actually coming up with the solutions ourselves".[31]

Equipment acquisition

15. Dstl also provides advice to support major equipment acquisition programmes. MoD's memorandum states that

> Dstl contributes at all stages of MoD's Smart Acquisition cycle: from analysing the shortfalls in military capability, identifying and developing the concepts needed to make these good, through to supporting the selection of equipment suppliers, and beyond, once equipment has entered service.[32]

Dstl has contributed to most acquisition programmes for all three Services and in all areas of military capability. The Future Rapid Effect System (FRES) and the Joint Combat Aircraft (JCA), for which the UK has selected the US Joint Strike Fighter (JSF) to fill the JCA requirement, are two examples of programmes where Dstl has been providing support.[33] We have undertaken inquiries into both these programmes.[34] On the JSF programme Dstl provided independent advice to the MoD's Investment Approvals Board on the risks in the programme, and have continued to assist the JCA Integrated Project Team (IPT) within the DPA in monitoring and reducing risk.[35]

16. Mr Peter Starkey, Dstl's Future Business Director, told us that in addition to the support provided to individual equipment programmes such as JSF and the Future Carrier, Dstl was involved in broader programmes such as Network Enabled Capability (NEC) and the future defence supply chain initiative. For the latter, industry would provide the new system, but Dstl had looked at what the current system provided, modelled the way that logistics flowed through the system, and concluded that there were improvements that could be made.[36]

29 Ev 33

30 Q 32

31 Q 33

32 Ev 34

33 Ev 35

34 Defence Committee, Second Report of Session 2005–06, *Future Carrier and Joint Combat Aircraft Programmes*, HC 554, and Defence Committee, Seventh Report of Session 2006–07, *The Army's requirement for armoured vehicles: the FRES programme*, HC 159

35 Ev 35

36 Q 31

Future role

17. In November 2006, the MoD published a revised Framework Document for Dstl. In the foreword to the Framework Document, Lord Drayson, Minister for Defence Procurement, stated that

> this Framework Document builds upon its predecessor and now sets out in one place what is required of Dstl as a Next Steps Agency…. In short, the Framework Document explains the Ministry of Defence's expectations of the organisation, including its top level objectives, and the mechanics and governance arrangements in place to ensure their effective delivery.[37]

18. We asked what were the major changes in the Framework Document and what impact the changes would have. Dr Saunders pointed to two areas. First, it provided a "rather clearer statement of the top-level objectives for Dstl". She was pleased to see that there was an objective about maintaining and sustaining capability to support the MoD in the future. Second, it made a change in the governance arrangements. A "new non-executive dominated board" had been put in place to oversee Dstl and "discharge the ownership function on behalf of MoD as owner". The Framework Document sets out at the role of the board and the corporate governance arrangements.[38]

19. The MoD's memorandum states that, in order to sustain its role in the longer term, Dstl needs to:

- maintain a high-level overview of science, technology and engineering relevant to defence and security;
- be world-leading practitioners in overarching technical areas such as systems and capability engineering advice as well as in the development and application of underpinning science and technology to address sensitive defence capability challenges; and
- actively engage with industry, government laboratories and academia in the UK and overseas.[39]

20. **We note that the new Framework Document provides a clearer statement of the top-level objectives for Dstl and makes it a key objective to maintain and sustain its capability to support the MoD in the future. We see such an objective as vital and look to the MoD to provide the necessary resources to achieve it.**

Collaboration

21. The MoD's memorandum states that Dstl has an extensive network of worldwide contacts in the military, academia and industry which it uses to ensure that the MoD is

37 Dstl Framework Document, November 2006, p 2

38 Q 11

39 Ev 23

aware of, and has access to, the very latest developments in science and technology.[40] Examples of collaboration are:

- a network of links with other Government Laboratories. The Inter Lab Forum is a partnership of the six UK Public Sector Research Laboratories. The Forum is seen as a way of ensuring that Government scientists can work together better across a range of work, but particularly in responding to emergencies;
- Co-operative Research Centres (CRCs) in UK universities, which facilitate the exchange of staff and pooling of resources between Dstl and its academic partners;
- Dstl has played a leading role in establishing an international network to assist with the scientific investigation of terrorism; and
- the Coalition Warrior Interoperability Demonstration (CWID) which Dstl hosts annually. CWID is designed to demonstrate emerging technologies for Command, Control, Communications and Computers (C4) and Intelligence, Surveillance, Target Acquisition and Reconnaissance (ISTAR) systems and improve interoperability between coalition nations.[41]

22. Dstl's Annual Report and Accounts 2005–06 provides further examples of international research collaboration involving Dstl. It participates in some 20 fora spanning the main European nations, the US, Australia and Canada. Dstl has played a role in forging a new UK/US initiative, the International Technology Alliance, which will facilitate joint technology development across UK and US governments, industrial and academic laboratories. Dstl is also involved in laboratory-to-laboratory partnerships with other countries such as France.[42] Dr Saunders told us that, based on the amount of activity, the most important international partners were the US and the other nations in The Technical Co-operation Programme (TTCP) activity (Canada, Australia and New Zealand).[43]

23. We asked what was the objective of international collaboration. Dr Saunders told us that the policy and objectives for international research collaboration was set by the MoD. Dstl's role was

> to help the MoD get gearing from the international research collaboration so they can get access to more knowledge through information exchange, and so on, than they would be able to get if all they did was fund the work in the UK.[44]

International collaboration also ensured that there was an element of Government-to-Government peer review, which allowed Dstl to test out its ideas against other scientists in government laboratories who perhaps had a different perspective.[45]

40 Ev 35

41 Ev 35–36

42 Dstl Annual Report and Accounts 2005–06, HC 1163, p 15

43 Q 94

44 Q 91

45 *Ibid.*

24. **Dstl has been proactive in networking with other organisations involved in defence research in the UK and overseas. International collaboration in defence research offers substantial benefits to the UK. For Dstl to be able to continue to collaborate with the US and other nations, it is vital that the UK provides sufficient research funding for Dstl to retain its current position and continue to be regarded as a worthwhile collaborative partner.**

3 Performance

Key Targets

25. The MoD Annual Report and Accounts 2005–06 summarises Dstl's performance against its Key Targets:

- 2005–06: 7 of 10 Key Targets achieved;
- 2004–05: 7 of 7 Key Targets achieved; and
- 2003–04: 7 of 7 Key Targets achieved.[46]

2005–06 Key Targets

26. Dstl's performance against its Key Targets for 2005–06 is set out in Table 2.

Table 2: Dstl's performance against its 2005–06 Key Targets

Target	Outcome
1. Maintain and by the end of a three-year period show an increase in score for scientific and engineering capability in the technical benchmarking exercise from 67% in 2002/03 to 72% in 2005/06—moderated by external assessors agreed with MoD's Chief Scientific Adviser (CSA)	Achieved
2. Identify and agree with MoD's CSA the top 10 Dstl capability needs, their alignment with the future programme and the required MoD funding by March 2006	Achieved
3. By the end of the three-year period show a linear improvement of at least 1.5% on the FY2004/05 customer satisfaction score of 75.4% for service provision	Not achieved
4. Implement a process for identifying and publicising Dstl's major achievements during the year	Achieved
5. Achieve Health and Safety Executive approval of the category 4 microbiology containment facility by 31 October 2005	Achieved
6. Define the scope, structure and funding requirements of a new defence and security research and development centre and, subject to new funding being available from customers, prepare a specific proposal for its creation	Achieved

46 Ministry of Defence Annual Report and Accounts 2005–06, HC 1394, p 263

Target	Outcome
7. Achieve planned progress within budget to meet the completion date of 2008 for the transfer of Dstl onto three core sites at Porton Down, Portsdown West and Fort Halstead. The key milestones for 2005/06 are: appoint the preferred bidder (August 2005); negotiate with the preferred bidder a reduction in facilities management costs of Dstl of at least 15% from August 2006; sign the contract (March 2006)	Not achieved
8. By December 2005, complete the detailed design and build phases of the new Integrated Corporate Applications System (iCAS) that will deliver Dstl's business information requirements from 2006/07	Not achieved
9. Maintain the average charge rate for staff for 2005/06 and beyond below that for 2001/02 uplifted by GDP deflator	Achieved
10. Achieve a ROCE of at least 3.5% averaged over the period 2004/05 to 2008/09 and an MoD dividend of £3 million in 2005/06	Achieved

Source: MoD[47]

27. We asked about the 2005–06 Key Targets which were not achieved and what action Dstl had taken. MoD told us that:

- for Key Target 3, the 2005–06 customer satisfaction score for service provision was 74.7%—a decrease of 0.7% on the baseline 2004–05 score. An investigation showed that the main cause was a "notably reduced score from customers in the Research Acquisition Organisation" (RAO).[48] Steps were being taken to improve the relationship with MoD Head Office and RAO science staff;

- for Key Target 7, the rationalisation project to consolidate Dstl's activities onto three core sites achieved two of its three key milestones, but it was not possible to sign the Facilities Management (FM) contract in March 2006. Serco had now been appointed as the FM provider. The handover of Facilities Management took place, as planned, on 1 August 2006. We examine the Dstl site rationalisation project later in this report (paragraphs 58–63); and

- for Key Target 8, the target to complete the detailed design and build phases of the new Integrated Corporate Applications System (iCAS) by December 2005 was not met. A decision was taken to delay the project to incorporate the latest version of the Peoplesoft 8 software into the design. Work was progressing well and the project was scheduled for completion in February 2008.[49]

47 Dstl Annual Report and Accounts 2005–06, HC 1163, p 24

48 The RAO is part of the MoD and is responsible for ensuring effective delivery of the MoD's non-nuclear Science and Technology research

49 Ev 29

28. **Dstl achieved seven of its ten Key Targets in 2005–06. Action is in hand to address those targets which were not fully achieved in the year.**

29. The CSA told us that the MoD was constantly evolving the Key Targets.[50] Mr Trevor Woolley, MoD's Finance Director, told us that

> some of the targets are harder than others. Some of the more qualitative targets in this area are inevitably going to be difficult….The targets are evolving. We are trying to reduce the number of targets to try and make them a little more relevant and in some respects they have got tougher over the years.[51]

2006–07 Key Targets

Table 3: Dstl's Key Targets for 2006–07

Area	Target
Delivery	1. Achieve a level of overall customer satisfaction in our delivery of at least 76.4% for FY2006/07 against a three-year target of 76.9% (FY2007/08) 2. Deliver high-quality outputs that have impact on MoD customers' top ten priority issues
People	3. Achieve an overall score of at least 72% for scientific and engineering capability in the technical benchmarking exercise. Develop, and agree with CSA, a robust process for assessing the quality of Dstl's evolving technical capabilities for the period 2007–2011
Environment	4. As part of the strategic aim to bring Dstl onto three sites by 2009, agree the overarching construction and facilities management contract and achieve key milestones on programme to time and cost, including delivering predicted efficiency gains 5. To enable greater knowledge sharing, improved management and operational efficiencies, by meeting agreed in-year targets to ensure Dstl has in place an integrated corporate business environment by the end of FY2008/09
Business Essentials	6. Achieve an average Return on Capital Employed (ROCE) of at least 3.5% over the period 2004/05 to 2008/09

Source: MoD[52]

30. Dstl's Annual Report and Account 2005-06 states that Dstl had "set out three overarching key result areas to focus the whole organisation's efforts on achieving results". The key result areas are: delivering high-quality output on the really important issues;

50 Q 171

51 Q 174

52 Dstl Annual Report and Accounts 2005–06, HC 1163, p 25

enabling people to realise their full potential; and creating an environment in which excellence can thrive.[53] Dstl's Key Targets for 2006–07 are set out in Table 3.

31. The number of Key Targets for Dstl has reduced from ten in 2005-06 to six in 2006–07. The six Key Targets in 2006–07 are now more aligned to the areas where Dstl is seeking to deliver results. It is important that targets should reflect an agency's central functions and not just its financial performance, but identifying targets which measure quality of output in a meaningful way can be difficult. Dstl's targets try to measure the quality of scientific and technical advice by setting as a target a percentage score for scientific and engineering capability in a technical benchmarking exercise. We note that Dstl plans to develop, and agree with the CSA, a robust process for assessing the quality of technical capabilities for the period 2007–2011. **We look to the MoD to review the Key Targets set for Dstl to ensure they are challenging and reflect their central function: providing expert advice to Government.**

Financial performance

32. The MoD Annual Report and Accounts 2005–06 provides the following summary of Dstl's financial performance in 2005–06:

> Although turnover remained static during 2005–06 at £353 million, net profit for the Dstl…. rose from £20.2 million in 2004–05 to £21.8 million in 2005–06. The ROCE [Return on Capital Employed] fell from 9.4% for 2004–05 to 8.8%. Manpower charge rates continued to be held below the target for the fifth consecutive year indicating a reduction in real terms of the cost to customers. Dstl's wholly owned technology management company, Ploughshare Innovations Ltd, successfully completed its first full year of operations.[54]

The MoD received a £3 million dividend from Dstl in 2005–06 (£3 million in 2004–05).[55] As a Trading Fund, Dstl is allowed to retain profit to fund future investment. In 2005–06, Dstl retained £18.8 million.[56]

33. The MoD considers that Dstl has had a strong financial track record since its inception. It has never failed to meet its financial targets, which include Return on Capital Employed (ROCE) and the MoD dividend.[57] A summary of Dstl's financial performance over the last four years is set out in Table 4.

53 Dstl Annual Report and Accounts 2005–06, HC 1163, p 25

54 Ministry of Defence, *Annual Report and Accounts 2005–06*, HC 1394, p 264

55 *Ibid.,* p 215

56 Ev 25

57 Ev 24

Table 4: Dstl's financial performance over the last four years

	2002–03 £ million	2003–04 £ million	2004–05 £ million	2005–06 £ million
Turnover	343.5	358.1	353.3	353.4
Operating profit	13.3	19.8	23.2	18.7
Profit for the financial year	14.9	20.5	20.2	21.8
Retained profit for the year	8.9	17.5	17.2	18.8
Fixed assets	109.8	125.5	122.9	124.6
Cash and cash equivalents	29.7	26.6	61.9	78.7
Net Assets	140.5	176.5	198.9	218.18

Source: MoD[58]

34. Turnover in 2005–06 remained the same as in the previous year. MoD considered that this performance reflected the confidence placed in Dstl by its customers. Work for the MoD declined marginally during 2005–06, but work from "other government departments and non-exchequer customers increased".[59]

35. We asked whether Dstl would see any increase in MoD income, if the MoD were to increase its investment in defence research. Dr Saunders told us that Dstl's forward projections of its income were relatively flat and it was only likely to see a possible rise to cover inflation. She considered that "at the moment we are not expecting to see any big increase in investment in Dstl".[60]

36. Dr Saunders told us that Dstl currently receive around 37% of the defence research budget and expected to receive "roughly about the same proportion into the future".[61] Mr Starkey said that, as Dstl only did those things which needed to be done in government

> that in itself determines the volume of our work…. we receive a particular proportion of most of the research programme—37% of that—but that depends on our role. We do not go up and down with the general volume; we look just at our role.[62]

37. During our inquiry into the Defence Industrial Strategy (DIS), the Minister for Defence Procurement told us that the MoD would open up more of its research spending to competition.[63] We asked how this would impact on Dstl, as it was unclear whether the

58 Ev 25

59 *Ibid.*

60 Q 15

61 Q 18

62 Q 19

63 Defence Committee, Seventh Report of Session 2005–06, *The Defence Industrial Strategy*, HC 824, Q 300

work Dstl undertook would be opened up to competition, and whether Dstl would be allowed to compete for defence research work currently undertaken by others. Dr Saunders told us that Dstl's Framework Document said that Dstl did not compete, so the proportion of the research budget that was opened up to competition was not open to Dstl.[64] She reiterated that Dstl received 37% of the defence research budget and there had been no indication that "anybody is going to change that percentage at the moment".[65]

38. We asked whether Dstl's work might be reduced by QinetiQ expanding the defence research it undertook, thereby squeezing out Dstl. Dr Saunders considered that Dstl had "done pretty well over the last five years…. we have not been squeezed". In her view, Dstl had carved out a "niche" for itself and it was doing something "distinctively different" from QinetiQ and others.[66]

39. **Since it was formed Dstl has demonstrated a strong financial track record increasing its profits and its net assets. However, Dstl's income is very dependent upon the amount of work which the MoD considers must be done within Government, which is some 37 per cent of the MoD's defence research budget. Dstl is not expecting any increase on this percentage and does not see it as its role to compete for other research work funded by the MoD. We consider that there could be benefit in Dstl operating in a more competitive environment and look to the MoD to assess whether there is scope to open up to competition some of the defence research budget currently allocated to Dstl and scope to allow Dstl to compete for defence research work currently carried out by others.**

Trading Fund status

40. Dstl is a Trading Fund agency of the MoD. The other Trading Funds are: ABRO (Army Base Repair Organisation); the Defence Aviation Repair Agency (DARA); the Met Office and the UK Hydrographic Office.[67] In its memorandum, the MoD states that it has re-examined the status of its Trading Funds. The MoD had reached the following conclusion:

> The confines, within which Dstl operates…. meant that the options in the Dstl review were restricted to either maintaining the status quo or returning the agency to "on-vote" status. The review concluded this summer and recommended that Dstl should retain Trading Fund status pending a further review once the "i lab" change programme has had sufficient time to become firmly embedded.[68]

The '"i lab"' programme is a major change programme intended to transform Dstl into an integrated laboratory ("i lab"). We examine the change programme later in this report (paragraphs 55–66).

64 Q 34

65 Q 36

66 Q 26

67 Defence Committee, Second Report of Session 2006–07, *Ministry of Defence Annual Report and Accounts 2005–06*, HC 57, p 26

68 Ev 26

41. Given that we had been told that Dstl only undertakes work which has to be done within Government and does not compete for other research work, we asked why Dstl was a Trading Fund. Dr Saunders told us that reviews undertaken in 2004 and 2005 had concluded that "there were a couple of quite big advantages of [Dstl] being a trading fund". The most important was "the customer/supplier relationship and the real focus on the customers". Another advantage for Dstl was being in charge of its financial future: the Trading Fund status had allowed Dstl to retain profits to invest in the major change programme. Also, the Trading Fund status meant that the Chief Executive was more accountable for making sure that the infrastructure and skills were maintained than if it was "an on-vote organisation".[69]

42. **Dstl is a Trading Fund, but only undertakes work that has to be done within Government and does not compete for work. There are advantages to Dstl remaining a Trading Fund, notably its ability to retain profits for future investment in the business. However, given the constraints under which Dstl operates, we look to the MoD to review, on a regular basis, whether Trading Fund status is the most appropriate option.**

69 Q 38

4 Management and staffing

The Owner

43. The "Owner" of Dstl is the Minister for Defence Procurement, who has been delegated day-to-day Ministerial responsibility for Dstl by the Secretary of State for Defence, who remains ultimately responsible and accountable. The Owner's main responsibilities are: to set and review Dstl's top-level objectives; to establish a policy and financial framework; and to approve major business decisions, including the long-term business strategy, a five-year Corporate Plan and annual Key Targets.[70] The Dstl Owner's Council is "a group of senior stakeholders", which meets as necessary to discuss and advise on how the Minister should exercise his ownership responsibilities.[71]

Dstl Board

44. Dstl's Board, led by an independent non-executive Chairman, Richard Maudslay, acts with delegated authority from the Owner. Its main role is "to support and constructively challenge the Executive, and to apply scrutiny both in the development of business strategies, plans, business cases and targets; and in assessing the business performance of Dstl in delivering the approved Corporate Plan". The Dstl Board comprises senior Executives and Non-Executive Directors.[72]

Chief Executive

45. The role of the Chief Executive is to lead and manage Dstl effectively in order to ensure delivery of the objectives and targets set for it by the Owner, and in particular the successful implementation of an approved corporate plan.[73] Dstl's former Chief Executive, Mr Martin Earwicker, resigned as Chief Executive on 2 May 2006. Dr Saunders has been Acting Chief Executive since 3 May 2006.[74] In its memorandum of 29 September 2006, the MoD stated that responsibility for the appointment of the Chief Executive lies with the MoD "and the post is currently being advertised. Interviews are expected to take place later this year".[75] Dr Saunders told us on 28 November 2006 that she believed the competition for the Chief Executive post was still running.[76]

46. **Dstl's Chief Executive resigned at the start of May 2006 and, as at the start of February 2007, a permanent appointment to the post has not been announced. Dstl is embarking on a major change programme which the Chief Executive will be responsible for overseeing. We look to the MoD to appoint a permanent Chief Executive as soon as possible.**

70 Dstl Framework Document, November 2006, p 8

71 *Ibid.,* p 9

72 *Ibid.*

73 *Ibid.*

74 Dstl Annual Report and Accounts 2005–06, HC 1163, p 30

75 Ev 25

76 Q 4

Retaining and developing science and technology skills

47. The Defence Technology Strategy (DTS), launched by the MoD on 17 October 2006, states that

> it is vital that Dstl retains and develops the S&T skills necessary to fulfil its role. This will be done by a combination of undertaking high quality research in-house, and in working closely with MoD's research suppliers, particularly the universities.[77]
>
> Since Dstl has a key role in helping ensure the MoD has access to skilled scientists and engineers, including supporting recruitment, it is particularly important that Dstl develops a close and effective relationship with the universities.[78]

48. Dr Saunders told us that Dstl recruited about 100 graduates a year and had very good relationships with the universities. Some of Dstl's younger staff went out and built relationships with universities. Dstl was included in *The Times Top 100 Graduate Employers*. She considered that Dstl had "got a reasonably good profile as a recruiter of graduate scientists and engineers" and told us that "at the bottom end of the scale it is actually a very healthy picture; we are getting some very good graduates".[79]

49. Dr Saunders told us that one of the challenges for Dstl was retaining staff in their late 20s and early 30s and "to hang on to enough of them at that point to work up to replace the grey beards in the organisation". Staff in this age bracket often had obtained chartership of their institute and were considering possible career moves.[80] To retain them, Dstl had introduced

> an associate fellowship scheme which is for people at that kind of stage in their career…. to have some time and some money to, perhaps, work with a university or work with the systems engineering innovation centre at Loughborough…. We think that would be quite an attractive proposition to help people stay with us during that period.[81]

50. Dr Saunders said that Dstl had a technical career path which allowed staff to get to the top of the organisation by staying in technology. Dstl had a fellowship scheme and senior fellows, who were paid the same as the management team and getting to the top of the organisation. She said that Dstl wanted to encourage more people to go this route as it was "the quality of our scientists and engineers who are absolutely key to us being able to do the kind of work we do".[82]

77 Ministry of Defence, *Defence Technology Strategy for the demands of the 21st century*, October 2006, para 25

78 *Ibid.*, para 26

79 Q 79

80 Q 81

81 Q 82

82 Q 83

51. Dr Saunders told us that Dstl did not have an ageing profile at the moment. However, changes in the retirement law meant that technical staff could now choose to stay beyond sixty years old and some were choosing to stay on full-time or part-time.[83]

52. Dstl had a number of initiatives to develop relationships with universities. There were "co-operative research centres", whereby the MoD paid Dstl to work with universities as part of Dstl's capability development activity. Some of the work was done in the university, but it also allowed for some of Dstl's staff to act as visiting professors or lecturers.[84] We asked Dstl how it handled security issues that might arise from working with universities. Dr Saunders told us that they worked with universities which were used to working with Dstl. Dstl was careful and "the kind of work we would do in a university would tend to be some of the underpinning work that would not be so sensitive".[85]

53. Dstl took on students from a wide variety of backgrounds and, though it had noted recent physics department closures, had not seen any problems so far in terms of a reduction in the pool of graduates from which it recruited.[86] The CSA told us that he was impressed by the quality of the graduates being recruited by Dstl.[87] One of his main tasks was working with Dstl to ensure "that we are recruiting and growing, keeping the next generation of deep specialists".[88]

54. **For Dstl to retain its position as a leading defence research organisation, it needs to recruit high quality graduates and retain and develop its current scientists and engineers. We are pleased to learn that Dstl has a number of initiatives to achieve this and that the MoD's Chief Scientific Adviser sees the recruitment and development of the next generation of scientists as one of his main tasks. While Dstl and the Chief Scientific Adviser were not unduly worried about recent closures of university physics departments, we are concerned that something which at the moment does not seem to be causing a problem for Dstl may well in the future begin to do so. We shall keep an eye on this important matter.**

83 Q 84

84 Q 85

85 Q 86

86 Qq 89–90

87 Q 146

88 Q 147

5 Change programme

55. The MoD's memorandum states that Dstl is

> an indispensable source of science and technology at the heart of defence. However, to maintain and build on its position and reputation, Dstl must adapt to new challenges and become more integrated both internally and with its customers.[89]

In 2004, Dstl embarked on a major change programme with the aim of transforming Dstl into an integrated laboratory ""i lab"" and improving the coherence and effectiveness of its activities. The three capital intensive aspects of the ""i lab"" are:

- site rationalisation (Project Inspire);
- the provision of an Integrated Business System (iCAS); and
- the implementation of an electronic document and records management system (EDRM).[90]

56. The iCAS project will replace Dstl's current business management system (FISP), which had been in use for seven years, and had become unreliable and expensive to maintain. The project was approved by the Dstl investment panel in early 2005 and is due for completion by February 2008.[91]

57. The EDRM project had been driven by a requirement for improved access to information helping Dstl staff find the information they needed quickly and easily. The project was endorsed in January 2003. The MoD's memorandum states that "following successful detailed design, testing and piloting of the solution, the first roll out of EDRM is due to take place in Summer 2007, with full implementation due in 2008.[92]

Site rationalisation

58. The aim of the site rationalisation is to achieve more effective working between staff, who are spread over 15 different sites. The Dstl Board decided to rationalise Dstl's activities onto three core sites: Porton Down (Wiltshire); Fort Halstead (Kent); and Portsdown West (Hampshire), by 2009. The plan was approved by MoD Ministers in November 2003.[93]

59. The Dstl estate is being reduced to three core sites in order to:

- reduce fragmentation of Dstl's science and technology capability base to maximise synergy and coherence of delivery to customers;

89 Ev 26

90 *Ibid.*

91 Ev 27

92 *Ibid.*

93 Ev 26

- sustain Dstl's long-term future by minimising overheads and reducing unnecessary duplication in laboratories, facilities and support functions; and
- rationalise the sourcing of facilities management services to one contract.[94]

60. Dstl has set up a project to cover: the construction needed at Porton Down and Portsdown West; the three core site plan; and the provision of facilities management for the three sites.[95] In terms of the progress made:

- the main construction work at Porton Down and Portsdown West was expected to commence in November 2006, with the new buildings at Porton Down due for completion in Summer 2008 and at Portsdown West in Spring 2009;[96]
- a 15 year facilities management contact was awarded to Serco Defence and Aerospace on 24 July 2006;[97]
- with the completion of the new accommodation, Dstl will be moving approximately 1,100 of its staff in approximately equal number to either Porton Down or Portsdown West from Farnborough, Malvern, Winfrith and Bedford.[98]

Cost of rationalisation

61. We asked how much the building work was going to cost. Dr Saunders told us that

> we have gone for a project that is a mixture of building a new build at Porton Down and refurbishing our site at Portsdown West. We have gone for a maximum price of £94.7 million and a target price of £92 million.[99]

Dstl is funding the cost from its retained profits.[100] The MoD Ministers had approved the use of the retained profits for the rationalisation programme,[101] and had approved the reduction from 15 sites to three.[102]

62. Dstl had considered two site, three site and four site options for the core sites. The three site option came out best in the cost-benefit analysis.[103] We asked whether the cost-benefit analysis had considered the impact on the local community. Dr Saunders told us that costs such as road improvements were considered and also the impact on services, such as local schools.[104] She said that discussions with local authorities had been very positive. Dstl had

94 Ministry of Defence, *Annual Report and Accounts 2005–06*, HC 1394, pp 264–265

95 Ev 26

96 Ev 27

97 Ev 26

98 Ev 27

99 Q 39

100 Q 40

101 Q 44

102 Q 45

103 Q 53

104 Qq 54–55

been asked to make a contribution to the costs of roads and had agreed to that. At Porton there were to be upgrades to one of the roads and building a roundabout. Dr Saunders told us that "£3 million or so of investment will be put into that to make those improvements".[105]

Ownership of sites

63. Of the three core sites, Dstl owns Portsdown West and Porton Down and has a 97 year lease on Fort Halstead, which is owned by QinetiQ.[106] The majority of the sites which Dstl is leaving are owned by QinetiQ.[107] Dr Saunders told us that part of the rationale for choosing the three core sites was that Dstl

> did want to split ourselves off from QinetiQ…. we wanted to have distinctive sites that were definitely our sites.... We chose the sites on the basis of what made most sense from the point of view of the type of work we are going to be doing in the future and the numbers of people that it made sense to put into those buildings and that sort of site.[108]

As Dstl does not own any of the 12 non-core sites it will not benefit from the sale of any of these sites.[109]

Progress in delivering the change programme

64. In Dstl's Annual Report and Accounts 2005–06, Dstl's Chairman stated that "excellent progress had been made on various aspects of "i lab" this year. With building plans finalised and planning permission secured, Project Inspire can now begin".[110] Dstl's Chief Executive stated that "the "i lab" programme is starting to deliver tangible benefits".[111]

65. **Dstl has embarked on a major change programme, intended to transform it into an integrated laboratory or ""i lab"". The programme includes a substantial site rationalisation: the building and refurbishment work associated with this has a target price of £92 million. We look to Dstl to draw on outside project management expertise to monitor closely progress against cost and time targets relating to this work so that action can be taken if cost increases or delays look likely.**

66. **It will be important for Dstl to monitor whether the expected benefits from the ""i lab"" change programme are delivered. We expect Dstl to put in place arrangements to track both the qualitative and quantitative improvements that flow from the change programme.**

105 Qq 56–57

106 Qq 48–49

107 Q 50

108 Q 53

109 Ev 38

110 Dstl Annual Report and Accounts 2005–06, HC 1163, p 4

111 *Ibid.*, p 5

6 Exploiting Intellectual Property

67. One of Dstl's top-level objectives is to

> exploit its intellectual property (IP), in line with MoD and Government policy for technology transfer, in order to generate value for money for the taxpayer. This should be done for example, by generating a financial return for the taxpayer through developing equity by Joint Ventures and income through licensing.[112]

The MoD's memorandum states that all public sector research establishments are required by Government to ensure that, wherever possible, their Intellectual Property (knowledge and technologies developed with public funding) is exploited within the wider economy. This policy applies fully to Dstl. The aim

> is not that Dstl itself expands into wider markets and undertakes commercial work, but that, where appropriate, its technology is safely transferred to independent companies (by licensing or through spin-outs and Joint Ventures) for them to develop into products and services for the greater public good.[113]

Ploughshare Innovations Ltd

68. When Dstl was formed in 2001, it inherited from DERA "a successful early track record in IP exploitation". This included three spin-out companies and "a portfolio of income generating licence agreements with third parties for the right to use patented Dstl knowledge". Dstl has formed a further three spin-out companies with outside investors.[114]

69. While Dstl has a clear remit to exploit IP, the MoD's memorandum acknowledges that there has "been some ambiguity surrounding Dstl's role", given that its primary purpose was undertaking work that had to be done in Government. The challenge for Dstl is to find a way to exploit its IP role without compromising its integrity or its ability to provide impartial advice to the UK Government.[115] In response to the challenge, the MoD's memorandum states that

> Ministers agreed that the best way for Dstl to meet its technology transfer obligations was through an MoD wholly-owned GovCo whose sole purpose was to pursue the Dstl's (and therefore the Government's) technology transfer and exploitation agenda with professional expertise.[116]

70. Ploughshare Innovations Ltd (Ploughshare) was created on 6 April 2005 and acts as Dstl's technology management company with a remit to exploit in non-defence fields the intellectual property that Dstl selects to license to it.[117] The MoD's memorandum sets out

112 Dstl Framework Document, November 2006, p 7

113 Ev 27

114 Ev 28

115 *Ibid.*

116 *Ibid.*

117 *Ibid.*

the Ploughshare business model. Ploughshare has access to Dstl's broad range of patented IP in a wide range of technologies. The company reviews and assesses the potential value of individual patents and clusters of patents and develops exploitation plans for transferring those patents and technologies to commercial exploitation plans in civil sectors. The two main income streams for Ploughshare are income from IP licences and from sales of equity in technology spin-outs and Joint Ventures.[118] Dr Saunders told us that

> Ploughshare….act as our agents for exploiting the intellectual property that we generate as part of our research….the two main ways are: to license that technology to companies that might already have products and would need a licence or could develop their product further to enhance it and would take a licence on our technology to make that happen. The other thing they can do, if there is no existing industry out there and no existing companies, is to look at developing a start-up company using the IP and taking it to a point where they, maybe, have a product to market or they have developed a prototype, at which point that start-up company could be sold or it could develop into a fully fledged company downstream.[119]

71. The MoD's memorandum states that the current (Years 1 to 3) licence revenue is insufficient to cover Ploughshare's short-term operating costs. The shortfall is to be covered from a "draw-down" loan from Dstl, up to a maximum of £750,000 over three years. Ploughshare is expected to repay the loan in 2007–08 and aims to do so from the proceeds of the first projected equity sale.[120]

Licensing Intellectual Property

72. We asked how much revenue Dstl received from exploiting its IPR and who retained this revenue. The MoD told us that the direct exploitation of Dstl's IPR by Ploughshare was in its early stages. In its first year of operation, Ploughshare collected over £200,000 of exploitation revenue. Income for 2006–07 was expected to be closer to £300,000 and further income growth was expected. All the income from such exploitation activity was collected and retained by Ploughshare, not by Dstl.[121]

73. We were concerned there might be technology that had been lost to the public good because the price being asked was too high. Dr Saunders said that Dstl was sensitive to this issue and Ploughshare was set some objectives which were not "purely financial". She said that Dstl tried "to maximise some of the benefit to the public", and took note of the number of jobs created.[122] Dstl did not get involved in the pricing of IPR. Ploughshare did that and its Board included non-executive directors who had worked in the "licensing and entrepreneurial areas".[123]

118 Ev 28

119 Q 58

120 Ev 28

121 Ev 38

122 Q 66

123 Q 74

Joint Ventures

74. Dstl was involved in seven Joint Ventures.[124] We asked whether the exploitation of its intellectual property was diverting Dstl from core activities. Dr Saunders said that the oversight of these Joint Ventures was done by Ploughshare. Dstl had employed Ploughshare to do that on Dstl's behalf.[125]

75. Dr Saunders told us that in order for technology to be released from Dstl to Ploughshare and then to Joint Ventures, Dstl had to get agreement from the Intellectual Property Group in the DPA.[126]

Governance arrangements

76. In our report on *The work of the Met Office* in 2006, we highlighted the losses incurred by the weatherXchange joint venture.[127] Mindful of this experience, we asked about the governance arrangements on Ploughshare and Dstl's joint ventures. Dr Saunders told us that Dstl had considered the experience of the Met Office.[128] The Ploughshare Board included Dstl's Acting Chief Executive and its Finance Director, but it was "dominated by non-executives" and it was chaired by a non-executive.[129] We asked how Dstl guarded against any potential conflicts of interest. Dr Saunders told us that "the important thing here is that Ploughshare is 100% owned by MoD and Dstl on behalf of MoD". There was no investment from external organisations into Ploughshare itself.[130] When consideration was given to ways of funding Ploughshare, it was concluded that it would not be "a wise move to bring investment into Ploughshare itself".[131]

77. Dstl had been gradually moving away from having Dstl directors on the Boards of the joint ventures. Ploughshare was now required to provide directors. Dr Saunders considered that this helped "put these things more at arm's length" and got "rid of any chance of conflict of interest".[132] The MoD's memorandum states that Dstl-nominated directors receive no additional remuneration for their work as non-executive directors of joint ventures. Dstl staff are not permitted to receive equity shares in newly formed joint ventures "as this could present staff with a conflict of interest or a distraction from their core work" for the MoD.[133]

78. **One of Dstl's top-level objectives is to generate a financial return for the taxpayer by exploiting its Intellectual Property. Ploughshare Innovations Ltd, a wholly owned Government Company, has been created to act as Dstl's technology management**

124 Q 72

125 Q 73

126 *Ibid.*

127 Defence Committee, Tenth Report of Session 2005–06, *The work of the Met Office*, HC 823, paras 58–66

128 Q 76

129 Q 75

130 Q 77

131 Q 78

132 *Ibid.*

133 Ev 32

company. We note that the aim of such an arrangement is to prevent Dstl from being distracted from undertaking its core work and to draw in staff with expertise in exploiting intellectual property.

79. **In the first two years of its operation, 2005–06 to 2006–07, Ploughshare is expected to raise some £500,000 and further income growth is expected in the future. This is to be welcomed, but we are unclear why Ploughshare will retain this income if the aim is to generate a return for the taxpayer. In addition to financial objectives, Ploughshare has been set non-financial objectives. We look to the MoD and Dstl to track performance against these non-financial objectives as well as its financial performance, and to provide full details in Dstl's Annual Report and Accounts.**

80. **For companies such as Ploughshare, which are either wholly or partly owned by Government Departments, it is important that arrangements are in place to minimise risk and potential conflicts of interest. The MoD has recognised these risks and put in place governance arrangements to address them. We look to the MoD to keep these arrangements under review to ensure they remain appropriate.**

Defence Diversification Agency

81. The Defence Diversification Agency (DDA) was established in 1999 to facilitate defence technology transfer into the civil sector and to broker civil technology insertion back into defence.[134] During our inquiry into the MoD Annual Report and Accounts 2005–06, the MoD told us that the "strategic landscape for technology transfer" had changed significantly since the DDA was established, with new organisations such as QinetiQ emerging and subsequently "spinning out their technology and intellectual property directly into the civil market". The MoD also told us that

> Ministers are minded to support the 2004 recommendation to disband the Defence Diversification Agency…. We are exploring whether industry or the relevant Trade Associations have an interest in acquiring the intellectual property and expertise at present sitting within the Agency. A final decision will not be taken until the consultation process has concluded later this year. Parliament will be informed of any decision to change the status of the Agency.[135]

82. We asked how the role of the DDA differed from Ploughshare. Dr Saunders said that the DDA's remit was rather different: it was not there to license Dstl technology to companies nor to manage joint ventures or start-ups. The DDA's main remit had been to work with Small and Medium-size Enterprises and "to look at spinning in technology into MoD".[136] When Ploughshare was set up, a review was undertaken to examine any overlap between the DDA and Ploughshare. This review concluded that the two organisations were "doing very separate tasks".[137] Dr Saunders told us that Dstl had not been reliant on the

134 Defence Committee, Second Report of Session 2006–07, *Ministry of Defence Annual Report and Accounts 2005–06*, HC 57, Ev 34

135 HC (2006–07) 57, Ev 34

136 Q 59

137 Q 60

DDA to bring in any particular technologies which it was looking for, nor had the DDA exploited any of Dstl's IP.[138]

83. Mr Woolley, MoD's Finance Director, told us that there was not a clear requirement from customers within the MoD for the services that the DDA provided nor an evident requirement in the defence industrial community. He said that "we had to ask the question whether this is the best way of spending defence money".[139] The CSA considered it sensible to review the "track record" of organisations such as the DDA, particularly when a "government department is under a lot of stress financially".[140]

84. We asked about the status of the DDA. Mr Woolley said that it had never been a formal defence agency.[141] The DDA was part of the MoD and comprised some 55 staff. It had its own headquarters and budget.[142]

85. **The MoD has told us that the Defence Diversification Agency (DDA) has a different role from Dstl, but we are unclear about what exactly it does or why—if the MoD thinks there is no clear requirement for the service the DDA offers—it still exists. We look to the MoD to make a swift decision on the future of the DDA.**

138 Q 64

139 Q 117

140 Q 125

141 Q 120

142 Q 123

7 The funding of Defence Research

Defence Technology Strategy

86. The MoD's Defence Technology Strategy (DTS) was launched on 17 October 2006.[143] At the launch, Lord Drayson said:

> This strategy will help MoD and industry plan future investment in research and development (R&D). In particular, it allows us to identify clear R&D priorities, including those areas in which we believe it is important to maintain sovereign control, highlight opportunities for collaboration, and provide long-term support to the UK's science and technology skill base.[144]

87. In its memorandum of 29 September 2006, some two weeks before the launch of the DTS, the MoD stated that Dstl had undertaken a range of activities to identify how the recommendations of the Defence Industrial Strategy (DIS) and the DTS were likely to "impact on their business and capabilities". The MoD considered it premature at that stage to specify the impact on Dstl. However, it acknowledged that

> the DIS's advocacy of the adoption of innovative acquisition models to replace the traditional "customer/supplier" relationship with a range of partnerships strategically aligned to MoD's long term needs has clear implications for Dstl….Dstl will be ensuring that its capabilities are aligned with those identified in the DIS and DTS.[145]

88. We asked Dstl's Acting Chief Executive how the DTS would impact on Dstl's work. Dr Saunders considered that it was going to impact on Dstl in "quite a great way". She said that Dstl's name occurred 77 times in the DTS and this was an indication of Dstl's importance to the MoD and "a recognition that we are part of the family". The MoD saw Dstl as "a node in the network of the academic research in the UK" and that there was a "very clear remit to work more closely with the universities and support MoD".[146]

89. Dr Saunders told us that Dstl would be working with the MoD to discuss the specifics about what the DTS meant for it. Dstl would be seeking clarification on whether there were areas of technology where Dstl needed to strengthen its expertise to provide an "in-Government capability". There might be other areas where the market would be allowed to drive the technology forward and Dstl would "disinvest". Dr Saunders thought that there would be quite a lot of debate about "what the actual implementation plan for this strategy means".[147]

90. Dr Saunders said that the biggest challenge for Dstl would be evolving and adapting in areas where it needed to strengthen its capability. It was, therefore, important to have the

143 Ministry of Defence, *Defence Technology Strategy for the demands of the 21st century*, October 2006

144 MoD Press Notice, *Lord Drayson launches Defence Technology Strategy*, 17 October 2006

145 Ev 29

146 Q12

147 *Ibid.*

right programmes of work to follow where the requirements were going to be.[148] One of the areas where Dstl needed to strengthen its capability was information management and, over the last five years, Dstl had sought to strengthen its capability in this area. The use of information technology and ISTAR (Intelligence, Surveillance, Target Acquisition and Reconnaissance) on the battlefield was an area where the MoD needed good quality in-house support, and Dstl intended to provide this.[149]

91. **The Defence Technology Strategy launched in October 2006 will have a significant impact on Dstl's future work, as Dstl will need to ensure that its areas of expertise, programmes and capabilities are aligned with the requirements of the MoD set out in the Strategy. We look to the MoD and Dstl to push forward their discussions about this, so that there is a clear understanding of the areas on which Dstl needs to focus in the future.**

Funding of Defence Research

UK funding target for Defence Research

92. The DTS states that

> the UK Government national target is to increase R&D investment from the 2005 figure of 1.9% (£22Bn) to 2.5% of GDP by 2014. Looking at civil and defence combined (which is dominated by civil), of the 1.9%, business enterprise (industry) is contributing slightly over 1.1% of the 1.9% (i.e. HMG is contributing 0.8%). As HMG increases its R&D investment to meet the 2014 target, it is looking to business enterprise (industry) to play its part. It is important to note however, whilst overall industry does invest in R&D, defence industry investment is low. It is thus crucial that all those involved in R&D must increase their efforts to demonstrate value and benefit from such investment, recognising that most of the spend today influences capability in future decades.[150]

The DTS acknowledges that the level of research and R&D investment requires wide debate, both within the MoD and more broadly across wider government and industry.[151]

Funding by industry

93. We examined the funding of defence research in our report *The Defence Industrial Strategy* published in May 2006[152], and more recently in our report *The Defence Industrial Strategy: update* published in February 2007[153]. During the DIS: update inquiry, Lord Drayson, Minister for Defence Procurement, told us that the MoD was discussing with industry the rewards and incentives for industry taking more risk in investing in research.

148 Q13

149 Q14

150 Ministry of Defence, *Defence Technology Strategy for the demands of the 21st century*, October 2006, para A2.8

151 *Ibid.*, para A2.10

152 Defence Committee, Seventh Report of Session 2005–06, *The Defence Industrial Strategy*, HC 824, paras 55–64

153 Defence Committee, Sixth Report of Session 2006–07, *The Defence Industrial Strategy: update*, HC 177, paras 57–64

He expected the outcome of these discussions to become clearer in the first part of 2007. The outcome would then be part of an overall plan for the MoD investment in research.[154] The MoD's supplementary memorandum to the DIS: update inquiry stated that "the Defence Technology Strategy is affordable within the current research budget provided that both MoD and industry invest to develop and sustain the necessary technology base".[155]

94. We asked the CSA about the prospects for industry increasing its investment in defence research spending. He told us that some of the larger industries were a little frightened by the suggestion that they might invest more in R&D. However, it was felt that "if Government plays its part in raising R&D spend, or sustaining it at a good level, then industry should play its part too".[156]

95. The CSA agreed with us that there were sometimes cases where there were "no commercial or other civil spin-off" and that in such cases the MoD would have to bear the brunt of the R&D expenditure. In other areas, such as UAVs, there was military use at the moment, but the civil opportunities could be enormous.[157] He said that one of the objectives of the DTS was to "give a road map so that they [industry] could invest in R&D with greater security that there was a procurement at the end of it".[158]

96. **We call on the MoD to clarify what progress has been made in securing a greater contribution to Research and Development by industry through the road map laid down in the Defence Technology Strategy.**

Funding by the MoD

97. In terms of the MoD's spend on research, the CSA told us that "we have stabilised our R&D spend at the moment for the near term, adjusted for inflation". He said that the most important thing to recognise was that the MoD had two very important priorities in terms of the two current operational theatres and these took priority. He added that these are "unusual times at the moment, and unusual pressures".[159] We sought further clarification on the impact of operations in Iraq and Afghanistan on the MoD's funding of defence research. The CSA said that in terms of funding, "the immediate grabs your attention". He said with R&D funding it was about investing now "for something 15 years hence" and it was "a difficult argument if the immediate priorities are very urgent and so apparent publicly".[160]

154 Defence Committee, Sixth Report of Session 2006–07, *The Defence Industrial Strategy: update,* HC 177, Q 102

155 *Ibid.,* Ev 35

156 Q 132

157 Q 137

158 Q 136

159 *Ibid.*

160 Q 139

98. In its memorandum, the MoD states that

> operational support can impact on Dstl's core defence research work. During all phases of Operation TELIC large parts of the lab were directly supporting the operation and as a consequence resources were diverted from the core activities….Some areas of the laboratory are still heavily committed to supporting UORs and in these areas the core research programme has had to take second place. Dstl seeks to spread the impact of UOR activity by utilising appropriate resources from across the laboratory.[161]

99. We are unclear as to what impact current operations are having on defence research: whether the cost of operations in Iraq and Afghanistan is reducing the amount spent on defence research; or whether the operations are focusing Dstl's research effort on urgent research requirements rather than long-term research.

100. **We recognise that supporting operations in Iraq and Afghanistan is an immediate priority for the MoD and that it is inevitable that some research funding will be directed to short-term research to support these operations. In its response to our report, we expect the MoD to assure us that the cost of the operations in Iraq and Afghanistan has not resulted in cuts to the defence research budget and to clarify whether, and in what respect, longer-term defence research has been cut in order to provide research support to these operations. The MoD must not make reductions in the funding of longer-term defence research to fund the costs of these operations, as such reductions will result in reduced UK military capability in the future.**

Impact of defence research funding

101. Section A2 of the DTS considers the impact of research spending on military equipment quality. It notes that recent analysis has shown that there is a correlation between the quality of military equipment and the investment by governments in Defence R&D.[162] The military advantage achieved at any one time depends upon the R&D investment made over the previous 25 years. The analysis has shown that "advantage can be gained or lost by increasing or decreasing R&D investment relative to other R&D investing nations".[163] Figure 1 below—which is reproduced from the DTS—demonstrates the capability advantage that the UK has gained from past investment in defence R&D and how quickly an advantage can be lost.[164] This figure was also in the Defence Industrial Strategy published in December 2005.[165]

161 Ev 40

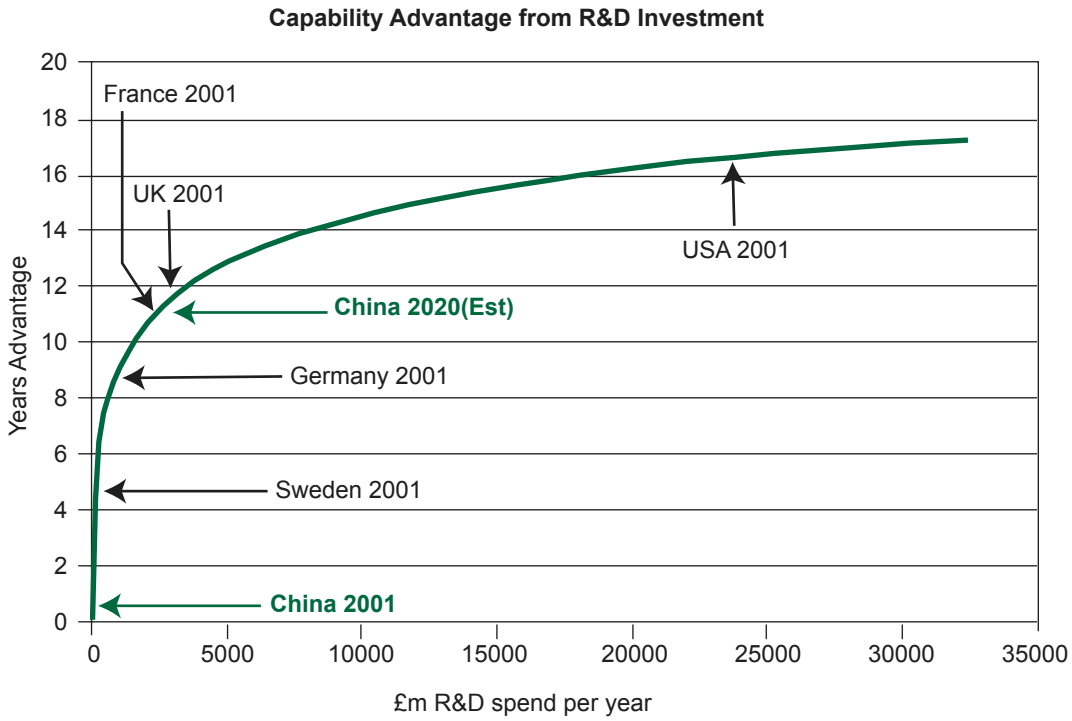
162 Ministry of Defence, *Defence Technology Strategy for the demands of the 21st century*, October 2006, para A2.1

163 *Ibid.,* para A2.3

164 *Ibid.*, p 17

165 Ministry of Defence, *Defence Industrial Strategy*, December 2005, Cm 6697, p 39

Figure 1: Relative Years Advantage in Equipment Quality as a Function of R&D Spend per Year



Source: MoD[166]

102. The DTS states that Figure 1 shows "that we now have the ability to predict the future equipment quality that the UK might face in combat, as a function of time and national investment level".[167] It states that Figure 1 shows that UK military equipment in 2001, taken as a whole, was on average 12 years more advanced than that of China's in the same year. The estimated position for the UK in 2020 is based on "assuming R&D levels are broadly maintained, whilst that for China assumes a continuation of its growth in R&D investment".[168] The DTS states that

> the analysis has shown that the advantage achieved at any one time depends on the R&D investment made over the previous 25 years. In particular, investments 5 and 20–25 years earlier are critical corresponding to development activity (about 5 years earlier) and defence research activity (typically 20–25 years earlier). Clearly advantage can be gained or lost by increasing or decreasing R&D investment relative to other R&D investing nations.[169]

166 Figure 1 reproduced with the permission of the MoD

167 Ministry of Defence, *Defence Technology Strategy for the demands of the 21st century*, October 2006, para A2.1

168 *Ibid.*, para A2.2

169 *Ibid.*, para A2.3

Comparisons with other countries

103. We asked how the UK's spend on defence research compared with other countries. The CSA said that the UK "hits hugely above its weight" and was only second to the US in terms of "science citation and international prizes". He considered that the UK started from a "privileged position" and that in his view, Dstl "is a jewel in the crown in terms of its capability". He told us that: the UK was "approximately equivalent" to France; behind the US; well ahead of China; and ahead of Russia. Overall, he considered that the UK "are second equal, somewhere in that domain".[170] We asked whether the UK needed to spend more to maintain its position. CSA thought "not at the moment". In some areas Dstl was regarded as the "world authority". He said "that is not a bad position in some sensitive areas. It is something to carefully watch….at the moment I am moderately comfortable".[171]

104. We sought further information from the MoD on the spending by the UK and a selection of other countries on defence research, split between the spending on defence research and on development. The latter relates to spending on the development of defence equipment projects. The MoD provided us with data on public sector Research and Development (R&D) spending and told us that "whilst overall R&D figures are available for most of the nations in question, the data is not usually split into separate research and development figures and exact definitions of the categories differ between the nations".[172]

Table 5: Defence R&D spend by other countries[173]

	Spend on defence research £m[174]	% of the defence budget[175]	% of Gross Domestic Product (GDP)[176]
UK	2,640	9	0.18
US	22,988	16	0.46
France	2,534	8	0.18
Russia	3,300	12	0.29
China	2,035	8	-

Source: MoD[177]

105. The data provided by the MoD are set out in Table 5. The data show that the UK is very much on par with France in the amount spent on defence R&D, the proportion of the defence budget spent on R&D, and the proportion of Gross Domestic Product (GDP) spent on R&D. What is very clear is the huge gap between the amount spent on defence

170 Q 145

171 Q 147

172 Ev 36

173 Figures for the UK, US and France are for 2004. Figures for Russia and China are for 2001.

174 The total amount spent on R&D by the public sector

175 The proportion of public sector investment in defence R&D as a percentage of the overall defence budget

176 The proportion of public sector investment in defence R&D as a percentage of GDP

177 Ev 36–37

research in the UK and the amount spent in the US. In 2004, the UK spend on defence research was just over a tenth of the US spend. That the UK spends a lot less than the US on defence research is hardly surprising. What is disturbing is how much less the UK spends compared with the US on defence research as a proportion of its defence budget and as a proportion of its GDP. The CSA considered that "£2.6 billion at 9% is not a bad figure", but he said that it was his role to argue "for that to be increased".[178] We pressed the CSA on whether the gap with the US was widening. He said "probably, yes".[179] In our view there is no "probably" about it.

106. Defining what is defence research may be increasingly difficult. The CSA told us that defence and security were "getting fuzzier" and that there were many technologies which had dual use, in both defence and in protecting against terrorist activity. He considered that areas such as detection, imaging and information processing, would be of "great advantage" to the MoD, the civil sector and homeland security sectors. In his view, these were areas where the UK "should sustain a significant investment".[180]

107. **The MoD's Chief Scientific Adviser considers that the UK is second equal with France in terms of its global standing in defence research and, in some research fields, Dstl is the world-leader. However, we are concerned that the gap between the UK and the US in defence research will continue to widen. This could leave the UK trailing further and further behind the US and losing its current position to other nations which are increasing their investment in defence research. We look to the Chief Scientific Adviser and to the MoD Ministers to make a strong case for an increase in the investment in defence research in the current Spending Review. The MoD and the Treasury must not ignore the impact on the UK's future defence capability if such an investment is not made. A failure to invest will also have implications for the MoD's ability to retain the high quality scientists it needs in defence research.**

178 Qq 153–155

179 Q 185

180 Q 187

Conclusions and recommendations

1. **We note that the new Framework Document provides a clearer statement of the top-level objectives for Dstl and makes it a key objective to maintain and sustain its capability to support the MoD in the future. We see such an objective as vital and look to the MoD to provide the necessary resources to achieve it.** (Paragraph 20)

2. **Dstl has been proactive in networking with other organisations involved in defence research in the UK and overseas. International collaboration in defence research offers substantial benefits to the UK. For Dstl to be able to continue to collaborate with the US and other nations, it is vital that the UK provides sufficient research funding for Dstl to retain its current position and continue to be regarded as a worthwhile collaborative partner.** (Paragraph 24)

3. **Dstl achieved seven of its ten Key Targets in 2005–06. Action is in hand to address those targets which were not fully achieved in the year.** (Paragraph 28)

4. **We look to the MoD to review the Key Targets set for Dstl to ensure they are challenging and reflect their central function: providing expert advice to Government.** (Paragraph 31)

5. **Since it was formed Dstl has demonstrated a strong financial track record increasing its profits and its net assets. However, Dstl's income is very dependent upon the amount of work which the MoD considers must be done within Government, which is some 37 per cent of the MoD's defence research budget. Dstl is not expecting any increase on this percentage and does not see it as its role to compete for other research work funded by the MoD. We consider that there could be benefit in Dstl operating in a more competitive environment and look to the MoD to assess whether there is scope to open up to competition some of the defence research budget currently allocated to Dstl and scope to allow Dstl to compete for defence research work currently carried out by others.** (Paragraph 39)

6. **Dstl is a Trading Fund, but only undertakes work that has to be done within Government and does not compete for work. There are advantages to Dstl remaining a Trading Fund, notably its ability to retain profits for future investment in the business. However, given the constraints under which Dstl operates, we look to the MoD to review, on a regular basis, whether Trading Fund status is the most appropriate option.** (Paragraph 42)

7. **Dstl's Chief Executive resigned at the start of May 2006 and, as at the start of February 2007, a permanent appointment to the post has not been announced. Dstl is embarking on a major change programme which the Chief Executive will be responsible for overseeing. We look to the MoD to appoint a permanent Chief Executive as soon as possible.** (Paragraph 46)

8. **For Dstl to retain its position as a leading defence research organisation, it needs to recruit high quality graduates and retain and develop its current scientists and**

engineers. We are pleased to learn that Dstl has a number of initiatives to achieve this and that the MoD's Chief Scientific Adviser sees the recruitment and development of the next generation of scientists as one of his main tasks. While Dstl and the Chief Scientific Adviser were not unduly worried about recent closures of university physics departments, we are concerned that something which at the moment does not seem to be causing a problem for Dstl may well in the future begin to do so. We shall keep an eye on this important matter. (Paragraph 54)

9. **Dstl has embarked on a major change programme, intended to transform it into an integrated laboratory or ""i lab"". The programme includes a substantial site rationalisation: the building and refurbishment work associated with this has a target price of £92 million. We look to Dstl to draw on outside project management expertise to monitor closely progress against cost and time targets relating to this work so that action can be taken if cost increases or delays look likely.** (Paragraph 65)

10. **It will be important for Dstl to monitor whether the expected benefits from the ""i lab"" change programme are delivered. We expect Dstl to put in place arrangements to track both the qualitative and quantitative improvements that flow from the change programme.** (Paragraph 66)

11. **One of Dstl's top-level objectives is to generate a financial return for the taxpayer by exploiting its Intellectual Property. Ploughshare Innovations Ltd, a wholly owned Government Company, has been created to act as Dstl's technology management company. We note that the aim of such an arrangement is to prevent Dstl from being distracted from undertaking its core work and to draw in staff with expertise in exploiting intellectual property.** (Paragraph 78)

12. **In the first two years of its operation, 2005–06 to 2006–07, Ploughshare is expected to raise some £500,000 and further income growth is expected in the future. This is to be welcomed, but we are unclear why Ploughshare will retain this income if the aim is to generate a return for the taxpayer. In addition to financial objectives, Ploughshare has been set non-financial objectives. We look to the MoD and Dstl to track performance against these non-financial objectives as well as its financial performance, and to provide full details in Dstl's Annual Report and Accounts.** (Paragraph 79)

13. **For companies such as Ploughshare, which are either wholly or partly owned by Government Departments, it is important that arrangements are in place to minimise risk and potential conflicts of interest. The MoD has recognised these risks and put in place governance arrangements to address them. We look to the MoD to keep these arrangements under review to ensure they remain appropriate.** (Paragraph 80)

14. **The MoD has told us that the Defence Diversification Agency (DDA) has a different role from Dstl, but we are unclear about what exactly it does or why—if the MoD thinks there is no clear requirement for the service the DDA offers—it**

still exists. We look to the MoD to make a swift decision on the future of the DDA. (Paragraph 85)

15. **The Defence Technology Strategy launched in October 2006 will have a significant impact on Dstl's future work, as Dstl will need to ensure that its areas of expertise, programmes and capabilities are aligned with the requirements of the MoD set out in the Strategy. We look to the MoD and Dstl to push forward their discussions about this, so that there is a clear understanding of the areas on which Dstl needs to focus in the future.** (Paragraph 91)

16. **We call on the MoD to clarify what progress has been made in securing a greater contribution to Research and Development by industry through the road map laid down in the Defence Technology Strategy.** (Paragraph 96)

17. **We recognise that supporting operations in Iraq and Afghanistan is an immediate priority for the MoD and that it is inevitable that some research funding will be directed to short-term research to support these operations. In its response to our report, we expect the MoD to assure us that the cost of the operations in Iraq and Afghanistan has not resulted in cuts to the defence research budget and to clarify whether, and in what respect, longer-term defence research has been cut in order to provide research support to these operations. The MoD must not make reductions in the funding of longer-term defence research to fund the costs of these operations, as such reductions will result in reduced UK military capability in the future.** (Paragraph 100)

18. **The MoD's Chief Scientific Adviser considers that the UK is second equal with France in terms of its global standing in defence research and, in some research fields, Dstl is the world-leader. However, we are concerned that the gap between the UK and the US in defence research will continue to widen. This could leave the UK trailing further and further behind the US and losing its current position to other nations which are increasing their investment in defence research. We look to the Chief Scientific Adviser and to the MoD Ministers to make a strong case for an increase in the investment in defence research in the current Spending Review. The MoD and the Treasury must not ignore the impact on the UK's future defence capability if such an investment is not made. A failure to invest will also have implications for the MoD's ability to retain the high quality scientists it needs in defence research.** (Paragraph 107)

Annex: List of Abbreviations

ABRO	Army Base Repair Organisation
C4	Command, Control, Communications and Computers
CRCs	Co-operative Research Centres
CSA	Chief Scientific Adviser
CWID	Coalition Warrior Interoperability Demonstration
DARA	Defence Aviation Repair Agency
DDA	Defence Diversification Agency
DERA	Defence Evaluation and Research Agency
DIS	Defence Industrial Strategy
DLO	Defence Logistics Organisation
DPA	Defence Procurement Agency
Dstl	Defence Science and Technology Laboratory
DTS	Defence Technology Strategy
EDRM	Electronic Document and Records Management System
FEL	Forensic Explosive Laboratory
FM	Facilities Management
FRES	Future Rapid Effect System
FY	Financial Year
GDP	Gross Domestic Product
HMG	Her Majesty's Government
iCAS	Integrated Corporate Applications System
IEDs	Improvised Explosive Devices
"i lab"	Integrated Laboratory
IP	Intellectual Property
IPR	Intellectual Property Rights
ISTAR	Intelligence, Surveillance, Target Acquisition and Reconnaissance
JCA	Joint Combat Aircraft

JSF	Joint Strike Fighter
MoD	Ministry of Defence
NEC	Network Enabled Capability
PJHQ	Permanent Joint Headquarters
R&D	Research and Development
RAO	Research Acquisition Organisation
ROCE	Return on Capital Employed
S&T	Science and Technology
TTCP	The Technical Co-operation Programme
UAV	Unmanned Aerial Vehicle
UK	United Kingdom
UOR	Urgent Operational Requirement
US	United States

Formal minutes

Tuesday 20 February 2007

Members present:

Mr James Arbuthnot, in the Chair

Linda Gilroy	Mr Kevan Jones
Mr Mike Hancock	Robert Key
Mr Dai Havard	

The work of the Defence Science and Technology Laboratory and the funding of defence research

The Committee considered this matter.

Draft Report (The work of the Defence Science and Technology Laboratory and the funding of defence research), proposed by the Chairman, brought up and read.

Ordered, That the Chairman's draft Report be read a second time, paragraph by paragraph.

Paragraphs 1 to 107 agreed to.

Annexes (Summary and List of Abbreviations) agreed to.

Resolved, That the Report be the Eighth Report of the Committee to the House.

Ordered, That the Appendices to the Minutes of Evidence taken before the Committee be reported to the House.

Ordered, That the embargoed copies of the report be made available in accordance with the provisions of Standing Order No. 134.

Ordered, That the Chairman make the report to the House.

[Adjourned till today at 4.30 pm.

List of witnesses

Tuesday 28 November 2006

List of written evidence

Defence Committee Reports in this Parliament

Session 2005–06

First Report	Armed Forces Bill	HC 747 (*HC 1021*)
Second Report	Future Carrier and Joint Combat Aircraft Programmes	HC 554 (*HC 926*)
Third Report	Delivering Front Line Capability to the RAF	HC 557 (*HC 1000*)
Fourth Report	Costs of peace-keeping in Iraq and Afghanistan: Spring Supplementary Estimate 2005–06	HC 980 (*HC 1136*)
Fifth Report	The UK deployment to Afghanistan	HC 558 (*HC 1211*)
Sixth Report	Ministry of Defence Annual Report and Accounts 2004–05	HC 822 (*HC 1293*)
Seventh Report	The Defence Industrial Strategy	HC 824 (*HC 1488*)
Eighth Report	The Future of the UK's Strategic Nuclear Deterrent: the Strategic Context	HC 986 (*HC 1558*)
Ninth Report	Ministry of Defence Main Estimates 2006–07	HC 1366 (*HC 1601*)
Tenth Report	The work of the Met Office	HC 823 (*HC 1602*)
Eleventh Report	Educating Service Children	HC 1054 (*HC 58*)
Twelfth Report	Strategic Export Controls: Annual Report for 2004, Quarterly Reports for 2005, Licensing Policy and Parliamentary Scrutiny	HC 873 (*Cm 6954*)
Thirteenth Report	UK Operations in Iraq	HC 1241 (*HC 1603*)
Fourteenth Report	Armed Forces Bill: proposal for a Service Complaints Commissioner	HC 1711 (*HC 180*)

Session 2006–07

First Report	Defence Procurement 2006	HC 56 (*HC 318*)
Second Report	Ministry of Defence Annual Report and Accounts 2005–06	HC 57
Third Report	Costs of operations in Iraq and Afghanistan: Winter Supplementary Estimate 2006–07	HC 129 (*HC 317*)
Fourth Report	The Future of the UK's Strategic Nuclear Deterrent: the Manufacturing and Skills Base	HC 59 (*HC 304*)
Fifth Report	The work of the Committee in 2005 and 2006	HC 233
Sixth Report	The Defence Industrial Strategy: update	HC 177
Seventh Report	The Army's requirement for armoured vehicles: the FRES programme	HC 159

Oral evidence

Taken before the Defence Committee

on Tuesday 28 November 2006

Members present:

Mr James Arbuthnot, in the Chair

Mr David S Borrow	Mr Adam Holloway
Linda Gilroy	Mr Bernard Jenkin
Mr David Hamilton	Mr Brian Jenkins
Mr Mike Hancock	Willie Rennie

Witnesses: **Dr Frances Saunders,** Acting Chief Executive, **Mr Peter Starkey,** Future Business Director, and **Mr Mark Hone,** Finance Director, Defence Science and Technology Laboratory, gave evidence.

Q1 Chairman: Welcome. This is an evidence session with Dstl, and so I should be grateful if you would just introduce your team. Tell us who you are and what role you take in Dstl.
Dr Saunders: I am Frances Saunders, I am the Acting Chief Executive in Dstl. I took over in May of this year when Martin Earwicker left the position of Chief Executive. On my right is Peter Starkey, who is our Future Business Director and is looking after the development of the kinds of products and services that we will provide to our customers into the future, and Mark Hone, who is the Finance Director of Dstl.

Q2 Chairman: You are the Acting Chief Executive?
Dr Saunders: That is correct.

Q3 Chairman: Why is that exactly?
Dr Saunders: When Martin Earwicker left they appointed me on an interim position whilst the MoD ran a competition to find a new Chief Executive.

Q4 Chairman: Is that competition still running?
Dr Saunders: I believe it is. I think you should probably ask my colleagues in MoD where they have got to in that competition.

Q5 Chairman: Your report and accounts tell us a bit about your work, but how is your work different from what QinetiQ does and what universities do?
Dr Saunders: That is a very good question. You have to go back to look at the reason why Dstl was created at the split up of DERA into the QinetiQ organisation, which was destined to be working in the private sector and to be privatised, and the Dstl organisation which was retained in government to do those things that are best done in government, and to do those things, particularly, of a sensitive nature or where we need to work very closely with industry and need to deal with proprietary information in areas such as support to operations or counter-terrorism, where you can understand the sensitivities, where it would not be appropriate for some of that work to be done in the private sector. As regards the universities, we tend to do rather more applied research than seeking out new knowledge for its own sake. We do not tend to do academic research but we do work very closely with the universities so that they have a better understanding of what MoD requirements from science and technology might be in the future. Then we can work with them to pull through their ideas into our more applied research and then into the equipments and the thinking that goes on within the rest of the department.

Q6 Chairman: Your report says that you employ about 3,400 people. Is that right?
Dr Saunders: That is about right, yes.

Q7 Chairman: Could you say how those people are broken down into each of the broad areas of the work that Dstl does? Roughly.
Dr Saunders: Roughly. If you think about the three sorts of work we tend to do, some is associated with supporting systems work—the higher level concept of development, support to policy development and support to the early stages of procurement—and probably about a third of our people are involved in that kind of work. The second third are looking more at the technology, so actually developing technology solutions that will be deployed in future equipments, particularly supporting things like urgent operational requirements (UORs) in areas that support operations in Iraq and Afghanistan. The final third is doing rather longer-term research of a strategic nature which uses the deeper end of Dstl's research base into areas such as biomedical counter measures, detection of chemical agents in the field, biological agents and explosives, and some of that longer-term research increasingly including some of the social science issues that need to be dealt with and brought into our thinking, as the nature of warfare is changing.

Q8 Mr Holloway: To what extent are you involved in the Litvinenko investigation? Are you involved in trying to trace the source of this material?
Dr Saunders: That is something that has obviously happened very recently. We have been asked by the Health Protection Agency to support them in providing some of our radiological detection

capability to support them in looking at sites that they are dealing with in London at the moment. That is the extent of our engagement. They 'phoned us on Sunday and said could we deploy our team. We have a team that we would normally use if there was an accident in a military establishment, and we can use that to support the Health Protection Agency.

Q9 Chairman: Thank you. Do you fund any research that is done by third parties?
Dr Saunders: Yes, we do. We have what we call an extramural research programme budget, which is a relatively small amount of money and has been going down since Dstl was formed. This year about £9 million of that extramural budget goes into the universities, so we fund work in universities, both in our own regard and also as an agent of MoD, in something called the joint grant scheme, which is a joint Research Council/MoD scheme for funding work in universities. We also fund work in industry in areas where we want to combine capability to integrate into some of the programmes we are asked to do by MoD, and that includes some of the support to operational requirements where we bring in small companies to develop prototypes of equipment, and so on.

Q10 Chairman: Why do you do that? Why is it necessary to have you as a barrier between the MoD and the industry that does the work?
Dr Saunders: It is interesting you use the word "barrier"; we actually only do that when we add value. So it is particularly where we need to explain the detail of the technical work to suppliers so that we can integrate it into some of the more sensitive areas of our programme. We need to have that technical expertise in order to be able to specify what is required and we understand the depth of that information. When it comes to the university linkages, again, it is this issue of integration; as more and more of the work in the research programme is competed and different suppliers provide output, there is a need to make sure that the MoD has a good understanding of the overall picture of work that has been done in a particular field in the UK. One of the reasons Dstl was kept in government was to provide that integration role. So we tend, really, only to put work out ourselves rather than it going directly from MoD in areas where we really believe, and MoD agree, that we can add value through that exercise.

Q11 Chairman: We have just received Dstl's framework document. Are there any major changes in that over the previous one? If so, how will they affect you?
Dr Saunders: There are two main things I would point to. One is, I think, a rather clearer statement of the top level objectives for Dstl, and I was particularly pleased to see in there an objective about maintaining and sustaining capability to support MoD in the future. Yes, we are there to do the things that need to be done right now, that need to be done in government, but there is also a recognition that you can only do that if you have got a very strong research base or S&T base and good people who have been active for a period of time. So this idea of sustaining capabilities and making it a specific objective will, I think, be very helpful to us. The other change, of course, is the governance arrangement. This recognises that over the last year or so there has been a new non-executive-dominated board put in place overseeing Dstl to discharge the ownership function on behalf of MoD as owner. So it looks at what is the role of that board vis-à-vis the role of the executive team and what are the levels of delegation and corporate governance arrangements that flow with that.

Q12 Willie Rennie: The Defence Technology Strategy. How is that going to impact on your work?
Dr Saunders: I think it is going to impact in quite a great way. If you go through the DTS document you will find Dstl's name liberally sprinkled in there—I think we counted 77 times. So the message from this since our aim has always been to be indispensable for MoD and to be part of them managing the science and technology base in the UK and helping them do that. I think the Defence Technology Strategy and the kind of challenges it puts out to Dstl to do that is extremely good news, and it is a recognition that we are part of the family. In terms of the detail of how it is going to change things, you will see an emphasis in there about our relationship with universities. They see Dstl very much as a node in the network of the academic research in the UK and being able to bring into defence some of those advances in technology that are more widely applicable, and so on. So a very clear remit to work more closely with the universities and support MoD. Obviously, there is also mention in there of the need to look at the balance between the work the Dstl does; how much research we do vis-à-vis how much advice work—the balance we talked about right at the start, about the third a third: is that right? Should it be different? Should it be different in different areas? Of course, when you start to then go into (section B) the different technology areas, the different market segments, then I think you will see a change over time of where Dstl has expertise as the implications of that strategy work their way through. We will be working with our colleagues in MoD over the next few months to articulate what does this mean in specifics for Dstl—i.e. are there areas of technology that actually we need to strengthen because they are going to be even more important to have an in-government capability? Are there areas of technology where actually we are going to allow the market to drive the technology forward and, therefore, perhaps we should disinvest? So there will be quite a lot of debate, I expect, over the next few months with our colleagues in MoD about what the actual implementation plan for this strategy means.

Q13 Willie Rennie: What do you think is going to be the biggest challenge within the strategy for yourselves?
Dr Saunders: The biggest challenge will always be this issue of evolving and adapting in areas where we need to strengthen our capability, to make sure we

are able to do that and that we have the programmes to do that, because you do not develop technical and scientific capability just by sort of sitting in a lab in isolation; you have got to have the right programmes of work. So making sure that the programmes follow where the requirements are going to be.

Q14 Willie Rennie: So there is no one specific area that you think is the biggest?
Dr Saunders: No, there is no one specific area that I think is the biggest challenge. If you look in terms of what work we are funding, one of the areas where we do need to, I think, strengthen our capability is in the whole area of information management, which is an area where, when we were set up as Dstl, we had a relatively low proportion of the capability that had originally been in DERA, and we have gradually been strengthening that over the last five years. I think that whole area of the use of information technology and ISTAR on the battlefield is an area where the MoD does need some good quality in-house support, and that is what we intend to be providing.

Q15 Mr Hancock: In the Defence Technology Strategy the Government suggested that their national target of R&D investment would be 2.5% of GDP by 2014. Do you confirm that that figure refers to all R&D, not just to defence, and what is your interpretation of where the Government's share of that spend is going to be—what the Government themselves are going to take on? Has it been indicated to you what you can expect as a share of that?
Dr Saunders: From a policy point of view I really do not think I can add anything, but my colleagues may be better placed to talk about what the overall policy means. In terms of what is the intention for Dstl, our forward projections of our income are relatively flat, so we are seeing possibly a rise to cover inflation but no more than that. So at the moment we are not expecting to see any big increase in investment in Dstl.

Q16 Mr Hancock: Do you know what the Government's target is for Research & Development specifically for defence?
Dr Saunders: I do not know that.

Q17 Mr Hancock: So you are not party—
Dr Saunders: I am not party to those policy discussions.

Q18 Mr Hancock: That is a decision that has now been made. It is not how the policy was made; it is now out to be implemented. You have not been given any indication over the next seven years what you would expect to have?
Dr Saunders: Not specifically. We currently receive around 37% of the defence research budget and we are expecting to continue to receive roughly about the same proportion into the future. That is the best information that we have.

Q19 Chairman: Mr Starkey, do you want to join in?
Mr Starkey: All I would add is to reinforce that we only do those things which need to be done in government, and that in itself determines the volume of our work. At the moment, there is an arrangement whereby, yes, we receive a particular proportion of most of the research programme—37% of that—but that depends on our role. We do not go up and down with the general volume; we look just at our role.

Q20 Mr Hancock: How does that compare with our European neighbours or other countries? Where are we in the hierarchy of having a government agency specifically remaining in government because of the sensitive nature of the type of work you are doing? How does your share compare with your counterparts elsewhere?
Mr Starkey: We cannot give you an authoritative answer to that, we can follow that up.[1]

Q21 Mr Hancock: But you talk to them?
Dr Saunders: We do talk to them, yes.

Q22 Mr Hancock: Do they say: "You're doing a lot for a little and a lot of our government share of the action is coming our way"?
Dr Saunders: No, I think we would have to give you some actual figures in order to be able to illuminate that, but we will look at doing that.

Q23 Chairman: Would it be more appropriate to ask Mr Woolley to do that, for example?
Dr Saunders: It may well be that between us we probably have that information because we, obviously, do talk on a laboratory-to-laboratory basis and he would have the figures on the overall spend.

Q24 Mr Hancock: We were told earlier this year by the Chairman of QinetiQ that he believed that it would be necessary for a 25% increase in research on defence expenditure, and that he believed that QinetiQ ought to be getting the lion's share of that. What is your view on that?
Dr Saunders: I do not think I can really comment on what the Chairman of QinetiQ's views are.

Q25 Mr Hancock: You are the Chief Executive of your organisation. I am asking you to tell us what you think you ought to be getting out of that.
Dr Saunders: I would go back to what Peter was saying, in that we are here to do the things that need to be done in government. So it is not about a share, it is about being very clear with our customers in government what it is they expect of us, at a detailed level. When do they need to use us and when could they use others? We do not have any targets that say we need to grow by a certain amount, or whatever. That is not the kind of business we are; that is what makes us a bit different, I would suggest, from QinetiQ.

[1] See Ev 36

Mr Hancock: When this Committee did the DERA break up it was very controversial for this Committee, and Chisholm and his colleagues had a hard time from the Committee. We were very concerned about the split and the constraints that were going to be placed on you by QinetiQ wanting to not just corner but to occupy the overwhelming majority of the research and development ground; that you would be, eventually, squeezed and your remit so tight that you did not have any scope for both securing your own future and holding on to the very people you were talking about keeping at that level of expertise and competence. What are you doing to ensure that you can—
Chairman: Keeping the people is something we want to come on to later.

Q26 Mr Hancock: Not that; I am more concerned about the squeeze.
Dr Saunders: Actually, I think we have done pretty well over the last five years. If you look at it we have not been squeezed. The reason that has been the case is because we have focused on doing things that are really important to our customers and MoD. So we are not doing things in the margins; we are doing things at the heart of the defence agenda, and we have been doing work in support of some of the major equipment programmes where we are doing something distinctively different from the QinetiQs and the others. We have carved out a niche for ourselves which I think is a very valuable part of the contribution that science and technology can make to defence. We are very happy with that niche, actually. It is clarified for us; we do not straddle a boundary between private sector and the government; we are now very clearly on the Government's side and doing those things that really make a difference. The kind of accolades and feedback I get from senior people in the Ministry of Defence now are much more heartfelt in terms of the thanks they say for the things we do than perhaps we had when we were DERA. So I think we have carved out a very clear niche for ourselves.

Q27 Mr Holloway: Can you help us to visualise the sort of things you are doing? What are these things that need to be done in government?
Dr Saunders: To give you some examples, in terms of some of the work we did in support of operations—I am sure Peter will join in with that—we deploy scientists out into theatre on a rolling basis; every three months we put a scientist out into Iraq—

Q28 Mr Holloway: How can we visualise the sort of things you are doing that industry is not?
Dr Saunders: Industry does not do that.

Q29 Mr Holloway: Sure, but the basis of my question is what sort of projects are they, and in what sort of areas? Can you take us through some?
Dr Saunders: Do you want to take us through what we are doing on FRES?

Q30 Mr Holloway: So FRES is one. What other stuff?
Dr Saunders: FRES is one. Joint combat aircraft—
Mr Starkey: Essentially, we have a role in all acquisition decision making, in that we are providing an in-house, evidence-based—

Q31 Mr Holloway: We have heard that, but what sort of things? FRES, future combat aircraft.
Mr Starkey: Future combat aircraft, carrier strike, NEC, right through to things which are, perhaps, less obviously tangible, like the future defence supply chain initiative, which is about how we better organise the logistic supply chain in the UK and in Germany. That is being provided by industry but actually the work that we did was to look at what is it that is there at the moment, to model the way that logistics flowed through the system and, actually, to come up with both confidence that there were improvements that could be made and then metrics—

Q32 Mr Holloway: But none of the things you have said so far, certainly in the way you have explained them, suggest that they need to be done in government. Commercial organisations do that. What is it particularly about what you are doing?
Dr Saunders: To give you another example that is clearly within government, the work we do in support of detecting and defeating improvised explosive devices. Clearly, there are a lot of sensitive security issues and intelligence issues that we do not want to widely communicate out into industry. So you need to blend that with the technical expertise we have to be able to design countermeasures that actually work. Similarly, support we have been doing on helicopter survivability where we have been able to work with the warfare centres to develop tactics. So we are not just talking about developing pieces of equipment and science, we are talking about how those things are deployed and the tactics that they use. We are helping the warfare centres train the pilots of helicopters to make them more survivable when they go out and fly in Iraq. Those are very different sorts of thing, not things I would suggest industry would be doing.

Q33 Chairman: How, in respect of improvised explosive devices, for example, do you divide up what you as Dstl do and what is done in Abbey Wood? We visited some of the things they do there.
Dr Saunders: Abbey Wood are, primarily, the procurers and we work very closely with the IPTs that are procuring the equipment to be used in theatre for operational requirements. We actually do some of the design work and we come up with the ideas for what we are going to do next. So we are actually coming up with the solutions ourselves.

Q34 Mr Borrow: Moving on to competition for this research spending by the Ministry, to what extent is that likely to affect your organisation?
Dr Saunders: As we have said, our framework document says we do not compete, so the proportion of the research budget that is being opened up to competition is actually not open to us anyway. So, that does not affect us in that regard. We have clearly

been working in support of our colleagues in the Research Acquisition Organisation to help them run some of those competitions and to do some of the peer review alongside academics as to the proposals that are coming in under competition.

Q35 Mr Borrow: Does all your work have to be done within government for national security reasons?
Dr Saunders: It is not all for national security reasons; some of it is for national security reasons. Some of the other reasons we do things in government—and this is really what Peter was saying about some of our support to major procurements—are where we have access to sensitive commercial information from a number of the different suppliers and we have to act with integrity and make sure that information does not pass from one area to another. So it is sometimes handling sensitive commercial information.

Q36 Mr Borrow: On this competition issue, if as an organisation you cannot compete and the Government increases the proportion of research spending that is open to competition, that, presumably, will have a knock-on effect in terms of the proportion that you are likely to be getting.
Dr Saunders: At the moment, as we have said previously, we currently get 37% of the budget and the rest of it is what is being opened up to competition. There has been no indication that anybody is going to change that percentage at the moment. Obviously, if there was a change in the volume of research then maybe there would be a re-look at that policy, but that is one of the targets at the moment the research budget has to meet with, which is to give us this 37%.

Q37 Chairman: Do you accept the premise of what David Borrow was just asking: as an organisation you cannot compete?
Dr Saunders: Yes.

Q38 Chairman: Why are you a trading fund exactly?
Dr Saunders: There are two reasons why we are a trading fund. As you will know, we have been reviewed in 2004 and 2005 just to check whether or not the trading fund is still the right business model for Dstl. That concluded that there were a couple of quite big advantages of being a trading fund. For me the most important one is the customer/supplier relationship and the real focus on the customers. So I think it helps customers to understand the cost of what they are buying, and then they can make decisions about whether they want to purchase that from us and whether they are getting good value for money. So this whole customer/supplier relationship; having the discipline of customers saying what they want and then us proposing a solution to that and having a debate about does that seem like a fair price for what you are going to be getting. I think it is quite a healthy debate and it stops Dstl being any kind of self-licking lollipop, because we clearly have to be focused on doing the things that our customers are looking for. The other benefit is just in terms of being in charge of one's financial future. Part of being a trading fund has allowed us to retain profits in order to be able to afford to do our rationalisation programme, and if we were not a trading fund we would not have been able to do that. I think, therefore, it makes, if you like, the chief executive of the organisation more accountable for making sure that they maintain the infrastructure and maintain the skills than if this was just an on-vote organisation.
Chairman: You are giving us very helpful, crisp answers which are directly addressing the questions that we are asking. Would that everybody did that. So thank you very much indeed.

Q39 Mr Jenkins: There are rapid changes you are making at the moment, particularly this laboratory you are building. How much did that cost and where is the money coming from?
Dr Saunders: I have got the figures here. It is £94.7 million, which is the maximum price. We have gone for a project that is a mixture of building a new build at Porton Down and refurbishing our site at Portsdown West. We have gone for a maximum price of £94.7 million and a target price of £92 million.

Q40 Mr Jenkins: Where is the money coming from?
Dr Saunders: The money is coming from our retained profits from the time Dstl started. So we have been able to hang on to the cash we have generated as an organisation, and that is sitting on our balance sheet at the moment and we are able to spend that cash.

Q41 Mr Jenkins: Retained profits. Do you not pay a dividend to the MoD?
Dr Saunders: We do pay a dividend to the MoD.

Q42 Mr Jenkins: Who decides how much is retained profit and how much is the dividend then?
Dr Saunders: That is something that we agree with MoD's Finance Director.

Q43 Mr Jenkins: So you decide it amongst yourselves?
Dr Saunders: Yes.

Q44 Mr Jenkins: Then you have this pot of money and you decide what to do with it.
Dr Saunders: No, we have to get agreement from the Minister to spend that money on our rationalisation programme. We have generated this pot of money but we still have to go and ask.

Q45 Mr Jenkins: So the Minister was in agreement to reduce from 15 sites to three sites, and he knew where the three sites were going to be?
Dr Saunders: Absolutely, yes.

Q46 Mr Jenkins: All in the south of England.
Dr Saunders: Yes.
Mr Hancock: I wonder if I ought to declare an interest here, Chairman, because my house is right opposite the site at—
Mr Jenkins: No, not unless it is on it.

Chairman: We will take that interest as duly declared, just in case.

Q47 Mr Jenkins: Who exactly owns the 15 sites?
Dr Saunders: I can provide a detailed breakdown of who owns each site.[2]

Q48 Mr Jenkins: Can you tell me how many sites you own and how many sites QinetiQ own?
Dr Saunders: QinetiQ own the Malvern site, QinetiQ own the Farnborough site. QinetiQ actually own Fort Halstead but we have a long-term lease on Fort Halstead.

Q49 Mr Jenkins: So who owns the three sites you are going to establish on?
Dr Saunders: We own Portsdown West, we own Porton Down and, as I said, we have a 97-year lease on Fort Halstead.

Q50 Mr Jenkins: So the majority of the ones that are being released are owned by QinetiQ?
Dr Saunders: Yes.

Q51 Mr Jenkins: So they can sell the sites and realise a lot of money on it.
Dr Saunders: They actually have more of the people on those sites. If you take the Malvern site, we are a minor lodger on that site; they have far more people on that site than we do. So what they will choose to do with that site will be part of their strategy. Again, we only have two small buildings on the Farnborough site. That is dominated by QinetiQ.

Q52 Mr Jenkins: If they can de-scale that or de-people those sites they can sell those sites and the money goes back to QinetiQ.
Dr Saunders: That would be the case, yes. I believe that is true.

Q53 Mr Jenkins: Was that part of the rationale why you chose these sites to locate on?
Dr Saunders: No. We did want to split ourselves off from QinetiQ in some ways so there was not any confusion about what they were doing and what we were doing. So we wanted to have distinctive sites that were definitely our sites, and I think there was certainly something of that in it. We chose the sites on the basis of what made most sense from the point of view of the type of work we are going to be doing in the future and the numbers of people that it made sense to put into those buildings and that sort of site. We did quite a lot of analysis of different options—a three-site option, a two-site option and a four-site option—to look at what would be the best cost-benefit analysis for our move, and this three-site option came out as the best balance. That is what we briefed to the Minister to get the decision.

Q54 Mr Jenkins: In your cost benefit analysis did you put into the equation the impact on the community for moving to any one of the sites?
Dr Saunders: We did consider the cost in terms of what we might have to do to make sure that we work well with the community, like road improvements, thinking about green transport, and so on. So we did think about those sorts of things but we did not specifically model, say, the impact on the community.

Q55 Mr Jenkins: So there is 550 staff moving to Porton Down but you have not worked out the effect that would have on the local schools—
Dr Saunders: Yes, we have done that. As part of planning we did that. That was not a part of the original cost benefit but in going up to Salisbury Council over the planning application that we have made, yes, we have looked at that.

Q56 Mr Jenkins: And it works out to be okay?
Dr Saunders: The discussions we have had with the local authorities have actually been very positive and they believe that this is going to work quite well.

Q57 Mr Jenkins: Have you been asked to make any contribution towards the cost?
Dr Saunders: Yes, we have been asked to make contributions to the costs of roads, and we have agreed to do all of that—so upgrading one of the roads at Porton and maybe putting in some traffic lights; building a roundabout, those sorts of things. So £3 million or so of investment will be put into that to make those improvements.

Q58 Willie Rennie: Can we look at the joint ventures, Ploughshare and DDA? Can you paint a picture of how they all fit together?
Dr Saunders: Ploughshare Innovations Limited was set up as a wholly owned subsidiary of Dstl to act as our agents for exploiting the intellectual property that we generate as part of our research. They can exploit that in a number of different ways, but the two main ways are: to license that technology to companies that might already have products and would need a licence or could develop their product further to enhance it and would take a licence on our technology to make that happen. The other thing they can do, if there is no existing industry out there and no existing companies, is to look at developing a start-up company using the IP and taking it to a point where they, maybe, have a product to market or they have developed a prototype, at which point that start-up company could be sold or it could develop into a fully fledged company downstream. So we currently have a number of so-called joint ventures but they are actually start-up companies where Dstl, and now through Ploughshare, has put the intellectual property into the joint venture and a couple of venture capitalists have put in the money to take the IP from a proven concept to a prototype and help develop the business.

Q59 Willie Rennie: How does that compare with the DDA?
Dr Saunders: The DDA's remit is rather different; it is not there to license Dstl technology to companies, nor is it to manage joint ventures or start-ups. Its

[2] See Ev 36

main remit has been to work with SMEs and, particularly more recently, to look at spinning in technology into MoD.

Q60 Willie Rennie: So the activity of Ploughshare is completely different.
Dr Saunders: It is completely different. The Director of DDA, Damien McDonnell, has conversations with Andy Tulloch, the Chief Executive, and they have looked at how complementary their activities are. Indeed, before we got approval to set up Ploughshare there was an investigation at the previous Minister's request to look at any overlap between the DDA and Ploughshare, and that concluded that they were doing very separate tasks.

Q61 Willie Rennie: So why the proposal to get rid of the DDA?
Dr Saunders: I think you really do need to ask my colleagues.

Q62 Willie Rennie: If it is of benefit to you—
Dr Saunders: We have never had anything particular from the DDA that has benefited our business, because, as I said, they have tended to work with SMEs. We have had examples where they have come to us with an SME who would, perhaps, like to have access to Dstl technology, but they have not had any money in order to pay us to help them do that technology transfer.

Q63 Willie Rennie: There has been a connection with the DDA.
Dr Saunders: There has been a connection over the years, and indeed some of our staff have been working in the DDA. We currently have three staff on secondment to the DDA, so there has been a relationship.

Q64 Willie Rennie: How would you fill that gap if the DDA was no longer there?
Dr Saunders: As I said, we have not been reliant on the DDA to bring in any particular technologies that we were looking for, nor to exploit any of our IP. So we do not see that there is actually a gap for us.

Q65 Willie Rennie: Some people say that they should not be making any money from the technology that they spin out on licence, or whatever, from the Dstl. Do you agree with that? It should actually be for the benefit of the wider economy rather than for the financial interests of the Dstl and the Government.
Dr Saunders: It is one of those interesting things, is it not? All public sector research establishments have a charge, really, from the Treasury to make sure that we maximise the value to the country of the IP and the research that we do. One way of doing that is actually to make sure that technology gets out there and is used. A lot of the things that we are exploiting will have benefits to society: they are things like rapid MRSA testing; they are new coatings that will, perhaps, help people in the drug industry. We see those kinds of benefits. In some ways the money is nice to have but it is kind of incidental; what we will then use that money to do is to help make that become a real virtuous circle. So with some of the money that we make out of Ploughshare (we will have to negotiate this with the Finance Director, of course) the intention will be to re-invest that in making technology transfer work even better by putting it into innovative work alongside our IP to help get that pull-through.

Q66 Willie Rennie: So you do not think there has been technology that has been lost to the public good because you have been trying to get too much money?
Dr Saunders: No, we are actually really rather sensitive to that, to the extent that when we look at Ploughshare's objectives they have some objectives that are not purely financial; it is about trying to maximise some of the benefit to the public, including thinking about: how many jobs are we creating? How many relationships are we creating? So it gives them more than just a financial imperative. Obviously, they have to cover their costs but beyond that there is a richer set of indicators.

Q67 Willie Rennie: Where do you see the balance of your future income from this area coming? Is it going to be from Ploughshare or is it going to be venture companies?
Dr Saunders: Ploughshare will, effectively, manage all of this for us. One of the reasons for setting this up was to allow the Dstl executive to focus on doing things for the MoD and other government departments, and bring in some expertise that can act as our agents to look at the exploitation. In each area of IP they come up with a strategy and an approach, depending on what that technology is likely to be. I would expect that there is always going to be quite a strong balance between licence revenue and income from joint ventures, because although the potential rewards from a spin-out company could be very high, rather few of them will actually deliver as much as you might hope, and licensing and getting that technology out through existing companies is also a very good way of making sure the technology gets out there.

Q68 Willie Rennie: The Lambert Review tried to give a big steer towards more licensing rather than spin-outs. Are you following that route?
Dr Saunders: Absolutely. In the early days of Dstl there was quite an emphasis on getting some spin-outs going because we wanted to get some experience of doing that and it made sense for the types of technology. However, now there has been a very clear redressing of the balance and this year the emphasis for Ploughshare has meant their target is to increase their licence revenue, and they have been quite successful in doing that.

Q69 Mr Jenkins: Before we leave Ploughshare and the DDA, I have still got some confusion in my mind. As far as I am aware, the DDA still owns intellectual property rights. You say they were looking at SMEs. What is the difference between your operation exactly and the DDA?

Dr Saunders: The DDA has no IP rights over Dstl IP.

Q70 Mr Jenkins: And it has no rights from anywhere else?
Dr Saunders: I do not know if it has got rights from anywhere else; I can only comment that it has no rights over our intellectual property.

Q71 Mr Jenkins: I believed their role was to roll out intellectual property rights through industry anyway; that is the "diversification" tag. Diversification meant that defence stuff would have been rolled out to industry, and you are claiming they only dealt with SMEs. What do you deal with (insofar as Ploughshare is going to be dealing with SMEs), why are you different, and why can we not be given a guarantee that Ploughshare is not going to run round the same circuit as the DDA?
Dr Saunders: Because Ploughshare actually have a licence from us to license on our technology or to develop our technology, which I do not think the DDA had, but you would probably need to ask our colleagues in the MoD what they had. So they have, if you like, a clear route to market for our IP and their main remit is to find people who want to license that technology or to find alternative routes to get it exploited. My experience with the DDA (and this is only my experience) is that they were working much more as a brokerage organisation brokering a relationship between SMEs and organisations that had research capability that could be applied to the products the SMEs were trying to develop. That is more like brokering for a contract research arrangement than an IP exploitation for research that has already been done.

Q72 Mr Jenkins: You have got seven joint ventures at the present time?
Dr Saunders: Yes.

Q73 Mr Jenkins: If you have got seven joint ventures and Ploughshare going on, how much effort have you been directing into that activity rather than your main "we only work for the Government" activity? What guarantee do I have that in future information will not be slipped out by these joint ventures that are funded by the British Government only to be found later on being utilised by some other organisation?
Dr Saunders: I will try and explain a little bit about how this whole governance arrangement works. Firstly, having established Ploughshare, then the oversight of these start-up companies, these joint ventures, is being done by Ploughshare. So we, as Dstl, have stood back from that now and we have employed Ploughshare to do that on our behalf. So we are not being diverted into those sorts of areas. In order for technology to be released from Dstl to Ploughshare and then on to these joint ventures we have to get agreement from the intellectual property group in the Defence Procurement Agency. So anything we release has been approved by them; anything that might be potentially controversial or sensitive we also have a technology transfer oversight group that includes people from CSA's organisation, who can look at whether or not they think there are some sensitivities in the technology that we have not picked up. Obviously, our security people also vet this before it goes out. So we have a very tight regime to make sure that any IP that we release is ready to be released and is fit to be released without it coming back and potentially causing a threat to us in the later stages. So we have a very strong governance regime for this.
Mr Jenkins: I am beginning to understand the relationship between the DDA now and why the DDA has not gone down this route. You cannot answer that but the MoD can.
Chairman: We can ask that later.

Q74 Mr Hancock: Where is your part in this negotiation for the transfer and selling on of intellectual property rights? Where do you come in on the pricing of it?
Dr Saunders: Actually we now do not do anything on pricing. We expect Ploughshare to do that. Ploughshare has its own board, which includes non-executive directors who have worked in the licensing and entrepreneurial areas to provide them with guidance as to the kind of prices that might be sensible to enter into a negotiation. For example, recently they, effectively, ran a competition for a licence for one of our areas of technology to see what the market would be prepared to pay for this, so they are using those kinds of mechanisms to set the price—a combination of having expertise on what this might mean plus some experience of doing these kinds of deals in the past. Andy Tulloch, the Chief Executive, has been very experienced at licensing deals in his previous career.
Mr Hancock: If it is anything like getting rid of our property that we own then God help you! You will be giving it away.

Q75 Chairman: Does Ploughshare's board include any directors who work at Dstl?
Dr Saunders: Yes, it does. At the moment, it includes myself and Mark. However, it is dominated by non-executives and it is chaired by a non-executive.

Q76 Chairman: Have you considered the experience of the Met Office?
Dr Saunders: Yes, we have.

Q77 Chairman: How are you guarding against conflict of interest?
Dr Saunders: The important thing here is that Ploughshare is 100%-owned by MoD and Dstl on behalf of MoD. So it has not got any other investment coming in from outside organisations into Ploughshare itself.

Q78 Chairman: And you would not expect that to happen.
Dr Saunders: And we would not expect that to happen. Indeed, when we talked about the ways of funding Ploughshare we came to the conclusion it would not have been a wise move to bring investment into Ploughshare itself. We used to have

Dstl directors on some of the joint ventures but we have gradually been removing them from that role and requiring Ploughshare to provide directors in their own right rather than us to provide the directors. That, I think, helps put these things more at arm's length and get rid of any chance of conflict of interest.

Q79 Linda Gilroy: The Defence Technology Strategy puts a lot of emphasis on the need for Dstl to recruit, retain and develop staff. How do you go about that and how challenging is it? In particular, perhaps you could cover any particular challenges arising from what we believe is an ageing profile, and, also, of recruiting the best of young British scientists?
Dr Saunders: We do a lot of graduate recruitment and we have got some very good relationships with the universities; we have people from our younger cadre who actually go out and build relationships with the universities. We aim to recruit about 100 graduates a year and since we have been set up that is the kind of level of recruitment that we have been going for. We are in *The Times* top 100 of graduate employers (I think we were 76th in the last round), and so we have got a reasonably good profile as a recruiter of graduate scientists and engineers. I think the standard of people we are getting in looks very healthy. In addition to that we also do quite a bit of work with pre-university students. We are very active sponsors of the "Year-in Industry" scheme, we provide a prize every year but, more than that, we actually employ of lot of "Year-in Industry" students, and to some of those we will offer the equivalent of scholarships to go off to university and then come back and work with us during their vacations. I think at the bottom end of the scale it is actually a very healthy picture; we are getting some very good graduates.

Q80 Linda Gilroy: Are you getting enough graduates?
Dr Saunders: Yes, I think we are.

Q81 Linda Gilroy: Are there any pinch points that are difficult?
Dr Saunders: Not at the moment. Where we have a pinch point is people in the late-20s, early-30s. That is when people have done their first few years with us—perhaps they have got chartership of their institute—and they are thinking about what do they do next? The challenge for us is to hang on to enough of them at that point to work up to replace the grey beards in the organisation.

Q82 Linda Gilroy: So how do you go about retention?
Dr Saunders: We are looking at a number of different ways of doing that. Clearly you want to target the ones you want to retain rather than just saying we want to retain everybody, because we do not want to retain everybody; we want to have some churn (of staff) because that is healthy. We have introduced what we call an associate fellowship scheme which is for people at that kind of stage in their career who want to really follow the scientific and technological careers, to have some time and some money to, perhaps, work with a university or work with the systems engineering innovation centre at Loughborough to establish their scientific and technical credentials and give them a step-jump on their scientific careers. We think that would be quite an attractive proposition to help people stay with us during that period.

Q83 Linda Gilroy: Is that because otherwise they are watching, largely, what other people are doing rather than being at the cutting edge of doing—
Dr Saunders: No. We have a very strong technical career path now that allows people to get on up to the top of the organisation by staying in technology. We have a fellowship scheme and senior fellows, and those guys now get paid the same as the management team; so they are getting right up to the top of the organisation. We want to encourage more people to go that route because it is the quality of our scientists and engineers who are absolutely key to us being able to do the kind of work we do.

Q84 Linda Gilroy: And the ageing profile?
Dr Saunders: As I said, if you look at it it is not too bad. The profile is not ageing; the gap is in this 28–34 area. I have a concern about that because, of course, if you do not get people into that gap then you will not have people for the future, but we do not have a big problem of an ageing profile at the moment. We have very robust succession planning for those people who are planning to leave the organisation. Of course, under the latest changes in the retirement law quite a number of our more senior people, our technical people, are choosing to stay on beyond 60, either full-time or on a part-time basis. You are not hitting a brick wall at 60 any more.

Q85 Linda Gilroy: How do you go about developing the close and effective relationship you need with universities?
Dr Saunders: We have had some initiatives going since Dstl was set up, particularly in areas where we have not got a lot of in-house research. We have something called co-operative research centres. Those are paid for by our MoD customer as part of the capability development activity, and they pay for us to work for the university. Some of the work is done in the university but it also allows some of our staff to act as visiting professors or visiting lecturers within the university, properly engaged in that research programme, providing advice, mentoring and so on, to postgraduates doing the work. So we have got a few examples with Southampton University, with Cranfield and with Imperial College of that kind of model working. You will see in the defence technology that MoD is keen to expand that kind of model to create communities of interest and create those kinds of strong relationships with the universities. So we have some experience of doing that.

Q86 Linda Gilroy: How do you handle the security issues that can arise from that, with foreign students? I am a member of the Quadripartite Committee on strategic export controls and we were told at an evidence session earlier this year that very often universities do not understand when they have to apply for ordinary or special licences.
Dr Saunders: We are working with universities that are quite used to working with us, so we have had some long-term relationships with these universities. We are also quite careful; the kind of work we would do in a university would tend to be some of the underpinning work that would not be so sensitive and so much of an issue.

Q87 Linda Gilroy: So you are fairly confident?
Dr Saunders: We are fairly confident that in the relationships we have with the universities we work with those kinds of issues are well understood.

Q88 Linda Gilroy: Have you had any cause for alarm about any work at all in that respect?
Dr Saunders: No, we have not had any cause for alarm.

Q89 Chairman: Last week, witnesses in front of us on the Strategic Nuclear Deterrent inquiry were expressing concern about things like the closure of the physics department at Reading University. You have expressed no such concern. Do you feel it?
Dr Saunders: It is one of those things we do keep an eye on because, clearly, if there are reductions in the number of physics departments then it could well have a knock-on effect on the pool of graduates that will be available to us, but we actually take students from a very wide variety of backgrounds, not just physics—obviously, quite a lot of engineers and chemists and biologists and social scientists. So we are not just dependent on one kind of area of science.

Q90 Chairman: So you do not find the pool is shrinking?
Dr Saunders: We have not had too much of a problem so far, but I think that is partly because the kind of work we are offering graduates they see as being rather attractive. There is quite a strong public sector ethos amongst our intake of graduates. They are quite driven by that; quite passionate about it. It is really good.

Q91 Mr Jenkin: I presume international collaboration is a major part of your activity. What is the objective of international collaboration?
Dr Saunders: In terms of the overall government objectives and MoD objectives for international research collaboration, again, the policy for that is set from the Chief Scientific Adviser's area. We are there to support them in developing technology agreements or joint work with laboratories in other countries. So we are there very much to help the MoD get gearing from the international research collaboration so they can get access to more knowledge through information exchange, and so on, than they would be able to get if all they did was fund the work in the UK. So a lot of this is about getting gearing; it is also about making sure that there is an element of government-to-government peer review, so we test out our ideas against other scientists in government laboratories that perhaps have a different perspective. So there is some benefit in that.

Q92 Mr Jenkin: What is the objective? Is it to gain more ownership over IP? Is it more directed towards the outcome capability?
Dr Saunders: As I say, I think you should ask the CSA for what he thinks are the top level objectives. From my perspective the objective is certainly not about getting IP or control over IP; it is more about exchanging information and about making sure that we have a good understanding of what the art of the possible is in terms of the sorts of defence capabilities the UK might need.

Q93 Mr Jenkin: What about access to non-UK technology? Does it differ in Europe, say, from the United States?
Dr Saunders: Do you have something to say on that, Peter?
Mr Starkey: It varies across all countries but, in a sense, there is a strong dependence on the particular technical areas—what we have to offer and what the other partner has to offer—and that varies even within our relationship with one country across those technical areas. So one cannot easily categorise it by nation, as such, I am afraid.

Q94 Mr Jenkin: Which is the most important international partner?
Dr Saunders: If you actually look at the amount of activity then it is going to be with the US and the other nations in the TTCP activity, which includes Canada, Australia, New Zealand, and so on. That grouping is a very influential grouping of countries.

Q95 Mr Jenkin: What constraints are there on that relationship?
Dr Saunders: It is constrained under the details of the memorandum of understanding that binds it together. So it is all set out exactly what we will do under those different arrangements: what we will exchange and the terms and conditions under which information is exchanged.

Q96 Mr Jenkin: Are we looking to break down obstacles that exist between us and other countries, and what are those obstacles?
Mr Starkey: The obstacles are quite often to do with the point you have raised earlier about intellectual property. We are in the business of getting value out of the exchanges, getting gearing out it; we are not in the business of giving away UK intellectual property without there being a *quid pro quo*, and we do not decide those things ourselves in Dstl; they are part of an MoD policy.

Q97 Mr Jenkin: What about access to what the Americans call their "black programmes"? Is that one of the obstacles?

Mr Starkey: All nations have programmes which for one reason or another they wish to protect. Sometimes it is because of sensitive applications, sometimes because of sensitive technology, sometimes because of commercial sensitivity. All of those can provide a barrier. My experience is that when the UK has something which other nations are interested in, whether it is a piece of technology, a bright idea or simply experience in an area so we can offer constructive criticism, then quite often, as long as value of that sort is seen by another nation, we can have a productive dialogue and exchange.

Q98 Mr Holloway: On dialogue, exchange and gearing, according to the Americans you were extremely helpful with sensitive stuff originally in Northern Ireland—ECM stuff. What would you have got out of that pretty much one-way street?
Mr Starkey: It is very difficult for me outside of a confidential arrangement to be specific there, but indeed that was not a one-way street. The United States has huge capability there, on which we have been able to have a very good engagement with them. I am not trying to avoid the question; it is not a one-way street; there has been definite benefit to the UK in that field through the United States investment and through the technology they have over an enormous field because we are no longer dealing with a very narrow technical issue in this area.

Q99 Chairman: On the Joint Strike Fighter, do you think you are getting enough of the information you need to give the Ministry of Defence proper advice?
Mr Starkey: That is a very good example of where research which is being carried out in the UK has taken the UK to a high enough level of understanding to be able to persuade the Americans that we are credible people to talk to, and that is one of the areas where we have indeed been able to provide very good advice to the Ministry of Defence on the level of technical risk, likely performance and so on and so forth to do with that programme.

Q100 Chairman: I am not sure that fully answers whether you are getting enough information from the United States. Do you think that you are?
Mr Starkey: I think we are getting a great deal of information. There are always areas where there is further discussion, and indeed, on that programme there are further areas that are currently subject of discussion that are quite important for the programme.
Chairman: That sounds like a "no". You are allowed to say "no".

Q101 Mr Hancock: What about what we wanted to get out of this aircraft? Will the capability of that aircraft as was first foreseen be available to us as a nation or will it be a downgraded specification because of the Americans' insistence on not allowing us to have the complete package?
Mr Starkey: I am not in the right position to answer that question.

Chairman: I think that is probably right.

Q102 Mr Jenkin: Can I just ask a more general question? There is a sense that over the years we have less and less to put on the table relative to particularly the United States.
Mr Starkey: There is a danger of that if one does not invest in the appropriate research programmes that generate that.

Q103 Mr Hancock: You have to know which ones to go for.
Mr Starkey: Certainly.

Q104 Mr Jenkins: I am sorry to labour this point, but this Ploughshare Innovations Limited is a limited company. Who actually owns it? Do you own it or does the MoD own it?
Dr Saunders: We are part of the MoD so it is owned by the Secretary of State for Defence.

Q105 Mr Jenkins: There are very subtle differences here. If it were at any time in the future to be packaged up and sold in the market place to raise capital, who would the money go to? Would you get a share or would it all go to the MoD?
Dr Saunders: That would be something we would have to discuss with the Finance Director at the time.

Q106 Mr Jenkins: But it is not clear.
Dr Saunders: There are no guarantees.

Q107 Mr Jenkins: I am not clear who owns this company.
Dr Saunders: The Secretary of State for Defence owns the company and we manage it on behalf of the Secretary of State for Defence because we are part of MoD.

Chairman: The Finance Director is listening very carefully.

Q108 Mr Hancock: One last question on an issue locally, and it is about Portsdown West, and it is not about my home. It is about the plans you have and the investment that you are going to make there. You are going to be bringing an extra 500 people on to that site. Is the investment absolutely assured, that that will take place in the time frame that is outlined in the papers to us?
Dr Saunders: Yes.

Q109 Mr Hancock: That is a guarantee?
Dr Saunders: Yes it is. We have the ministerial agreement, the £97 million maximum price that I have talked about. That includes the refurbishment of Portsdown West and that is due for completion in 2009. We have signed the contract, so Serco press the "go" button and yes, that will be happening.

Chairman: There are a number of other questions that we may wish to ask you about but I think, in view of the time, and we have a number of other

people to see, we need to ask them in writing rather than anything else. I apologise to those members of the Committee who have burning issues that they wish to ask. May I repeat what I said before, that your answers have been crisp, and answers to the questions we have been asking, and that has been a most refreshing and enjoyable experience. Thank you very much indeed.

Witnesses: **Professor Sir Roy Anderson,** Chief Scientific Adviser, **Mr Trevor Woolley,** Finance Director, **Mr Mark Preston,** Director of Business Delivery, and **Dr Paul Hollinshead,** Director Science & Technology Policy, Ministry of Defence, gave evidence.

Q110 Chairman: May I welcome you to the second part of the morning. I wonder if you could perhaps introduce yourselves for the record and tell us what your role is. Professor Anderson, would you like to start.
Professor Sir Roy Anderson: I am Roy Anderson, Chief Scientific Adviser to the Ministry of Defence. Sitting to my right is Trevor Woolley, who is the Finance Director, and beyond Trevor is Mark Preston, who is the Director in the Business Delivery Group within the Ministry of Defence, reporting to Trevor, and to my left is Paul Hollinshead, who is the Policy and Planning Director within the Science Innovation and Technology part of the MoD.

Q111 Chairman: Could you describe to us, please, your role as the Chief Scientific Adviser in the Ministry of Defence in terms of research, particularly in relation to Dstl.
Professor Sir Roy Anderson: Within the Ministry of Defence, the Chief Scientific Adviser's position is the oldest one within all government departments, established during the Second World War. Responsibility is as a top-level budget holder for the science and technology budget. That is the first responsibility, and that is to ensure that the Ministry of Defence gets sound technical and scientific advice on both capability today and also looking into the future about the strategic capabilities required. The second area is to do with the deterrent, other more strategic technologies in that area, and the third responsibility is as Chairman of the Investments Approval Board for the category A projects and, as a consequence of those two, I sit on the Defence Management Board of the Defence Council.

Q112 Chairman: The category A projects are which projects?
Professor Sir Roy Anderson: They are the big ones, as it were, which are over a certain value.

Q113 Chairman: What is the value?
Professor Sir Roy Anderson: About £300 million.

Q114 Chairman: How many scientists do you have in the MoD, not including Dstl?
Professor Sir Roy Anderson: Within the Science and Innovation top-level budget, that is, within the main building at Whitehall, then we have a subsidiary site at Shrivenham, which is the Research Acquisition Organisation, the current total is roughly 240. It varies between 240 and 270. Half are based at Shrivenham and half in the main building in Whitehall.

Q115 Chairman: How do you decide which work goes to Dstl on which work those scientists do?
Professor Sir Roy Anderson: We have a Board, a Science and Technology Board, which is populated by the customers, equipment capability and so forth, and the Services themselves, and we have discussions at the Board about the policy of directing research towards Dstl. The management of that is largely undertaken by the Research Acquisition Organisation in Shrivenham. If you think of a research council in the civil sector, research councils like the Medical Research Council and so forth have a body of staff who procure, monitor, and peer-review the quality of research and that is the function of the Research Acquisition Organisation.

Q116 Willie Rennie: We received a note from the MoD recently about the DDA, and it said the DDA was established in 1999 to facilitate defence technology transfer into the civil sector and to broker civil technology back into defence. As you will have heard, in the previous session we heard that the Dstl had a light relationship with the DDA and there would be no gap to fill if the DDA were to go. Why is that the case, when they were supposed to take technology transfer out and in, and the Dstl is one of the main holders of technology?
Professor Sir Roy Anderson: I am going to ask Trevor, as Finance Director, largely to answer this but I want to stress the point that Frances is made. A deep understanding of the research that is going on in an organisation is absolutely crucial to deciding what bits might be exploited, and I think it is more appropriate that Dstl, being best placed to make those judgements, has this intimate relationship with spinning out small parts of the organisation. That is the point I want to stress which Frances made.
Mr Woolley: I think the key facts are that events have moved on since the Defence Diversification Agency was originally created. It was originally created as part of the Defence Evaluation and Research Agency, DERA, which of course has now subsequently evolved into Dstl and into QinetiQ. As Professor Anderson says, in terms of the spin-out of technology, as far as MoD-owned and funded technology is concerned in Dstl, the Ploughshares arrangement is the one that we think is most effective, and that is the route through which the spin-out is going. QinetiQ are heavily engaged in the civil and commercial sector anyway and are well placed to spin out technology there. As far as the spin in side is concerned, MoD procurement policies now encourage the pull-through of civil technology

directly into the defence supply chain through the prime contractors, and it is therefore less clear what role there is in technology brokerage for the Defence Diversification Agency, and that is why its role has been reviewed, that is why it is the subject of a consultation document and a consultation period, in the light of which Ministers will take final decisions on its future.

Q117 Willie Rennie: But the relationship has never really been there, from what we heard earlier on, so it is not really that the landscape has changed; the relationship was never there in the first place. Is that not the case?
Mr Woolley: I think the landscape has changed. As I say, originally DDA was part of DERA, as part of the Department's in-house research and technology organisation but events have moved on. There is not a clear requirement from customers within the Ministry of Defence for the services that the DDA provides and there is not an evident requirement in the defence industrial community for that service and therefore we had to ask the question whether this is the best way of spending defence money, which of course is, as always, extremely tight.

Q118 Willie Rennie: So the DDA were successful in the past, under the old structure, in getting spin-in and spin-out?
Mr Woolley: What the DDA has come to be is a technology brokerage service. It is not directly spinning in or spinning out.

Q119 Willie Rennie: It is facilitating the process.
Mr Woolley: It has facilitated it. It is a sort of dating agency. The question is, though, whether it is essential to that process and whether the value it adds to that process is commensurate with the cost to the Department.

Q120 Chairman: Before moving off that, in a sense, that decision has already been taken, has it not, because, although it is called the Defence Diversification Agency, it is not listed in the accounts of the Ministry of Defence as being one of your agencies. Has it been declared a non-person?
Mr Woolley: It was never a formal agency in the sense of the "next steps" agency construct. It does not match the constitutional requirements of a formal defence agency. It is, if you like, an agency with a small "a" rather than a capital "A".

Q121 Chairman: Are there any other organisations in that category?
Mr Woolley: I think it is unique in that regard.

Q122 Chairman: Does it actually exist?
Mr Woolley: It does exist.

Q123 Chairman: Does it have a legal personality?
Mr Woolley: It is not legally independent of the Ministry of Defence. It is part of the Ministry of Defence. It comprises some 55 people, it has a headquarters, it has its own budget, it has its own Director, but it is not a formal agency in the sense that the Defence Procurement Agency is formally an agency.

Q124 Willie Rennie: In the higher education sector, the NHS, they have all set up bodies like the DDA, which is responsible for that brokerage. What makes the nature of defence any different from the NHS and from the higher education sector?
Professor Sir Roy Anderson: May I just interject one thing? In all these activities, surely the prime criterion should be success: is it doing well?

Q125 Willie Rennie: You think it is not doing well?
Professor Sir Roy Anderson: I think it is sensible every now and again to examine the success and track record of such organisations, particularly when a government department is under a lot of stress financially.

Q126 Willie Rennie: You think it is not performing well?
Professor Sir Roy Anderson: I am not going to comment on that in the sense that it is prior to this review and consultation that is going on at the moment but the general point I want to make is that you should always look at whether these organisations are serving the function they were set up to do.

Q127 Willie Rennie: Is it systemic or is it the personnel involved? You do not just scrap something if it is failing; you try to reform it.
Professor Sir Roy Anderson: Of course, but we are very encouraged by the success of Dstl in looking at interesting spin-outs and I make the point again that I think those who are very close to the technology are often the best judges of what is likely to be successful.

Q128 Willie Rennie: How is that different from the higher education sector and the NHS?
Professor Sir Roy Anderson: The higher education sector is a very interesting one because, of course, there—and there has been great success in recent years at spinning out companies from universities—it is the deep involvement of those who are actually involved in the research and the management of it. I see that more as the Dstl model.
Mr Hancock: Surely, the writing was on the wall the minute the decision was made to pack up DERA. With QinetiQ going, there was no role for the DDA. I am surprised it is still there today. Everyone on the Defence Committee at the time thought its days were numbered at that time and, for the life of me, I cannot understand why none of you have just said that, because their main business went when QinetiQ went.

Q129 Chairman: Is there something in this?
Mr Woolley: I do not disagree with that. That is the point I was trying to make when I said that the landscape has changed since it was set up. As for why it has taken so long, I think that the DDA has

evolved into something slightly different from what was originally intended and there has been a view that the value of what it has evolved into is something that we should assess before taking decisions.

Q130 Mr Hancock: Nobody can tell us what we got out of it. Nobody can tell us what that value was to the MoD or, for that matter, to the state.
Mr Woolley: I think it is precisely because we do not judge that we have got value from it that is commensurate with the cost that Ministers have been minded to close it.

Q131 Willie Rennie: Defence Technology Strategy. Professor Anderson, what has your involvement in that strategy been and what is the feedback on the strategy from the stakeholders?
Professor Sir Roy Anderson: That is an interesting question. The Science Innovation and Technology top-level budget produced the document, so my staff were very much involved with it over the past six months. It was a first pass. I do not know whether you have seen previous technology strategies published by the Ministry of Defence, have you?

Q132 Willie Rennie: No.
Professor Sir Roy Anderson: It was a first pass trying to be much more open about what our research needs are. Myself and the Minister, Lord Drayson, were very keen that the document was in the public domain. In other words, we were trying to provide some research roadmaps for industry of the things at the top of our priority list. There is a second, classified document, which also deals with other roadmaps in more sensitive areas but it was the public document that was most important. The objective here was—and this is not an easy task and if you do not get it right first time, there will be iterations here and there are fuzzy edges—to try and think of what areas of science and technology we should sustain in the UK because they were so important to us for defence and security. In other words, we had to remain world class in those fields. The US has a stated policy that it will remain world class in all areas of science and technology and engineering that are relevant to defence and security. We are a small country and we cannot afford to do that so we have to be smarter and more incisive about the selection of those fields. That was the objective of it. Turning to the second part of your question, what has the response been from industry and academia: very positive from academia. Both Lord Drayson and myself have had many letters on that side and also from the small and medium enterprises in the industrial sector. I think some of the larger industries, quite understandably, have been a little frightened by the suggestion that they might invest more in R&D, which was a heavy component of that report. We felt if government plays its part in raising R&D spend, or sustaining it at a good level, then industry should play its part too.

Q133 Mr Borrow: I have a number of questions around the whole issue of research spending. They are fairly straightforward, just to get information. How much is currently spent on defence research in the UK and how much of that is government spend?
Professor Sir Roy Anderson: The total spent by government is £2.6 billion. In relation to a question from the Chairman earlier, if you take £2.6 billion R&D spend as a fraction of MoD's total spend, you are of the order of 10%. So we are well above other government departments, etc. If you take the total R&D spend of the defence sector industries, there are fuzzy edges here, because there is communication and so on. My understanding from the DTI figures which publish the R&D investment is that we are talking about a very significant spend. The figures are not precise because of the fuzzy edges but I would guess it may be 20 to 30% of total R&D spend, so it is a very heavy commitment. If you look at the export market and the status of the defence sector in the UK and as an employer of science and engineering graduates, then again you are talking about a third, position three, so it is a very important industry.

Q134 Mr Borrow: Of the MoD's research spend, how much of that goes to Dstl and how much to QinetiQ?
Professor Sir Roy Anderson: It is about half and half of the fraction that we spend, so it is about £160 million this current financial year to Dstl. It is a little less than that to QinetiQ at the moment but that is probably just a temporal issue in billing rather than intention. The intention is to spend roughly equal proportions there. That is not the total R&T, which is the more basic end of the spend, which, of the £2.6 billion, is about £500 million. We spend in other areas there too, not just in Dstl and QinetiQ.

Q135 Mr Borrow: The Defence Technology Strategy refers to the national targets being set for R&D investment of 2.5% of GDP by 2014. I understand that that figure refers to all R&D, not just defence, and includes both government and private sector funding. Does the Government have a target for defence research?
Professor Sir Roy Anderson: Not that I am aware of. The DTI publishes very good figures on R&D spend company by company. You can break it down by sector. The pharmaceutical sector strikes you as very high, up the top end. The defence sector is variable. Some companies are very good, some are less good. Rolls-Royce obviously is a company with a civil and a defence arm and has a high R&D expenditure, but there is no stated Government target, to answer your question.

Q136 Mr Borrow: The Defence Technology Strategy also states that the defence industry investment—that is, the private sector investment—in R&D is low and that the industry should increase the amount of investment. You have just mentioned that yourself. How does the

MoD intend to contribute towards defence research and how does the MoD decide what is the appropriate level of MoD research spending?
Professor Sir Roy Anderson: There are multiple facets to that question. The first one is we published in the Defence Industrial Strategy quite a detailed statistical analysis of the relationship between R&D spend and our equipment and technology capability. There is a very close correlation between the two. There is about a 15-year time lag between the two so what you spent 15 years ago determines what you have today. We know that relationship is there. We have stabilised our R&D spend at the moment for the near term, adjusted for inflation. I am a research scientist by background and instinct and research scientists, if asked if they want more R&D money, always say "yes" but the most important thing to recognise is that the MoD has some very important priorities in terms of the two current operational theatres, and these take priority. You always have to bear that in mind when you are thinking about how much we should spend on R&D. Unusual times at the moment, and unusual pressures. It is my role to argue within the Defence Management Board with the Finance Director and so on the logic of the case for increased R&D spend. That is my responsibility. If you take the industrial sector and you take the big players, I think their R&D investment is probably a little less than we might like, and the objective of the Defence Technology Strategy was to give a road map so that they could invest in R&D with greater security that there was a procurement at the end of it. I have often heard from senior executives in the defence industry who have quite fairly made the point "We are spending on R&D and we have been greatly encouraged by you, then you decide not to procure anything so I have got to write off all that R&D expenditure." One of the prime objectives here is to try and provide a more detailed road map.

Q137 Mr Borrow: Do you accept the argument that there are certain areas of research where it is unrealistic to expect industry to fund all or a large proportion of that, and if UK plc wants that research to take place, even if that takes place within private sector companies, the Government is going to have to put a hand in the taxpayer's pocket to make sure that that research takes place?
Professor Sir Roy Anderson: Absolutely correct. I would agree with that. If you are thinking about a unique capability for UK defence or the Services, which has no commercial or other civil spin-off, then clearly we have to bear the brunt of that R&D expenditure. In developing these road maps for our technology needs, in part published in the Defence Technology Strategy but in part these are developing in consultation with industry, through a very helpful committee at the National Defence Industrial Council, which has a sub-committee which is an R&D committee. There is very good work happening there and they contributed enormously to the Defence Technology Strategy document. We are working out areas where in essence we will have to put initial funding in but there are some other areas. If you take UAVs, for example, unmanned air vehicles, what is apparent is that you have very heavy military use at the moment, but the civil opportunities are enormous. So there we might be arguing that to start with perhaps we should bear the brunt of the R&D, but you should also think about the civil market that could emerge.

Q138 Willie Rennie: It may be your style but your language is very gentle on industrial R&D for what is quite a dire situation, that we are way below the OECD average and industrial competitors, and, if Britain is going to compete in an increasingly competitive world, we are going to have to up our R&D level to at least the OECD average. Your language is very gentle.
Professor Sir Roy Anderson: Perhaps I am being very polite in this particular environment. You should hear me when I am talking to industry.

Q139 Mr Borrow: You mentioned how difficult the financial situation is for the MoD at the moment because of the two major operations we have going on but obviously, in your discussions with the Treasury, making bids for funding for research, I am sure you would make the case that these projects are important and therefore a certain amount of investment needs to take place but would you also recognise that to make short-term reductions in research on the defence side because of the priority being given to operations may actually risk undermining the long-term research in defence and actually have a long-term negative effect on the defence of the UK?
Professor Sir Roy Anderson: That is a very fair point but it is a common problem in life. The immediate grabs your attention and, with all R&D investment, whether it is in this industrial sector or others, boards of directors or whatever, if you are saying "I'm investing now for something 15 years hence", it is a difficult argument if the immediate priorities are very urgent and so apparent publicly. It is my task to make those arguments, and one of the reasons we commissioned that analysis of the relationship between R&D expenditure and capability to pick up this very strong correlation between the two and the 15-year time lag, was to illustrate exactly that point. I am in favour of quantitative evidence to support your arguments.

Q140 Mr Borrow: The Executive Chairman of QinetiQ made a comment that research spending needs to be increased by 25%.
Professor Sir Roy Anderson: And it should all go to QinetiQ—is that right?

Q141 Mr Borrow: From what you have said so far, I assume you are not necessarily going to agree with him, although I assume you would not be unhappy if there were a significant increase.
Professor Sir Roy Anderson: I think my prime task is to open up defence R&D to a broader community. In fast-moving areas of technology industry is often not at the front; it is other people who are at the

front, and there are some very fast-moving areas of defence technology, as we are seeing, sadly, with improvised explosive devices. The Web, in the notion of the flat Earth, as it were, has made technology move very quickly so we have to be exceedingly agile and we need to bring in some of the best and brightest minds from university. If QinetiQ wants to collaborate with some of those and come in and compete for moneys, fine, but to believe that we should favour QinetiQ over others—we choose the best people.

Q142 Chairman: If I may interject, I think you are being a little tough on QinetiQ there because I think the context in which that answer was given by John Chisholm was the long-term decline of research in defence, and I do not think he was suggesting that it should all go to QinetiQ, although obviously he would like that. But do you accept that there has been a long-term decline in defence research?
Professor Sir Roy Anderson: The statistics are in the Defence Industrial Strategy document. There is a graph in there which shows the percentage spend over time. I stress the point I started with, that I am a research scientist and it is my case to argue the point that we should look at this and analyse the trend very carefully.
Mr Woolley: I think it is the case that there was, from the late 1980s, a policy decision by government to spend less on defence R&D. So there has, since the late 1980s until around 2002–03, been a decline in real terms in spending on research. That has now flattened out and over the last few years the defence research spend has been broadly level, or slight real growth in the last few years actually. Development spend is much more related to the phasing of projects in the equipment programme and, depending on the particular phase a project may be in, there will be years when development expenditure is a high and then subsequent years when it is a bit lower and then subsequent years when it is higher again. So it tends not to be as constant; it tends to be slightly more volatile for that reason.

Q143 Chairman: But heavily prioritised towards the current theatres?
Mr Woolley: Development spend is related to our procurement process. In terms of research spend, it is for the internal MoD customers of the research budget to prioritise research expenditure and, yes, obviously, some of the spend in recent years has been focused on research in support of operations.

Q144 Mr Borrow: One final question. The Defence Technology Strategy talks about a wider debate on R&D investment in defence and the need for that. When is that likely to happen and what would your role be?
Professor Sir Roy Anderson: That is very much going on at the moment. We have done two things. First of all, you will have seen that we did the capability alignment study of our £500 million more R&T spend and I was very keen that we set an example for other government departments in having external peer review of that research for its quality and alignment, despite the fact that there are some sensitive areas in it, and that we successfully managed to do. We have a Defence Science Advisory Council of about 240 individuals who are national authorities in various areas of science and engineering, and we are the first government department to subject our research to that degree of scrutiny, the same that the research councils do, and that will be an integral part of our practice now. By the way, one of your sister committees, the Science and Technology Committee, failed to pick up that we have been doing these things for some time. The second point is that for the broader £2.6 billion R&D, we are very much looking at the detail of how better to manage that at the moment and there is quite a broad debate on the management and direction of that going on right at this moment within the Ministry of Defence. We also need to bring in our industrial partners to that very intimately in relation to my earlier comment about providing joint investment R&D road maps. Chairman, someone asked about a comparative figure in the previous session about what Britain spends versus other countries.

Chairman: We are just coming on to that actually.

Q145 Mr Jenkin: What do we spend in comparison to other countries? How does it compare in quality and objectives? You mentioned the United States but, obviously, we are in a completely different category from them but a more accurate comparator might be France, for example.
Professor Sir Roy Anderson: First of all, David King has made this point many times. Britain hits hugely above its weight and is second only to the United States in terms of science citation and international prizes and so on, so we start from a privileged position. This is in my view a jewel in the crown and Dstl, in my view, is a jewel in the crown in terms of its capability. This capability alignment study assessed something like 90% of the projects to be world class or high national class, and I think most universities, including Oxford and Cambridge, would have been delighted if the external peer reviewers had said that, so I want to stress that point; there is real quality in Dstl, so it is a jewel. In relation to France, as far as we are currently aware, France can be a little more coy about some areas of its defence R&D, particularly on the deterrent side, but we are approximately equivalent to them. The United States we are behind. China is very difficult to obtain figures from but we are certainly well ahead of them at the moment. Russia, again, the figures are somewhat hidden but we suspect we are ahead of Russia at the moment. We are second equal, somewhere in that domain.

Q146 Mr Jenkin: The impression one gets is that we seem to lose technology, intellectual property, faster than we are generating it, that we are going sub-critical in terms of what we contribute to our own procurement programmes.

Professor Sir Roy Anderson: I think that is an older mantra. If you look at the university sector and you look at some of Dstl's current activities, I think we are in the process of regenerating. Frances talked about the encouraging recruitment at the graduate and PhD levels. I go down there quite a lot, I go to their conferences, and I am always impressed by the young people who come in there. There is this capture business, which is, as Frances mentioned, aged 25 to 30 or perhaps a little beyond, that may have bigger opportunities in industry but that is not an area of my worry at the moment. The area of my worry is that we have to keep Dstl as an open organisation which has very intimate collaborations with the university sector and the small and medium-sized companies to capture these fast moving areas of technology.

Q147 Mr Jenkin: You paint a very positive and rosy picture. Are we spending enough to maintain that position? When you say that we need to spend more, do you think we are at a critical juncture? Are we at risk of losing this position?
Professor Sir Roy Anderson: I think not at the moment. It is early days from the split from QinetiQ, it is early days from the settling down of Dstl; it needs very careful monitoring and nurturing. Frances also mentioned that we have this age distribution where you have a set of individuals who are very highly skilled areas of great importance to us who might be in the 50 to 60 year age bracket. Another one of my main tasks, working with Dstl, is to ensure that we are recruiting and growing, keeping the next generation of deep specialists. If I comment on some of the areas, even with our American competitors, there is a set of fields at Dstl that we are regarded as the world authority in. That is not a bad position in some sensitive areas. It is something to carefully watch and something to carefully nurture but at the moment I am moderately comfortable.

Q148 Chairman: Professor Anderson, in answer to where we were in competition with other countries, you said we were behind some, level with others and ahead of others, which sounds vaguely unscientific as an answer. I wonder if you can possibly give us your best estimate of the amount of that. It might be best to ask for this in writing.
Professor Sir Roy Anderson: I have the figures.[3]

Q149 Chairman: What I would like is the amount that several countries spend, both in the public sector and in the private sector, on defence research and those countries I think should include the United States, France, Russia, China and India and if you are able to give us those broken down, if you have them to hand, that would be fine and we would be grateful.
Professor Sir Roy Anderson: China and India you may struggle a little bit with because the figures are more difficult to verify.

[3] See Ev 36

Q150 Chairman: Presumably, you in the Ministry of Defence, with all your clever technology, make assessments of what these figures might be, so please give us your best estimate.
Professor Sir Roy Anderson: The top three, for your information here, is 15% spend of essentially defence expenditure in the US.

Q151 Chairman: Fifteen per cent of what?
Professor Sir Roy Anderson: Fifteen per cent of total defence expenditure. In the UK it is 9% and in France it is 8.2%. So when I said we were roughly equivalent to France . . .

Q152 Chairman: Total defence expenditure in the United States is what?
Professor Sir Roy Anderson: I do not know off the top of my head. It is a big number.

Q153 Chairman: It is a lot, and 15% of a lot is a very great deal more than 10% of rather a little.
Professor Sir Roy Anderson: £2.6 billion R&D spend.

Q154 Chairman: I am being unscientific myself now. Do you accept the point that not only are we behind the United States, but we are falling further behind because of the proportion of their much larger budget that they put into research into technology?
Professor Sir Roy Anderson: That would be true of every other country.

Q155 Chairman: Yes, but it does not make it right.
Professor Sir Roy Anderson: No, but I would still make the point that £2.6 billion at 9% is not a bad figure and I also make the point that it is my role to argue for that to be increased.

Chairman: All power to you.

Q156 Mr Hancock: You talked about the unusual circumstances of this country being engaged in very intensive fighting in two separate areas. No amount of increased expenditure on research and development would essentially help the situation there immediately. It really leads me to believe that some of the solutions that you are seeking on behalf of those men and women are off-the-shelf solutions that are readily available. What does that do to your organisation when that pressure will not decrease but will increase, so the pressure on you is not to research and develop your own but simply to find out what is the best product for the men and women who need it virtually instantaneously?
Professor Sir Roy Anderson: You have a series of horizons. The question to the Services with R&D is "What would you like very instantaneously, in other words, six months?" There is research very much related to solving problems on that timescale.

Q157 Mr Hancock: Can industry react to that?
Professor Sir Roy Anderson: Yes, we can, very much so.

Q158 Mr Hancock: You might, but can the defence industries then fulfil what you come up with?
Professor Sir Roy Anderson: Very much so. If it is an urgent operational requirement, when we get through the research into the capability provision, there are a number of specific examples where that has been achieved.

Q159 Mr Hancock: Could you give us one that has come about in six months?
Professor Sir Roy Anderson: Yes: improvised explosive devices counter-measures, and I am not going publicly into details but there is a continuing evolution of the technical capability there on a very fast time scale.

Q160 Chairman: Professor Anderson, could you give us the figures that I asked for, please, in writing?
Professor Sir Roy Anderson: Yes.[4]

Q161 Chairman: Would you regard us as people who are likely to try to help you in your battle with the person on your right. If you can give us some idea of the extent to which other defence research has suffered because of our concentration, as David Borrow was asking, on the immediate theatres of war and therefore our investment in the longer term has suffered, then it might be a good thing not only for you but for the country.[5] Could we move on, please, to the management of defence research and technology. The NAO made several recommendations in its 2004 report. I wonder whether those recommendations have been implemented, or to what extent they have been.
Professor Sir Roy Anderson: Providing clearer technology and strategy, we have already talked quite a bit about the defence technology strategy and that is a clear objective there. The management side of research I think has, as I understand it, given that I have been in his post two and a half years, has improved greatly and the intimacy of the relationship strategically between Whitehall and Dstl and the customers about deciding what your priorities are for research, both in relation to your question, what you would like soon, what you would like in three to five years, what the capability need is in 15 years. I think that planning is improving although there is more to do. If we take the metrics for R&D, one of my other, almost an obsession, is that we should have accurate databases on precisely what our R&D expenditure is at any one time, and these databases should not only include the bare facts, but they should have things about the detail of what the result of that research was, whether there is IPR associated with it, who is responsible for following that IPR, etc, etc, and what publications, what reports have arisen out of it. We have just constructed a database called STRIMS, which is a Science and Technology Research Management database, and this I think is going to pay great benefits into the future although it will not pay benefits instantly. That provides metrics for R&D and what you got for it, basically. If we take the expertise and the role of the TLB and Dstl, I suppose, in the spirit of your previous comment, Chairman, I always am concerned about the scientific expertise within government, largely because we recruit very bright and able people, and I have been hugely impressed by the intake, and then we have lost the old science and technology streams in the civil service, where somebody could end up at a high level within the civil service being a deep specialist. The Ministry of Defence is very actively discussing this at the moment in the context of or in relation to the establishment of a new agency, the merger of the DPA and the DLO, and how we sustain specialist expertise lines for engineers and scientists. We have appointed head of professionals in both. There is a lot to do but it fits in with the broader government objective with the Cabinet Secretary about specialist skills in government. If I am blunt, I think it was a mistake getting rid of the specialist science and technology careers stream. I think you had technology demonstrator programmes and technology exploitation. The demonstrator programmes is something we are very much thinking about how best to fund this with industry. We have a very high emphasis on technical demonstrators and sometimes, in relation to your comment about timescale, I could quote one which from concept to the demonstrators about a year, which is very pertinent to an operational theatre.

Q162 Mr Hancock: Lord Drayson told us it was his intention back in February to have greater competition in research and development. It has taken some time to get that moving. What is your feeling on that and are there targets have been set for what will be sent for competition and what will not and how will the decisions be made?
Professor Sir Roy Anderson: We have a stated target, and it is published in the Defence Technology Strategy, of competing about 60% of our total R&T funds, that is the £500 million.

Q163 Mr Hancock: By when?
Professor Sir Roy Anderson: By 2009, and we are ramping that up at the moment. If you are thinking about that sum of money and you want to do this properly, where you have adequate peer review, you have to create an infrastructure to do this carefully. I am very keen on the open competition side because, as I mentioned earlier, I think in fast-moving areas of technology a lot of the innovation comes out of the universities and small companies. I also, with Lord Drayson's approval, commissioned a study, which will be published quite soon: where does innovation come from in the technology defence industry? At the top you have the big primes, then you have the medium-size companies, many of the small ones at the bottom and perhaps the university spin-out groups at the very bottom of this pyramid or food web. In that study we have looked at 36 technology trees in a great deal of depth and, unsurprisingly, a lot of the really innovative bits come out at the bottom. The

[4] See Ev 36
[5] See Ev 36

top is still crucial, because they have the skills of system integration and defining the capability requirement. So the top is absolutely essential but we need to think about how we target some of this money, or the competition side, to make sure that we do not exclude small companies, who are often less agile and less informed.

Q164 Mr Hancock: How would they be able to afford to take part in the competition that you are devising? Will this inevitably mean that there will be prime players in the research and development who in turn will systematically downstream the resources?
Professor Sir Roy Anderson: There are two strategies to this. This is a slightly different approach so I will answer this in two parts. In the past, we have always felt we knew what we needed in technology and therefore we put out calls for people to bid for X, Y and Z. I am very keen that we actually also ask the community "Do you have interesting areas of technology that might have important defence and secure at security implications, not necessarily immediately but some time in the future?" All a small company has to do there is get on to the website, write half a page and say, "I have got this. It is terribly exciting" and then somebody from the Research Acquisition Organisation will go down and see them.

Q165 Mr Hancock: So why did they tell us when they gave evidence that there was a problem in knowing what you wanted and how to go about getting part of the action?
Professor Sir Roy Anderson: Fair comment. I think in the past we have been less transparent than ideal, and our relationships with the big primes are the strongest, so they are always very well informed but, if you look at the real powerhouse of innovation in the UK at the moment, it is often in those small companies. In October we launched the Defence Technology Strategy website up and running with the competition of ideas. I spoke to 600 people last week from the small and medium-sized company end to tell them, with the Director of the Research Acquisition Organisation, Andrew Baird, how to do it and we will be as synergistic or encouraging as we possibly can be. The universities are another bit of this.

Q166 Mr Hancock: I think it is vitally important, and it is great news that we have got that far. Maybe that will go some way to address the criticism they brought to us when they gave evidence on it. What do you see as any potential downsides and how do you play a part in protecting us from a decline of that interest from the small players?
Professor Sir Roy Anderson: As I said, we have not been as good as we should have been perhaps in nurturing them. We have not recognised that a lot of the innovation comes from that end. Now that we have finished a study of technology trees, innovation trees, we now have hard numerical data on the different types of capability or technologies, where the really innovative bits come from. Now we have that in front of us, which is very recent, that gives me a firm basis from which to say we have to spend a lot of attention on these companies and the spin-out groups in the universities. Sometimes they will do it with partnership because a company such as QinetiQ or BAe Systems could quite correctly argue that they know us as the beast much better and therefore if a small company collaborates with them, they are more likely to be successful in the research bid, and some of that will go on, I am sure, but as this community sees us as a more friendly, interested customer, I am hopeful.

Q167 Mr Hancock: The French now have a pot of money which people can bid for for carrying out specific research that they themselves have generated, which they have persuaded the French Ministry to support in one way or another, with possibly no chance of it ever coming to success, but hopefully it will. Are we going down a similar route?
Professor Sir Roy Anderson: We are doing two things. I said there was a competition of ideas: as one of them, going out to them. Also, again via the website, and the Research Acquisition Organisation, we are going to compete 60% of the £500 million. This competition will be rather like writing a proposal. It can be detailed or it can be a short inquiry, and the Research Acquisition Organisation's responsibility is to sift these and to look for the interesting ideas and the well-written proposals. I may be biased because this has been a big hobbyhorse of mine, but I think we have been doing more at the moment than we have ever done before and we are going to do more and more.
Mr Hancock: That is good news.

Q168 Mr Jenkin: We have heard quite a lot about Dstl's role from Frances Saunders already. Is there anything you want to add from a strategic point of view, from your oversight point of view, to what Dstl's role is?
Professor Sir Roy Anderson: One thing that is not commonly realised—and Frances hinted at it to fire a question concerning polonium 210—is that Dstl is vital to this country, not just in defence but in many security areas. It provides deep technical expertise. It is not ever in the public eye. It might be the Home Office and others who take the lead, correctly, but the technical backup for this lies often, very often, in Dstl. So it is something we need to nurture and sustain and look after, in my view.

Q169 Mr Jenkin: You do not feel the work that DERA used to do is compromised in any way by losing quite a lot of the intellectual property to the private sector?
Professor Sir Roy Anderson: In the areas that are particularly important in the security and counter-terrorism and counter-insurgent areas, I think we have kept the areas of expertise that we need because these are very sensitive. We have already mentioned the IED areas, we have mentioned

biological and chemical weapons, detection, counter-measures, protective suits, explosive forensics, etc, a whole pile of areas at a AWE in radiological detection and clean-up—those have been sustained within government control through Dstl.

Q170 Mr Borrow: The jewel in the Crown, as you described Dstl, you are obviously very pleased with its performance, but do you have no concerns at all?
Professor Sir Roy Anderson: One of you asked a question to Frances about physicists. I have concerns about university entrants and graduation in physics, engineering, mathematics, computer science, etc. These are all highly competitive fields in the civil sector. We rely on very good people here, so we will feel the effects in the future in recruitment in what used to be called the hard sciences—it is a bit of an insult actually to other areas. They are mathematics-based sciences often. We will feel the effects. I could recruit from Ukraine and China bucketfuls of mathematicians and engineers at the drop of a hat but, of course, as you hinted earlier, we cannot do that in security sensitive fields I think we are part of a larger effort through the Academy of Engineers and the Royal Society, which we have very intimate and good relationships with, and we have all got to strive to raise the excitement and stakes for being a scientist and an engineer. As Frances mentioned, a lot of young people get very motivated by contributing to security and defence.

Q171 Mr Jenkin: On the narrower question of Dstl's actual performance, are its targets stretching enough? Are there additional targets which it should be given?
Professor Sir Roy Anderson: I am new to Government targets so I might not have a good understanding of this. We are constantly evolving these targets in a learning experience with an agency. I want to come back to one of your earlier questions. The other slight concern I have—in a spirit of honesty here about it—

Q172 Chairman: That is always relieving to hear!
Professor Sir Roy Anderson:—Government departments are often in a cycle of customer knows best-driven research and I will make the point that we have gone through that cycle quite quickly and we have now orientated Dstl's work very much to customer needs. I do place the caveat that saying that the customer knows best in fast moving areas of technology and science is wrong. You must sustain a proportion of your activity, which is young people who have got a fascination with fields of science where, independent of the customer need, they can see very exciting things to do. We are evolving and iterating the balance between that at the moment. I think the Defence Technology Strategy hinted that we are looking to perhaps slightly increase the proportion which is not so customer-driven but is more inquiry enthusiasm-driven.

Q173 Mr Jenkin: What proportion of the budget is that?
Professor Sir Roy Anderson: At the moment it is probably about—I should give you a more exact figure here—10% or so, something of that nature. Remember, to the very good scientists in Dstl the board there gives them incentives. To keep the very best you might have to say, "Four days a week you work on the customer problems but one day a week you can pursue your inquiry and inquisitiveness", so you can keep a more basic research programme going. In discussion with the Dstl board we need to think about all sorts of incentives for encouraging that.

Q174 Chairman: In a spirit of honesty, Professor Anderson, you gave the impression just now, in answering about targets, that you thought in this field anyway essentially they were a load of drivel. Would you be able to confirm that is your view in a spirit of honesty?
Professor Sir Roy Anderson: I think that inference would be wrong. I am not an expert here and, Trevor, you are far more experienced in setting targets.
Mr Woolley: Clearly some of the targets are harder than others. Some of the more qualitative targets in this area are inevitably going to be difficult. I do think, though, it is important, as part of the governance of trading funds, that the owner of the trading fund does set targets on the agency, and this is what we do. The targets are evolving. We are trying to reduce the number of targets to try and make them a little more relevant and in some respects they have got tougher over the years.

Q175 Chairman: I will take that as a financial answer rather than a scientific answer.
Mr Woolley: I would like it to be taken as a governance answer rather than a scientific answer. There is a financial dimension. Obviously the interest of the Department as owner is only partly financial, it is also to ensure we get the best quality out of the agency, and the targets are aimed at quality as well as financial return.
Professor Sir Roy Anderson: Chairman, can I correct one figure? I said 60% of 500 million were going to compete; it is 60% of 410 million. I apologise and would like to correct the record.

Q176 Linda Gilroy: On the role of Dstl, an emerging argument of those who have difficulty in appreciating the merits of a nuclear deterrent is that climate change needs scientists who are in scarce supply. How does that argument look from where you stand as the Chief Scientific Adviser to the MoD? Given that climate change and energy security have got strategic defence relevance, presumably there is cross-departmental discussion amongst scientists on these issues?
Professor Sir Roy Anderson: Yes, very much so. David King takes the lead in DTI and the Office of Science and Technology, but I asked **DSAC**, which is our Defence Science Advisory Council, about a year ago to produce a report about their

assessment of what climate change predictions could do, or the implications for the MoD, in particular thinking about certain areas of procurement because we are thinking now about procuring for 15–20 years ahead. If you take issues such as helicopter lifting, high temperatures, cooling systems for land vehicles, protection gear and clothing, there are huge implications for us. It is a very, very active area of thought at the moment. I would not be telling the truth if I said it had entered heavily into our procurement thinking, but from the science and technology end it is a very active area of thought.

Q177 Linda Gilroy: In terms of the supply of scientists?
Professor Sir Roy Anderson: Of what global warming might imply for us as a defence activity. The supply of scientists is more a Met Office issue. The Met Office attracts very good quality people. If you talk to graduates now, climate change is something they are all aware of and if they can work in that field they get quite excited. Increasingly climate change models now have the environment and biological component. If you are talking about physics and high-end computing, perhaps there are problems.

Q178 Linda Gilroy: In the competition between the two areas?
Professor Sir Roy Anderson: No, in competition with the civil sector. Business high-end computing people are highly desirable in a whole variety of areas of employment.

Q179 Chairman: You talked a bit about the supply chain, what about international collaboration in defence research? Would you care to answer about whether we are getting enough from the United States in relation particularly to Joint Strike Fighter?
Professor Sir Roy Anderson: First of all, in relation to the previous comment, if you look at my facts earlier, the United States produces a very high proportion of the total science and technology output today. Scientists are there to try and solve technical or understanding problems, and the best strategy, in my view always, is to go to the best people in the world. Science is an international activity, it does not have borders. The web provides this communication instantaneously, so if you have got a problem to solve, you should do your collaboration first on a strategic judgment, in other words who you have a Memorandum of Understanding on, but you should also weigh into this equation technically who is the best in that field. That total international environment for science is changing very rapidly, as you know. There are some fields where China would not even have been on the horizon five years ago. I am thinking, particularly, of signal processing where suddenly countries like China have a significant activity there. We have got to think very carefully over the coming years about how we form these collective Memoranda of Understanding. At the moment they are dominated by our relationship with the United States for very good science and technology reasons because a lot of the very best people are there. That is an evolving area of thought for us. If you take Western Europe as a whole and you sum science output from Western Europe as a whole, then the gap between Western Europe and the United States is closing. Again, we need to think strategically over a 10 to 15 year horizon whether in some areas where there is deeper expertise in Europe, our research collaboration should broaden. That is important to do. With the Joint Strike Fighter, I am not well placed to comment on the detail of that. My own experience is in areas where there is no commercial sensitivity, your comment about black programmes, we get complete access with the United States and a very privileged position in many fields. Where there are commercial sensitivities and IPR issues, then inevitably—and it is the same this side of the Atlantic as the other—there could be acute sensitivities about sharing information with anybody. My understanding of the Joint Strike Fighter at the moment is that we are seeking the same product as the United States. There are very active and ongoing discussions concerning what technical information we require for sovereignty and security reasons and, by and large, those discussions have been going well.

Q180 Mr Jenkin: Can I ask what role you think the European Defence Agency is going to play in all of this?
Professor Sir Roy Anderson: Clearly we are being encouraged by our French partners to contribute to the R&D budget of the EDA. My own view, and of many of my colleagues in the MoD, is that we need to take this very slowly. The EDA has no experience of managing R&D and no skilled infrastructure to both commission peer review and manage it and this will evolve over time. At the moment our Ministry of Defence strategy, which I believe is absolutely correct, is to work with partners, particularly France because they have a big R&D investment, equivalent to ours, the others have a very small R&D investment, and choose areas where our joint activity would be more than the sum of the parts. In other words, there would be synergy. I can think of areas of missile guidance technology where France is very, very good. From the French aspect, I can think of areas of CBRN protection detection where we are stronger than France. It is a matter of choosing areas where synergy makes sense to us.

Q181 Mr Jenkin: You believe essentially that bilateralism is far more in the national interest than working through a European institution which is inevitably going to be horse-trading on other issues rather than what is in the direct national interest?
Professor Sir Roy Anderson: In the SIT and R&D community at the moment that is our attitude. We feel these bilateral relationships are very good, particularly with the French, and we see great benefit from continuing those.

Q182 Mr Jenkin: Have we placed ourselves under any obligations by agreeing to the establishment of the European Defence Agency, or is it just a cipher of an institution which need not do anything unless we want it to?
Professor Sir Roy Anderson: I cannot judge; I am going to focus on the R&D. My benchmark or metric is how quickly they develop a capability to manage R&D programmes and we will see how that evolves over the coming years.

Q183 Chairman: Without any money I doubt it will be very quick, will it?
Professor Sir Roy Anderson: We will see.

Q184 Chairman: You said just now that the gap between Western Europe and the United States was closing and yet you said a little while ago that the United States was spending 15% of its large defence budget on research and technology, whereas we were spending 10% of our small defence budget and everybody else was spending less. How is the gap closing? Is it because we are cleverer than Americans by a factor of two or three, or is it that we spend the money better or what?
Professor Sir Roy Anderson: My comment was related not just to defence, it was related to the science and engineering outputs of the nations across all sectors. If you take Germany, for example, Germany has a low defence R&D expenditure but a very, very high civil R&D expenditure in certain fields, in engineering, the motor industry, et cetera. My comments about the metrics of scientific output—these are published figures compiled by OST—if you sum Western Europe and you look at the United States, then the United States are still well ahead but the derivatives of the slope, there is evidence of Western Europe becoming more influential as a whole. In the defence sector, as you quite rightly point out, the United States is hugely ahead. I am making the argument in that earlier comment that we will close the ground in the defence R&D field.

Q185 Chairman: And that is widening, is it not?
Professor Sir Roy Anderson: Probably, yes.

Q186 Chairman: Certainly, yes.
Professor Sir Roy Anderson: In some areas, no.

Q187 Mr Hancock: Is there any real reason why we should not want to close the gap?
Professor Sir Roy Anderson: Defence and security are getting fuzzier now, so in the American jargon of homeland security, there are many technologies there which have dual use, in both defence and in protecting against terrorist activity in the UK. This is a hugely expanding commercial market and I can see interesting opportunities for UK industry in that field. There could be fields there, like detection, imaging and information processing, which will be of great advantage to the Ministry of Defence, the civil sector and the more homeland security sectors where, in my view, we should sustain a significant investment.

Chairman: I think we have covered the ground, and we are going to allow you away for some lunch. Thank you very much indeed for a very interesting session and a very interesting morning altogether. Thank you to all the witnesses.

Written evidence

Memorandum from the Ministry of Defence

THE DEFENCE SCIENCE AND TECHNOLOGY LABORATORY

1. Role of the Dstl

1. Dstl is a trading fund agency of the Ministry of Defence (MOD). The organisation undertakes a wide range of defence focused research, modelling, simulation, and analysis activities and uses the results of this work to provide science and technology-based knowledge, expertise and advice to the UK Government.

2. The overall objective of the Dstl Trading Fund is to deliver value to the UK taxpayer, by using its assets and capabilities to deliver timely advice and solutions to the Government's most important defence and national security-related problems in the most efficient and effective manner. Value is created and delivered by focusing Dstl efforts on the following areas:

- meeting the requirements of MOD;
- meeting the defence and national security-related requirements of other governmental customers; and
- exploiting Dstl's intellectual property, in line with government policy for technology transfer in order to generate value for money for the taxpayer.

3. Dstl only undertakes work for MOD and other government customers that must be done within government. Dstl does not directly compete with industry in any of its activities unless specifically requested by the MOD or Other Government Departments (OGDs). In addition, Dstl only undertakes commercial work when specifically requested to do so by MOD or an OGD with the permission of the owner. Such cases are relatively infrequent but can arise where there are opportunities identified to share costs or create additional value from commercial arrangements with third parties. In those cases, as a Trading Fund, Dstl is also required to maximise the financial return to the taxpayer. In the case of services to Government customers this is to be in line with the Government's pricing policy.

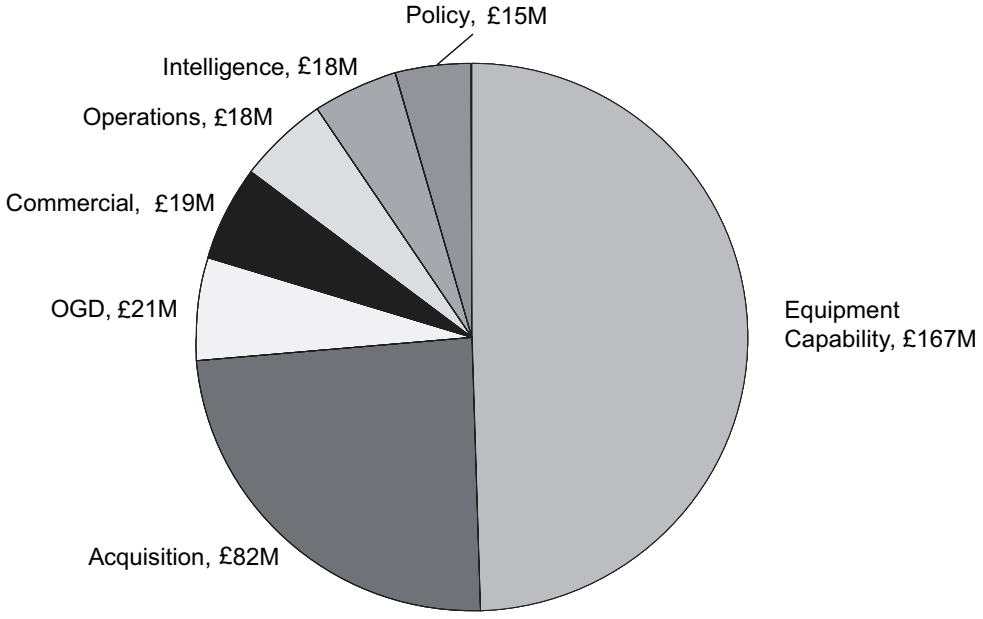
4. Dstl's customer base in MOD can be broadly separated into four areas. The first, described as support functions, consists mainly of capability development for MOD's Chief Scientific Advisor, but also includes tasking from Defence Estates and the Defence Intelligence Staff. The second area is work in support of military operations for the three services and command headquarters. The third is supporting the acquisition and maintenance of military equipment for Deputy Chief of Defence Staff (Equipment Capability) (DCDS(EC)), DPA and DLO. Fourthly Dstl carries out a range of tasks relating to policy for the MOD Policy Director. Dstl also undertakes a range of tasking for OGDs with the agreement of MOD. A complete breakdown of Dstl's major areas of work is shown in figure 1.

5. Looking to the future, in order to sustain its role in the longer term Dstl will need to:

- maintain a high-level overview of science, technology and engineering relevant to defence and security;
- be world leading practitioners in overarching technical areas such as systems and capability engineering advice as well as in the development and application of underpinning science and technology to address sensitive defence capability challenges; and
- actively engage with industry, government laboratories and academia in the UK and overseas.

Figure 1

BREAKDOWN OF DSTL TASKING



2. Dstl Highlights

6. Since its inception Dstl has used science and technology to deliver high impact solutions to a wide range of defence and security related problems facing its customers. Dstl's scientists and engineers can bring to bear a wealth of experience built up over years of research and development. Only with this depth of experience can Dstl deliver these solutions to the evolving problems being posed to the MOD and other areas of government.

7. Dstl has made a major contribution, both in terms of technology and expertise, to the fight against international terrorism both in the UK and abroad. The increased deployment of our armed forces has led to Dstl deploying a significant number of staff into theatre as well as providing support to operations from the UK. Having our forces deployed abroad, in particular in Iraq and Afghanistan, has required Dstl to rapidly develop new force protection measures, in particular against improvised explosive devices.

8. While Dstl has been delivering solutions to the problems faced by our troops abroad and protecting the UK from terrorist threats it has not neglected the longer term requirements of MOD. Dstl is playing an important role in planning and developing the capability MOD will need in the future, in particular in relation to the future structure of our armed forces and how its various units will be networked together to deliver improved military effectiveness. Dstl is also making a key contribution to the Joint Combat Aircraft programme.

9. In order to deliver against such a wide ranging requirement Dstl is proud of the extent of its network of contacts and collaborations with the military, industry and academia both within the UK and abroad. This brings real added value to the work Dstl does with MOD.

3. Financial Performance

10. Dstl has a strong track record since its inception and has never failed to meet its key financial targets, which include Return on Capital Employed (ROCE), the MOD dividend and maintaining the staff average charge rate below that for 2001–02 uplifted by the GDP deflator. Further details of Dstl's performance against key targets are set out in Annex A.

11. Dstl's financial performance, over the last five years as detailed in table 1, has been consistent and sustained with each year building on the previous. In a difficult trading environment with increases in external costs outside its control such as fuel and pensions, Dstl has through effective control maintained charges to customers below the 2001–02 average (in real terms). This has enabled Dstl to generate significant funds allowing the Balance Sheet to strengthen over the period since its creation. Net Assets stand at a level some 70% higher than in 2002. As a consequence Dstl is now in a strong financial position to face the future with confidence.

Table 1

DSTL FINANCIAL PERFORMANCE OVER THE LAST FIVE YEARS

	2006 *£ million*	*2005* *£ million*	*2004* *£ million*	*2003* *£ million*	*2002 ** *£ million*
Profit & Loss					
Turnover	353.4	353.3	358.1	343.5	498.8
Operating profit	18.7	23.2	19.8	13.3	24.3
Impairments/exceptional items	—	(4.7)	—	0.5	(8.8)
Loss on disposal of fixed assets	—	(0.3)	(0.1)	—	(2.9)
Interest receivable	3.1	2.0	1.0	1.5	3.4
Interest payable	—	—	(0.2)	(0.4)	(1.1)
Profit for the financial year	21.8	20.2	20.5	14.9	14.9
Dividends	(3.0)	(3.0)	(3.0)	(6.0)	(6.0)
Retained profit for the year	**18.8**	**17.2**	**17.5**	**8.9**	**8.9**
Balance Sheet					
Fixed assets	124.6	122.9	125.5	109.8	103.9
Working capital	21.4	22.1	34.4	15.8	24.3
Cash and cash equivalents	78.7	61.9	26.6	29.7	22.3
Creditors: amounts falling due after more than one year	(2.1)	(2.8)	(4.4)	(7.2)	(10.8)
Provisions for liabilities and charges	(4.5)	(5.2)	(5.6)	(7.6)	(11.7)
Net Assets	**218.18**	**198.9**	**176.5**	**140.5**	**128.0**
Cash Flow					
Cash inflow/(outflow) from operating activities	22.4	43.5	11.3	24.7	(19.7)
Net cash inflow from returns on investments and servicing of finance	3.0	1.9	0.8	1.1	2.3
Capital expenditure and financial investment	(5.6)	(6.0)	(7.1)	(10.3)	(13.9)
Acquisitions and disposals	—	—	—	—	(58.0)
Dividends paid	(3.0)	(3.0)	(6.0)	(6.0)	(5.0)
Cash inflow/(Outflow) before financing	16.8	36.4	(1.0)	9.5	(94.3)
Net cash outflow from financing	—	(1.1)	(2.1)	(2.1)	(2.4)
Increase/(decrease) in cash	**16.8**	**35.3**	**(3.1)**	**7.4**	**(96.7)**
Return on capital employed	**8.8%**	**9.4%**	**11.9%**	**9.6%**	**4.6%**

* Dstl separated from DERA on 30 June 2001. The results for 2002 include three months of the DERA Trading Fund.

12. Turnover of the trading fund remained the same in 2005–06 as in the previous year, at £353.3 million. This performance reflects the confidence placed in Dstl by its customers. Although work for the Ministry of Defence declined marginally during the year, work from other government departments and non-exchequer customers increased.

13. Cost control and close monitoring of financial performance throughout the year contributed to a profit of £18.7 million in 2005–06, an increase of 2.7% on the previous year.

14. Dstl had a positive cash inflow last year amounting to £19.8 million (excluding the dividend payment). This inflow was partly due to the continued monitoring of the balance sheet to ensure cash did not get tied up pending investment on the **i lab** programme over the next two to three years. Cash and cash equivalents on the balance sheet improved by £16.8 million and cash balances remained positive.

15. Cash expenditure on fixed assets was £5.6 million in 2005–06, compared with £5.7 million the previous year, which included capitalisation of costs associated with site rationalisation and the acquisition of new equipment to maintain Dstl's position at the leading edge of technology.

16. The level of government funds, represented by the Group balance sheet value, increased by £19.2 million to £218.1 million, mainly due to the £18.8 million retained profit for the year.

17. The Group's return on capital employed was 8.8% in 2005–06, compared with 9.4% the previous year.

4. Current Management Issues—Chief Executive Recruitment

18. In April 2006, Martin Earwicker left Dstl to move to a post outside the Department after five years as Chief Executive. Frances Saunders, formerly the Operations Director, has taken on this role pending the appointment of a permanent successor. Responsibility for the appointment of the Chief Executive lies with MOD and the post is currently being advertised. Interviews are expected to take place later this year (chaired by a Civil Service Commissioner) with the post being graded at 2-star level.

19. In preparation for the Comprehensive Spending Review, and as part of a wider examination of defence support services, the MOD re-examined the structure and ownership of each of its Trading Funds with a view to determining and confirming whether its current status remained optimal for the future. The confines, within which Dstl operates, in that it only undertakes work that must be undertaken within government, meant that the options in the Dstl review were restricted to either maintaining the status quo or returning the agency to "on-vote" status. The review concluded this summer and recommended that Dstl should retain Trading Fund status pending a further review once the **i lab** change programme has had sufficient time to become firmly embedded. The recruitment process for the new Chief Executive has been taken forward on this basis.

20. In addition, the appointment of a Technical Director has now been made and it is expected that he will take up the role in October 2006.

5. Progress of Major Change Programmes

Background

21. Since its formation in 2001, Dstl has rapidly become a key asset to MOD—an indispensable source of science and technology at the heart of defence. However, to maintain and build on its position and reputation, Dstl must adapt to new challenges and become more integrated both internally and with its customers. In 2004, the organisation embarked on a major change programme with the aim of transforming Dstl into an integrated laboratory (**i lab**) and improving the coherence and effectiveness of its activities.

22. The three capital intensive aspects of **i lab** are: site rationalisation (Project Inspire), the provision of an Integrated Business System (iCAS) and the implementation of an electronic document and records management system (EDRM). All three projects are described in further detail below.

23. Significant progress has been made on the **i lab** change programme. Key aims of the programme are to rationalise Dstl's activities onto three core sites (Porton Down, Fort Halstead and Portsdown West with an enclave at Alvestoke) by 2009. Alongside the physical relocation, the programme also aims to develop the capabilities of Dstl staff to enable everyone to contribute their best in an environment that encourages teamworking and knowledge sharing. This will be facilitated through the creation of common processes and systems enabling staff to devote more time to delivering customer outputs.

24. On completion of the **i lab** programme, Dstl will be in a position to deliver even higher quality output to its customers on the really important issues by enabling its staff to realise their full potential and by creating an environment in which excellence can thrive. To ensure that a change programme of this magnitude delivers, Dstl is producing a full benefits tracking process which identifies not only the quantitative benefits but also the qualitative benefits which it expects to result from the programme in line with smart acquisition principles.

Governance

25. The Chief Executive has overall responsibility for the success of **i lab**. In turn, the Operations Director, supported by the Business Change Manager, is responsible for realising the expected business benefits. The Head of Laboratory Integration is responsible for the effective, efficient and consistent management of the programme.

26. The **i lab** programme is managed in accordance with best practice, as outlined in the Office of Government Commerce's (OGC) *Managing Successful Programmes* (MSP) guidelines. An internal assurance team provides the Dstl Executive and Board with assurance that programmes and projects are capable of delivering the required outputs and outcomes. The programme manager provides monthly reports to the Dstl Executive on progress against the agreed programme plan.

Project Inspire—Site rationalisation programme

27. The aim of the site rationalisation programme is to achieve more effective working between staff, originally spread over 15 different sites. After detailed study, the Dstl Board decided to rationalise Dstl's activities onto three core sites-Porton Down, Fort Halstead and Portsdown West with an enclave at Alvestoke) by 2009. The plan was approved by Ministers in November 2003.

28. Following this, Dstl set up a project to cover the construction needed at Porton Down and Portsdown West to achieve the 3 core site plan and the provision of facilities management for these sites. An invitation to tender for the contract was produced, a preferred bidder selected and detailed contract negotiations concluded.

29. Prior to Serco's appointment as Preferred Bidder on 10 August 2005 the tender evaluation had resulted in a clear understanding of the three bidders' proposals and how they would impact upon Dstl in due diligence and beyond. As a result the 15-year facilities management contract was awarded to Serco Defence and Aerospace on 24 July 2006.

30. The construction contract is based on a target cost and maximum price, now agreed to. Any increase above the target cost arising from agreed risk is shared equally by Dstl and Serco up to the maximum price. Any increase above the maximum price is met in full by Serco.

31. The main construction work at both sites is expected to commence in November 2006 with the new buildings at Porton Down due for completion in summer 2008 and at Portsdown West in spring 2009. Agreement has been reached with the relevant local authorities regarding the construction itself and measures to address local transport issues.

32. With the completion of the new accommodation Dstl will be moving approximately 1,100 of its staff in approximately equal number to either Porton Down or Portsdown West from Farnborough, Malvern, Winfrith and Bedford. In addition there will be a further 100 military secondees and contractors relocating predominantly to Portsdown West. Dstl are working closely with the Trade Unions and the staff themselves to provide a comprehensive relocation package and detailed information regarding the new locations. A regular series of briefings are taking place at the sites being vacated along with drop-in events and one-to-one sessions for staff.

Integrated business systems project

33. FISP is Dstl's business management system and has been in use for seven years. It is an ageing system and hardware failure is an increasing problem. The system is also costly and difficult to maintain. FISP is a source of significant risk to both business continuity and future business development.

34. The iCAS project aims to replace FISP with stable, yet flexible, industry-supported software and hardware systems to meet the requirements of business functions such as finance, commercial and human resources.

35. The project was approved by the Dstl investment panel in early 2005. Since then, the Dstl Board has granted approval for the design, build and testing of iCAS based on Peoplesoft 8.9. The project is due for completion by February 2008. Project delivery is on a 'targeted time and materials' basis, with risk sharing built into the contract.

Electronic Document and Records Management (EDRM) project

36. The EDRM project has been driven by a requirement for improved access to information, helping people to find the information they need quickly and easily. Dstl's existing document management system contains multiple copies of the same information and this creates issues in finding information. Dstl owns a considerable archive of records and records management practices (eg reviewing and destroying information assets) have been undertaken all too infrequently in the past.

37. The EDRM project was endorsed in January 2003. At that time, there was a major push in government towards better records management, as highlighted in *The Modernising Government* white paper. This paper stated that: "*all central government organisations were set a target to create and manage records electronically to mange information electronically*." EDRM was a key part of Dstl's efforts to meet this challenge.

38. EDRM also tied in with the objectives of **i lab** and supported many of the programme's outcomes. More specifically, EDRM aims to create a collaborative working environment that helps Dstl to manage and use its knowledge effectively and efficiently. It is also focused on creating consistent corporate processes and procedures by providing a common toolset and information system. Following successful detailed design, testing and piloting of the solution, the first roll out of EDRM is due to take place in summer 2007, with full implementation due in 2008.

6. Performance of Ploughshare Innovations Ltd

Exploitation of intellectual property through Ploughshare Innovation Ltd

39. All public sector research establishments (PSREs) are required by Government to ensure that, wherever possible, their Intellectual Property—that is to say, knowledge and technologies developed with public funding—are exploited within the wider economy. This ensures that the tax-payer, in the long run, gets the best value for money from the public investment in R&D. The policy applies fully to Dstl (as an MOD-owned PSRE) to the extent that it does not compromise its core role within MOD. This remit to spin out technology to create wealth in the civil sector is enshrined in Dstl's Trading Fund Framework Document inherited from Defence Evaluation and Research Agency (DERA). The aim is not that Dstl itself expands into wider markets and undertakes commercial work, but that, where appropriate, its technology is safely transferred to independent companies (by licensing or through spin-outs and Joint Ventures) for them to develop into products and services for the greater public good.

40. When Dstl was formed in 2001, it inherited from DERA a successful early track record in IP exploitation, including three spin-out companies and a portfolio of income generating licence agreements with third parties for the right to use patented Dstl knowledge. Since then, Dstl has formed a further three new spin-out companies with outside investors and others are in the pipeline. Despite the clear remit to exploit IP, and the track record of success, there has been some ambiguity surrounding Dstl's role in this, given its clear primary purpose of undertaking work that must be done in government. The challenge for Dstl was to find a way to fulfil the important exploitation role without ever compromising its integrity or its ability to provide impartial advice to UK Government. These two necessary functions do not sit easily in the same individuals.

41. Ministers agreed that the best way for Dstl to meet its technology transfer obligations was through an MOD wholly-owned GovCo whose sole purpose was to pursue the Dstl's (and therefore the Government's) technology transfer and exploitation agenda with professional expertise. With this purpose in mind, Ploughshare Innovations Ltd was created on 6 April 2005 and is based in offices in the Science Park at Porton. Ploughshare acts as Dstl's technology management company with a remit to exploit in non-defence fields intellectual property that Dstl selects to licence to it. Responsibility for managing Dstl's technology transfer portfolio has now been transferred to Ploughshare along with the resources and full transparency of the costs. This also involves the transfer to Ploughshare of Dstl's equity in most of its spin-out and Joint Venture companies, a process which is ongoing.

42. The governance arrangement for the operation of Ploughshare along with the transferred joint venture companies is detailed in Annex B.

Ploughshare business model and financial issues and risks to Dstl

43. Ploughshare's business model has as its principal objective the sustainable generation and recovery of value from IP. It has access to Dstl's broad range of patented IP in a wide range of technologies. The Company reviews and assesses the potential value of individual patents and clusters of patents and develops exploitation plans for transferring those patents and technologies to commercial applications in civil sectors. The two main income streams for the Company will be income from IP licenses and from sales of equity in technology spin-outs/JVs.

44. To deliver a sustainable business, Ploughshare will need to create a virtuous cycle of IP development and commercial income realisation. The business model adopted is strongly driven by the assets placed with Ploughshare on start-up, the financial support agreement with Dstl, and the evolving requirements of its stakeholders.

45. Ploughshare's operating principles are to:

- treat each IP opportunity on its merits and take it forward via *the most appropriate* exploitation route for that IP (licensing or spin out);
- invest in, and maximise income from, new licence agreements in the short term; and
- manage and support the development of the JV/spin-out portfolio towards successful disposal of equity.

46. The current (Years 1 to 3) licence revenue is insufficient to cover the short-term operating costs of the business. Whilst the new business develops this income stream towards the point of self-sustainability, the shortfall will be provided via a "hard cash" drawn-down loan from Dstl, up to a maximum of £750,000 over three years. Ploughshare is expected to repay this capital sum in 2007–08 and aims to do so from the proceeds of the first projected equity sale. At this time of writing the prospects of a JV sale in the next 12 months are encouraging.

7. The Impact of Defence Industrial Strategy and the Defence Technology Strategy on Dstl

47. The Defence Technology Strategy (DTS) is currently being updated as agreed in the Defence Industrial Strategy (DIS)[1] and is scheduled for publication later this year. Professor Sir Roy Anderson, the MOD's Chief Scientific Advisor (CSA) is leading this review and is working with others in MOD (including Dstl), industry and academia. The DTS will look to identify the key technologies that the UK needs to maintain a national capability in, and those technology areas where it might be more appropriate to rely more on collaborative or "off the shelf" sources. The DTS and DIS represent an important and influential shift in Government thinking on defence acquisition, specifying the need for a closer, more transparent relationship with industry, and underlining the importance of Through Life Capability management.

[1] *Defence Industrial Strategy*. Presented to Parliament by the Secretary of State for Defence, December 2005.

48. Dstl is currently undertaking a range of activities to identify how the recommendations of the DIS and DTS are likely to impact on their business and capabilities. Although specifying the true nature of the impact at this stage is premature, the DIS's advocacy of the adoption of innovative acquisition models to replace the traditional "customer/supplier" relationship with a range of partnerships strategically aligned to MOD's long term needs has clear implications for Dstl. As Dstl only provides support to MOD activities that demand either impartiality of expertise or support effort in the most sensitive areas of defence capability, significant areas of defence are currently supported outside government. As MOD brings industry closer, it is Dstl's responsibility to adapt and facilitate access to the best available expertise.

49. To accommodate this shift in balance and greater openness in capability objectives, Dstl will be ensuring that its capabilities are aligned with those identified in the DIS and DTS. Its business will evolve in a manner that is consistent with the strategic guidance contained in the DIS and DTS, to ensure that it positions itself to deliver best on the emerging issues that count.

Annex A

KEY TARGETS AND PERFORMANCE

Key Performance Targets

A range of key performance targets for Dstl are agreed with the Minister for Defence Procurement at the start of each financial year with performance against these targets reported in the annual report and accounts, Corporate Plan and Business Plan (shown in Table 1).

Performance Against Key Targets in 2005–06

Dstl fully achieved or exceeded seven of its 10 key targets for 2005–06. The organisation achieved a score of 71.6% in the 2004–05 technical benchmarking exercise—maintaining the required improvement on the 2002–03 figures. This puts Dstl on track to meet its 2005–06 target of 72% in 2007.

In 2006, Dstl presented its top 10 current technical capability risks to MOD's Chief Scientific Adviser (CSA). The agency is working closely with the CSA's team within his SIT TLB to examine the implications of the Defence Industrial Strategy S&T priorities on Dstl's future technical capability requirements. Dstl has also agreed, with MOD, the top 10 programmes and projects which require Dstl support in the shorter term, based on their impact to the customer. These have now been specifically included in the key targets for 2006–07.

In order to publicise Dstl's achievements more widely, a new technical "highlights document" has been launched. This provides a platform from which to communicate key achievements to senior customers in MOD and wider government. Two major new capabilities were introduced in 2005–06. Work has commenced on category 4 micro organisms and the new MOD Counter-Terrorism Science and Technology Centre has been launched (both at Dstl Porton Down). Finally Dstl exceeded its two financial targets relating to the charge-out rate for staff and Return on Capital Employed (ROCE).

Performance against the three remaining key target areas that were not fully met was as follows:

- The 2005–06 customer satisfaction score for service provision was 74.7%—a decrease of 0.7% on the baseline 2004–05 score. Although this is a three-year target, the slight drop in score in the first year required further investigation. The principal cause was a notably reduced score from customers in the Research Acquisition Organisation (RAO). Mitigation steps are now being taken to address these issues and improve the relationship with MOD Head Office and RAO science staff. Overall, however, customer satisfaction increased from 80% to 83%.
- The rationalisation project to consolidate Dstl's activities onto three core sites achieved two of its three key milestones but it was not possible to sign the facilities management (FM) contract in March 2006. However, Serco has now been appointed as the FM provider and the programme of work remains on schedule. The handover of facilities management took place, as planned, on 1 August 2006.
- The target to complete the detailed design and build phases of the new integrated corporate applications system (iCAS) by December 2005 was not met. However progress was made in terms of capturing user requirements, agreeing the design of the new system, identifying software solutions and procuring the relevant licences. A decision was taken to delay the project to incorporate the latest version of the Peoplesoft 8 software into the design. In the long term, this will reduce the need for customisation and therefore reduce the cost and risk. Work is now progressing well and the project is scheduled for completion in February 2008.

Table 1

DSTL KEY TARGETS 2004 TO 2007

2004–05	2005–06	2006–07
Maintain and by the end of a three year period show an increase in score for scientific and engineering capability in the technical benchmarking exercise from 67% in 2002–03 to 72% in 2005–06. **Achieved.**	Maintain and by the end of a three-year period show an increase in score for scientific and engineering capability in the technical benchmarking exercise from 67% in 2002–03 to 72% in 2005–06—moderated by external assessors agreed with MOD's Chief Scientific Adviser (CSA). **Achieved.**	Achieve an overall score of at least 72% for scientific and engineering capability in the technical benchmarking exercise. Develop and agree with CSA a robust process for assessing the quality of Dstl's evolving technical capabilities for the period 2007–11.
By 31 July 2004 publish an update of Dstl's technical strategy that identifies the key technical issues and Dstl's role in addressing them, and by 31 March 2005 agree with MOD a future process that ensures that Dstl aligns itself with MOD's S & T outputs. **Achieved.**	Identify and agree with MOD's Chief Scientific Adviser the top 10 Dstl capability needs, their alignment with the future programme and the required MOD funding by March 2006. **Achieved.**	Deliver high quality outputs that have impact on MOD customers' "top 10" priority issues.
At least maintain overall customer satisfaction and understanding of Dstl; by 31 March 2005 implement new methodology and set the baseline against which Dstl will monitor and improve its customer relationship in the future. **Achieved.**	By the end of a three-year period show a linear improvement of at least 1.5% on the FY2004–05 customer satisfaction score of 75.4% for service provision. **No specific target score this year.**	Achieve a level of overall customer satisfaction in our delivery of at least 76.4% for FY2006–07 against a three year target of 76.9% (FY2007–08).
Achieve planned progress to meet the completion date of 2008 for the transfer of Dstl onto three core sites at Porton Down, Portsdown West and Fort Halstead. The Key milestones for 2004–05 are: issue the invitation to tender for the site rationalisation and facilities management contract (December 2004); pilot office layout options (March 2005); produce a plan for site remediation at Porton Down (October 2004). **Achieved.**	Achieve planned progress within budget to meet the completion date of 2008 for the transfer of Dstl onto three core sites at Porton Down, Portsdown West and Fort Halstead. The key milestones for 2005–06 are: appointment of the preferred bidder (August 2005); negotiate with the preferred bidder a reduction in facilities management costs for Dstl of at least 15% from August 2006; sign contract (March 2006). **First two milestones Achieved but contract signature slipped beyond end of FY.**	As part of the strategic aim to bring Dstl onto three sites by 2009, agree the overarching construction and facilities management contract and achieve key milestones on programme to time and cost, including delivering predicted efficiency gains.
Achieve a ROCE of at least 3.5% and an MOD dividend of £3 million. **Achieved.**	Achieve a ROCE of at least 3.5% averaged over the period 2004–05 to 2008–09 and a MOD dividend of £3 million in 2005–06. **Achieved.**	Achieve an average Return on Capital Employed (ROCE) of at least 3.5% over the period 2004–05 to 2008–09.
	By December 2005, complete the detailed design and build phases of the new integrated corporate applications system (iCAS) that will deliver all Dstl's business information requirements from 2006–07. Target areas not fully achieved.	To enable greater knowledge-sharing, improved management and operational efficiencies, by meeting agreed in year targets to ensure Dstl has in place an integrated corporate business environment by end of FY2008–09.

2004–05	2005–06	2006–07
Pilot at least three areas of category management—procurement of staff technical support, travel and laboratory equipment—to achieve cost and efficiency savings of £5.5 million by 31 March 2005. **Achieved.**	Define the scope, structure and funding requirements of a new defence and security research and development centre and, subject to new funding being available from customers, prepare a specific proposal for its creation. **Achieved.**	
Maintain and average charge rate for staff for 2004–05 and beyond below that for 2001–02 uplifted by GDP deflator. **Achieved.**	Maintain the average charge rate for staff for 2005–06 and beyond below that for 2001–02 uplifted by GDP deflator. **Achieved.**	
	Achieve Health and Safety Executive approval of the category 4 microbiology containment facility by 31 October 2005. **Achieved.**	
	Implement a process for identifying and publicising Dstl's major achievements during the year. **Achieved.**	

Annex B

GOVERNANCE OF PLOUGHSHARE INNOVATIONS LTD

Ploughshare is a wholly owned GovCo. The company currently includes an independent Chief Executive appointed by the Dstl Chief Executive, three senior technology exploitation managers and four support staff.

The Ploughshare Board comprises:

- a Non-Executive Chairman (external appointment, remunerated);
- a Chief Executive;
- three Non-Executive Directors (external appointments, remunerated); and
- two Dstl-appointed Directors (Dstl Finance Director, Dstl Technical Director; non-remunerated).

The Ploughshare Board reports to the Dstl Main Board which is responsible, *inter alia*, for approving Ploughshare's business plan. Any business decision by Ploughshare that is potentially novel or contentious for MOD or Dstl is referred to the Dstl Main Board for approval. Where appropriate, decisions will be referred to Ministers for approval. Min (DP) is kept informed of all significant developments in the exploitation of Dstl's IP.

Ploughshare's activities are additionally overseen by the **Technology Transfer Oversight Group (TTOG)** which acts as an advisory board to the Dstl Board with responsibility for scrutinising in more detail, and advising on matters to do with, Dstl's technology transfer and exploitation strategy and the activities of Ploughshare. TTOG representation is at 1-star level and from:

- Director S&T Policy, MOD
- Director Business Delivery, MOD
- Shareholder Executive
- two Dstl Directors (Finance Director and Technical Director)
- one Dstl Main Board Non-Executive Director
- Manager, Dstl IP Group
- Head of Technology Transfer, Dstl
- Chair and Chief Executive of Ploughshare Innovations Ltd.

The TTOG, which meets quarterly, is tasked with:

- advising the Dstl Board on Ploughshare's annual business plan and progress against targets and any major, novel or contentious issues which may require Board intervention;
- monitoring the development of Ploughshare's equity portfolio;
- overseeing the continuing development of Dstl's IP portfolio, in line with government policy and national security requirements;

— overseeing the funding generated as a result of Ploughshare's activities, including the progress and effectiveness of the Dstl Rewards to Inventors scheme; and

— advising Dstl-nominated Directors on any matters associated with discharging their role effectively at Ploughshare Board meetings. This includes early identification of any major, novel or contentious projects, including JV propositions, to enable appropriate action to be taken.

From the outset, Dstl's policy has been that its investment in spin-out companies/JVs is confined to its intellectual property, invested in exchange for equity in the company except where there are exceptional reasons, which the Dstl Board endorses, for doing otherwise in the public interest. Notwithstanding the latter, cash to enable the companies to operate and to develop their products and markets is normally and primarily provided only by external investors. Dstl does not sell or market its own services or products through its JV companies. The return for Dstl comes when its equity in a spin-out company is disposed, either to another cash investor or through a successful trade sale or flotation of the spin-out.

Governance of Dstl Joint Ventures

As a shareholder of a spin-out company, Dstl is able to nominate one or more non-executive directors to the Board of each spin-out. Dstl nominated directors have generally been appointed because of their technical and domain experience. They receive no additional remuneration for their work as Non-Executive directors of spin-outs.

Dstl staff are not permitted to receive equity shares in newly formed spin-outs as this could present staff with a conflict of interest or a distraction from their core work for MOD. However, staff are at liberty to resign from Dstl in order to continue their research careers for commercial ends. If a member of staff does resign to join a Dstl spin-out, a business appointment related conflict of interest does not arise because Dstl's interests are also served by the success of the spin-out company.

29 September 2006

Second memorandum from the Ministry of Defence

Counter Terrorism

1. The attacks on the US of 11 September 2001 had a fundamental effect on the global strategic environment. Counter terrorism became one of the highest priorities for Government and Dstl has played a vital role in delivering science and technology advice and solutions both to MOD and other government departments.

2. Increasingly, the defence science base developed by Dstl is being utilised in the wider security context and in particular for counter-terrorism and counter-insurgency. Dstl's capabilities are being utilised by other government departments to improve the robustness of the UK's response. In recent months, this has been highlighted by the MOD's decision to bring together elements of its counter-terrorist activities by setting up a dedicated facility. Based at Porton Down, the Counter-Terrorism Science and Technology Centre is operated by Dstl on behalf of MOD.

3. Dstl also operates the Forensic Explosive Laboratory (FEL) which is funded by the Home Office. FEL provides a round-the-clock forensic explosive investigation service for the UK; this includes operational scientific support and a forensic analysis capability. Dstl staff attend the scenes of incidents and provide advice and scientific support to decision makers. In 2003 Dstl provided case officers to Istanbul following the bombing of the British Consulate and HSBC bank where they provided crucial advice on scene interpretation and forensically significant evidence. More recently, Dstl provided crucial support to the Metropolitan Police in July 2005 when London's transport infrastructure was attacked. Forensic explosives experts from Dstl deployed immediately to the scene of the attacks and worked non-stop to retrieve and analyse the huge volume of forensic evidence in support of the ongoing investigation.

4. Dstl supports the UK's response to Chemical, Biological and Radiological (CBR) terrorism; this includes maintaining capabilities on a 24/7 basis.

5. Each year, Dstl provides forensic and scientific support and advice to more than 300 police investigations involving the criminal misuse of explosives, from individual criminal cases through to terrorist incidents.

Support to Operations

6. Dstl is increasingly being called upon to provide scientific support to operations. Operation TELIC saw the largest number of scientists being deployed to support operations since the Second World War.

7. Dstl involvement in TELIC covered all aspects of the operation ranging from support to campaign planning, the delivery of equipment as part of the urgent operational requirements (UOR) process, to ongoing post-conflict support through deployed scientists and reachback. In March 2003 Dstl provided advice on the possible operational environments, prepared data and developed models for any possible conflict. As the likelihood of conflict increased more than 100 Dstl staff were trained for possible deployment into theatre. In parallel scientific advice was provided to a wide range of customers, including PJHQ (combat analysis, casualty profiling), Director Joint Warfare (chemical, biological and radiological advice), and other government departments such as the Department for International Development and the Department of Health.

8. Dstl also contributed to a number of UORs, these included the enhancement of the capabilities of the in-service biological detection system to extend its range and enable it to detect a wider range of CB materials and other projects. Dstl support continues on the ground and through reachback. The embedded scientific advisor (SCIAD) role has been instrumental in ensuring that science and technology can be brought to bear on urgent operational problems. After one operation the 4* Army officer in command commented that the SCIAD role had almost certainly saved lives and senior officers have expressed the desire to see the SCIAD role normalised for all future operations.

9. The events of September 11th 2001 and the subsequent operations in Afghanistan saw Dstl analysts permanently deployed to PJHQ, carrying out casualty analysis, historical research, measures of effectiveness and combat assessment. Two analysts were then deployed to ISAF HQ in Kabul to give the deployed forces direct access to situation assessments, non-battle casualty data and military patrol statistics. Recently a SCIAD has been deployed to support the NATO deployment in Afghanistan.

10. More than 100 Dstl staff have received medals in recognition of their contribution to Operation Iraqi Freedom. The then Vice Chief of the Defence Staff, Air Chief Marshal Sir Anthony Bagnall paid tribute to Dstl scientists, referring to them as the unsung heroes of military operations.

Force Protection

11. Dstl supports MOD in all elements of force protection particularly in relation to security (in particular counter terrorism), fire safety, Explosive Ordinance Disposal (EOD), Chemical Biological, Radiological and Nuclear (CBRN) materials, medical issues, air countermeasures and fratricide prevention.

12. Dstl has made a significant contribution to the protection of our deployed forces in both Iraq and Afghanistan. As the threat from improvised explosive devices (IED's) and more sophisticated weapons systems employed by insurgent groups has evolved Dstl has played a vital role in protecting coalition troops. Dstl has developed expedient armour that when fitted to in-service armoured vehicles have provided enhanced protection against the specific threats being faced in these theatres. This effort was praised by the Director of the Royal Armoured Corps who commented that the armour gave a strong sense of confidence to the vehicle crews, enabling them to do their job with assurance. As well as enhancing the armour of vehicles Dstl has been actively working to develop a range of other countermeasures to the rapidly evolving IED threat, particularly in Iraq.

13. Dstl has received particular praise for the countermeasure systems on UK air platforms, all of which have evolved in some way from Dstl research and support to the Air Warfare Centre (AWC). In recognition of the Dstl's contribution, the AWC wrote "the Dstl Team currently holds a world-leading position in countermeasures development. The product of their work is tested daily in operational theatres and has not been found wanting. It is not being overdramatic to say that lives and aircraft have been saved as a direct result of the work that we have jointly undertaken and we should be justly proud of our achievements."

Public Health

14. Dstl has provided expertise in support of a number of public health issues over the last five years. In 2001 the outbreak of foot and mouth disease in the UK had a significant effect on the UK livestock industry. As well as advising on policy, Dstl staff were deployed to the Joint Co-ordination Centre and the Disease Emergency Control Centre in London. Initially they provided database analysis and database design then went on to providing analysis to answer specific questions from DEFRA. Also specific studies required the development of quick running models to support analysis activities. A team of Dstl experts provided round the clock support to the relevant scientific committees and then the Army in its implementation of the policy and planning for the clear up operation.

15. Dstl's vaccine research, particularly for immunisation against anthrax and plague, has been widely praised, and recognised by the award of substantial contracts by the US National Institute of Health. Dstl has also recently developed the first anti-toxin effective against all seven serotypes of botulinum. Not only is this available for use by MOD but is now being used in the NHS to treat cases of botulism that occur naturally in the civilian population.

Technology

16. Over the last five years, Dstl has developed a range of technology with applications in both military and commercial sectors. These include:

- novel processes for the disposal of obsolete explosive and chemical materials;
- naval electronic warfare systems;
- x-ray equipment for non-intrusive scanning of vehicles and containers at ports;
- a system to identify bacterial infections and their resistance to antibiotics;
- remote bomb disposal systems for military forces;
- electric armour systems to defeat shape charge projectiles;
- detection systems for biological and chemical materials;
- non-lethal weapons systems for use by police forces;
- novel multi-spectral flare systems for aircraft protection;
- the adaptation of a drug developed for haemophiliacs to help prevent haemorrhaging on the battlefield;
- the Remote Air Sampling for Canine Olfaction (RASCO) system for the rapid screening of air cargo for explosives; and
- an integrated gene probe detection system for the rapid detection of biological warfare agents.

Future MOD Capability

17. The 2004 Defence Review highlighted a need for flexible and adaptable armed forces properly supported to carry out the most likely expeditionary operations. It identified new force structures and new capabilities, such as Network Enabled Capability (NEC) and the Effects Based Approach, as key routes to achieving this. Through research and operational analysis, Dstl has been working closely with customers in Central MOD, the MOD acquisition community and the front-line to identify and refine the options. Our work on NEC and the Future Force Structure Study are typical.

18. **Network Enabled Capability (NEC)** is one of MOD's highest priorities for future investment. Dstl is leading a joint research programme with industry aimed at transforming NEC from a concept to the delivery of a network-enabled force that can achieve desired effects through a smaller number of more capable assets. Dstl has contributed in a number of different areas. For example, Dstl has exploited its corporate memory to identify and collate quantitative evidence of the benefits and risks of NEC. Evidence suggests that NEC can deliver force multiplier effects, but only if a coherent approach is taken across all of the defence lines of development. Dstl is helping to translate these NEC benefits into real and practical interventions. One way it is doing this is through working with the equipment capability areas in MOD to identify specific opportunities for improved military effectiveness through networking. Dstl is also contributing in identifying and developing the process and culture changes needed to deliver NEC. This includes working with the Defence Procurement Agency to develop a behavioural model that can be used by the acquisition community to measure its maturity in adopting NEC.

19. The **Future Force Structure Study (F2S2)** explored the force structures that will better meet the UK's defence needs in the 2025 timeframe in a changing security environment. It looked at a broad portfolio of scenarios illustrative of the military tasks that the UK may need to undertake as part of our foreign and security policy, and used these to measure the ability of different future force structures to meet policy aims, in either single or concurrent operations.

20. The analysis explored demands placed on the force structure including the requirements of force readiness, roulement and permanently committed forces. It tested alternative views of future circumstances and priorities and exploited new operational or system concepts. All deployable UK forces from the three services were considered, and the requirements for non-deployable force elements taken into account. The relationship between deployed force size and total fleet size, which is different for different force elements, was informed by more detailed Dstl studies. Other specialist teams in Dstl provided information on the cost and manning implications of each structure.

21. The F2S2 analysis contributed to Defence Strategic Guidance, to the Equipment Plan and was explicitly cited in the 2004 White Paper.

Support to Acquisition

22. One of Dstl's major roles is to provide advice to support major equipment acquisition programmes and decisions. Dstl contributes at all stages of MOD's smart acquisition cycle: from analysing the shortfalls in military capability, identifying and developing the concepts needed to make these good, through to supporting the selection of equipment suppliers, and beyond, once equipment has entered service. Dstl

makes a real difference to decision-making by delivering integrated advice based on systems understanding, operational analysis and our ready access to a wide range of technical and scientific expertise and knowledge, both within Dstl and across Industry.

23. Since its formation, Dstl has contributed to most major acquisition programmes for all three services and in all areas of military capability. The Future Rapid Effects System and Joint Combat Aircraft are typical and two of the most significant Dstl has supported.

24. **Future Rapid Effects System (FRES):** The Strategic Defence Review and subsequent defence white papers have articulated the new strategic context and the need for a UK medium weight armoured capability to project power rapidly world-wide in support of national and alliance interests. FRES will form a key part of this capability.

25. FRES is a programme that will deliver a network-enabled fleet of medium-weight armoured fighting vehicles. These are key to the British Army's plans to develop battle-winning, rapid reaction capabilities and replace the ageing manoeuvre support capability currently provided by several armoured vehicle types.

26. Dstl has supported the initial assessment of the capability, the objectives of which included defining the optimum FRES capability; its boundary and its constituent elements, in terms of performance, time and cost; recommending an optimised FRES acquisition strategy; and identifying and mitigating the risks associated with achieving the required FRES capability.

Dstl is part of an integrated FRES team comprising the Central MOD customer, the Integrated Project Team, and Atkins, the Systems House appointed to support the 24 month Initial Assessment Phase. Dstl has brought to this team key technologies and a wealth of expertise developed through years of related science and technology programmes.

27. Dstl's contribution to this programme relied on the close working of technologists, systems engineers, analysts and military staff in integrated teams under the management of a single point of contact in Dstl able at short notice to draw on the knowledge and expertise of engineers, scientists and analysts throughout all Departments of Dstl. This "inter-working" approach was fundamental to the delivery of a co-ordinated programme of support and the efficient exchange of information between government and industry.

28. **Joint Combat Aircraft:** The Joint Combat Aircraft (JCA) programme will provide the UK with a supersonic carrier-capable strike fighter to replace the Joint Force Harrier. The US Joint Strike Fighter (JSF) has been selected to fill the JCA requirement, providing a key part of the UK's Future Combat Air and Carrier Strike capabilities alongside other systems such as Typhoon and the Future Aircraft Carrier.

29. Dstl has provided comprehensive support to the programme. Dstl experts analysed the policy implications of the future capability, assessed the level of technical risk in the programme and developed simulation software and facilities to explore operational concepts and tactics for JSF. These facilities have proved invaluable in assessing the complex interaction of technical issues associated with this state-of-the art, revolutionary aircraft.

30. Dstl's support to the programme also covered other issues such as the pilot-vehicle interface, identification and mitigation of design aspects that could disrupt the smooth introduction to service of JCA and examining through-life cost logistical issues.

31. Dstl's independent advice has been critical to the MOD Investment Approvals Board's understanding of the level of risk remaining and the organisation is continuing to help the Integrated Project Team to monitor and reduce risks in the programme in the run up to key decision points.

Collaboration

32. Dstl has an extensive network of worldwide contacts in the military, academia and industry that it uses to ensure that MOD is aware of, and has access to, the very latest developments in science and technology. This adds considerable value to MOD research programmes and is particularly productive with respect to our links to the USA. Some of the many examples of Dstl's collaboration are described below.

33. Dstl has a network of links with other Government laboratories; this is demonstrated by the Inter Lab Forum, a partnership of the six Public Sector Research Laboratories. The Forum is seen as a way of ensuring that Government scientists can work together better across a range of work, but particularly in responding to emergencies. Dstl is the largest of the group of labs, which includes Defra's Central Science Laboratory, The Centre for Environment, Fisheries and Aquaculture Science, the Health and Safety Laboratory, The Health Protection Agency and the Veterinary Laboratories Agency. In the event of a crisis at one laboratory where facilities, equipment or staff are incapacitated, the other Forum members have agreed to endeavour to provide assistance. Although each is distinctive in its remit, there is expected to be considerable scope for mutual support in areas of strategic and operational importance, like disease control, detection and decontamination of hazardous materials and animal health research facilities.

34. Co-operative Research Centres (CRCs) in UK Universities, facilitate the exchange of staff and pooling of resources between Dstl and its academic partners. Whilst the work must be of importance to MOD, CRCs have the complementary aim of keeping skills fresh and promoting networking. Participation of Dstl staff in CRCs helps to ensure that knowledge is kept current and aids training and development. Working alongside external researchers provides benchmarking of our abilities, ensuring that we stay at the

forefront of excellence. CRCs also provide Dstl and MOD with access to specialist university facilities, university research and cutting-edge expertise. To date, CRCs have been set up in partnership with The University of Cambridge, Imperial College, University of Oxford, Cranfield University and the University of Southampton.

35. Dstl has played a leading role in establishing an international network to assist with the scientific investigation of terrorism. An example of this was the establishment of the FINEX network in partnership with the Netherlands Forensic Institute, which provides support to the International Criminal Court. This involves scientists from over thirty countries engaged in the investigation of terrorist bombings, from the crime scene to the court room and promotes effective collaboration in the investigation of incidents such as the Madrid train bombings.

36. The Coalition Warrior Interoperability Demonstration (CWID) which takes place annually, hosted by Dstl, is an excellent example of our collaboration with military scientists and allied armed forces. CWID is designed to demonstrate emerging technologies for Command, Control, Communications and Computers (C4) and Intelligence, Surveillance, Target Acquisition and Reconnaissance (ISTAR) systems and improve interoperability between coalition nations. Participants have included Australia, Canada, New Zealand, the USA and South Korea. CWID has repeatedly proven the benefits of live military multinational interoperability exercises and has generated significant financial savings for MOD. In 2005, Dstl was awarded a Smart Procurement Award from the Minister for Defence Procurement for its outstanding contribution to CWID.

29 September 2006

Supplementary memorandum from the Ministry of Defence

(Qs 20–23, Qs 148–149, Q 160) *For the UK and for other countries (United States, France, Russia, China and India) the following data (for the latest year in which data are available)*

- The total amount spent on defence research (showing the amount spent by the public sector and the private sector).
- The proportion of the total public sector defence spending which is spent on defence research.
- The total amount spent on defence research as a proportion of GDP.
- The total amount of public sector spending on defence research split between Research and Demonstration.
- The total amount of public sector spending on defence research spent on the equivalent of Dstl in these countries (and the percentage of the public sector spending on defence research spent on the equivalent of Dstl).

Table 1 provides the latest available information, in which there is confidence, on defence R&D expenditure for all of the nations except India, where there is currently no available data. The figures in the table are for "public sector" investment in defence R&D, given in £ million (2001 values), as a percentage of GDP and as a percentage of overall defence budget.

Whilst overall R&D figures are available for most of the nations in question, the data is not usually split into separate research and development figures and exact definitions of the categories differ between the nations. The figures for China may represent a significant underestimate of their true defence R&D expenditure since it has been widely reported that the officially available figures may be 40–70% lower than reality[2].

Table 1

DEFENCE R&D SPEND

		2004	*2001*
UK	£m	2,640	–
	% Defence Budget	*9**	–
	% GDP	0.18	–
US	£m	22,988	–
	% Defence Budget	*16**	–
	% GDP	0.46	–

[2] http://www.rand.org/news/press.05/05.19.html

		2004	*2001*
France	£m	2,534	–
	% Defence Budget	*8**	–
	% GDP	0.18	–
Russia	£m	(4,200)	3,300
	% Defence Budget	–	12
	% GDP	–	0.29
China	£m	–	2,035
	% Defence Budget	–	8
	% GDP	–	–

Table 1 Data sourced from data used for study carried out for MoD[3].

* Data in italics sourced from graphs in Royal United Services Institute Report "NATO Science & technology Trends, Challenges & Priorities for Reform" dated November 2005. It may not be directly comparable with other data in table and is included for indicative purposes only.

Identification of "Demonstration" spend is also problematic; in UK terms, this would be considered as an element within the Development part of the defence R&D spend and is not accounted for separately. Therefore, it is unfortunately not possible to provide data on this question, even for the UK, without commissioning specific work to compile such data. Information at this level of detail would be difficult or impossible to obtain for the other countries of interest and, again, there are issues from nation to nation in terms of the definition of the term "demonstration". However, as noted above, we do have figures for the split between research and development for the UK. In 2001, the UK defence R&D spend was 27% research, 73% development. In 2004 it was 25% research, 75% development.

Figures for private sector R&D investment, both in the UK and globally are published in the 2006 DTI R&D Scoreboard[4] for the top 800 UK companies and top 1,250 global companies. This lists UK Aerospace and Defence R&D investment for 2005–06 as around £2.5 billion. It should be noted that the R&D Scoreboard accounting methodology is not directly comparable to the public sector defence research figures.

Private sector investment is only available by international companies for Aerospace & Defence and total R&D investment by country, rather than National defence R&D.

Other nations of interest do not have a direct equivalent of Dstl, as each have a different model for government-owned defence research laboratories. For example, in the US, each of the Armed Forces operate their own network of research laboratories which are more like our old DERA model than Dstl in terms of the way they operate. Defence research is also separately funded by the Department of Defence, eg through DARPA. In France, the DGA is an agency of the French MoD which broadly covers the same functions as Dstl but fulfils a wider range of roles in addition to these.

(Q 161) *The amount the UK has spent to date on defence research funding to support current operations in Afghanistan and Iraq. Details of how the spend on defence research funding to support these operations has impacted on other defence research spending (the longer term defence research not in support of operations)*

Total defence research budget spend in support of operations in the current financial year is assessed to be just under £15 million. This covers all operations though the vast majority of this sum has been in relation to Iraq and Afghanistan. Most of the expenditure has been on research which was already planned, but which has been brought forward for considerably faster exploitation than originally intended in order to meet emerging operational needs. It is therefore considered to be re-prioritised/re-scheduled "normal business" for the research programme and only a tiny proportion (about 2%) of this expenditure is being recouped from the operational budget. The re-prioritising/re-scheduling impact on the remainder of the research programme has so far been accommodated in the current budget by delaying other short and long term work.

(Q 47) *Details of who owns the 15 Dstl sites*

Table 2 below shows the current status of, or plans for, the sites occupied by Dstl following vesting in 2001. Also shown, in Table 3, is the status of some additional property occupied by Dstl since 2001.

[3] NB. Summary of this study is given in "The Effects of Defence R&D on Military Equipment Quality, Middelton, Burns et al, Defence & Peace Economic April 2006".

[4] http://www.innovation.gov.uk/rd_scoreboard/

Table 2

STATUS OF ORIGINAL SITES

Site	*Owner*	*Status*
Porton Down	Dstl	Freehold; retained (Core Site)
Portsdown West	Dstl	Freehold; retained (Core Site)
Fort Halstead	QinetiQ	Head Lease (up to 2091); retained (Core Site)
Bedford Enclave	QinetiQ	Vacate 2008
Farnborough New Site (eg A2/A3)	QinetiQ	Vacate 2009
Chertsey	QinetiQ	Vacated
Pinehurst	QinetiQ	Vacated
Alverstoke INM	MOD	MOTO[5]; retained after rationalisation
Alverstoke Main (the Hyperbaric and Escape and Rescue site owned by QQ)	QinetiQ	Vacated
Winfrith	English Partnerships	Vacate 2009
Bincleaves	QinetiQ	Vacated
Malvern	QinetiQ	Vacate 2008
Defford/Pershore	QinetiQ	Defford Vacated/ Pershore Vacate 2008
Glasgow—Kentigern House	MOD	Vacated
Rosyth South Arm	QinetiQ	Vacated

Table 3

ADDITIONAL SITES ACQUIRED SINCE VESTING

Site	*Owner*	*Status*
Portsdown Main	Dstl	Freehold; acquired from Defence Estates as part of earlier rationalisation plan, retained for planning purposes and future sale
Pyestock	Dstl	Freehold; transferred to trading fund 2001 plan to sell 2007–08
Portsdown Hill (MWC)	MOD	MOTO; acquired 2003 vacate 2008
St Athan	Welsh Development Agency	Trials building leased from 2005 until 2029

(Q i) *How much annual revenue does Dstl receive from exploiting its IPR? Does Dstl retain all of this revenue? Does all the IPR revenue come through Ploughshare Innovations Ltd, or does some come from other "spin-out" companies?*

How much annual revenue does Dstl receive from exploiting its IPR? Annual revenue is received from licence agreements with, and from royalty payments by, companies that use Dstl's IPR in non-defence (non-MOD) markets. The direct exploitation of Dstl's IPR by Ploughshare is in its early stages. During its first year of operation, Ploughshare collected over £200K of exploitation revenue. Efforts by Ploughshare to increase substantially the scale of income are under way and income for FY06–07 is expected to be closer to £300K. Further income growth is expected.

Does Dstl retain all of this revenue? All the income from such exploitation activity is collected and retained by Ploughshare, not by Dstl.

Does all the IPR revenue come through Ploughshare Innovations Ltd, or does some come from other spinout companies? As stated above, all the income from commercial exploitation as described above is collected, retained and consumed by Ploughshare in the discharge of its remit from Dstl. No other spin-out companies are a source of annual income of this type to either Ploughshare or Dstl. Please see the answer to question 5 for the case where income from the sale of equity in spin-out companies arises.

[5] MOTO = Memorandum of Terms of Occupation.

(Q ii) *In its memorandum to the Committee (paragraph 46) the MoD stated that "the prospects of a JV [Joint Venture] sale in the next 12 months are encouraging". Please could MoD clarify what is being sold.*

As well as receiving income from licence agreements and royalty payments, Dstl/Ploughshare owns equity (in exchange for its IPR) in a number of spin-out companies/Joint Ventures. The aim is that Dstl/Ploughshare's equity is these ventures will be disposed of at the optimum time for the company and its investors (including MoD) through either a trade sale or Initial Public Offering (IPO).

From its inception, Ploughshare's business plans have included a trade sale or IPO of at least one of the ventures before the end of 2007. Negotiations for the sale of one of the spin-out companies to a global company are now at an advanced stage, though exact details are commercially sensitive.

On sale, Ploughshare would receive a substantial initial payment with further deferred income and licence royalty revenues to follow. The size of both of the latter income streams would depend on the subsequent sales revenues generated by the purchasing party.

(Q iii) *Dstl operates the Counter-Terrorism Science and Technology Centre on behalf of the MoD. Has Dstl received additional resources for this purpose? Is the Centre funded solely by the MoD? What are the expected benefits from bringing together the various elements of the MoD's counter-terrorist activities?*

The costs incurred by Dstl in setting up and managing the Centre on MoD's behalf have been directly met by MoD. MoD will continue to cover the infrastructure and overhead costs of the Centre. Research commissioned by the Centre is currently funded by MoD, Home Office and Department for Transport.

MOD has an extensive S&T programme and it is essential that all CT related elements are coordinated and coherent. The CT S&T Centre is able to provide this coherence and is a source of technical advice across MOD for all S&T issues relating to CT. The CT S&T Centre also acts as a portal into MOD's CT S&T for other Government Departments (and other Governments for international collaboration) helping to avoid duplication of programmes and providing access to MOD's often security sensitive technologies while protecting overall national security. MOD's major CT programmes can at times overwhelm available resources (industry, academia and the government laboratories) and, working with other Government Departments and suppliers, the Centre aims to ensure the best use of these resources and that national priorities for CT S&T requirements are met.

(Q iv) *Dstl plays a role in supporting UK operations and Dstl staff have been deployed in support of recent operations. What roles does Dstl undertake to support operations? Does Dstl support peace-keeping operations?*

Dstl's operational support activities have ranged from assisting with campaign planning through the delivery of equipment using the Urgent Operational Requirement (UOR) process to support during and post-conflict. Operation TELIC puts these activities into context. At the earliest stages of this operation, Dstl assisted with campaign modelling and wargaming. During the build-up phase, Dstl addressed numerous requests for support and advice and contributed to many UORs. On transition to war, advisors and analysts deployed to theatre with UK Forces. To date over 100 Dstl staff have been deployed to headquarters in Iraq and Afghanistan. Embedded Scientific Advisors (SCIADs) enable science and technology to be brought to bear on urgent operational problems and provide the commanders with access to key decision support tools. Reachback allows those deployed to easily access the full range of Dstl's expertise and Dstl ensures that the advice provided is timely, consistent and quality checked.

Dstl has considerable experience in supporting peace-keeping operations, again through deployment of advisors and analysts supported by reachback. Dstl is recognised as a leader in analysis and support to peace-keeping operations based on its experiences in the Balkans. Recently, support has been provided to the UK-led ARRC deployment to ISAF in Afghanistan. The principal role of the deployed analysts is to provide advice on patrolling, crime statistics and to develop measures for the success of the operation through analysis of a wide range of civil and military measures of effectiveness. A Dstl SCIAD is also deployed into the NATO ISAF HQ in Kabul with the remit of developing science and technology solutions for peace-keeping.

Dstl also supports, through the Military Aid to the Civil Powers arrangements, home based counter-terrorism operations for the Home Office. Support is provided at all levels of the operational response. Dstl has also provided analysis in support of planning during the fuel crisis (2000), the Foot and Mouth outbreak (2001) and the firemen's strike (2003).

(Q v) *Has the need to deploy Dstl staff on operations had any impact upon staff retention? What impact does Dstl's support for operations have on Dstl's core defence research work?*

As outlined above, operational support ranges from reachback and supporting UORs through to operational deployment. Dstl has not experienced any detrimental impact on staff retention and there is evidence that it has had a positive impact on staff. All personnel deployed on operations are volunteers. Younger members of staff actively seek the opportunities to deploy their skills in an operational theatre and

invariably speak positively about the experience and insight they have gained. The pool from which Dstl can select candidates for the more senior deployed posts is small because of the expertise required and the family and other commitments potential candidates might have. Dstl has to manage this pool carefully and is taking action through training to increase the size of the pool.

Dstl provides operational support under the Military Aid to the Civil Power arrangements; for these operational activities there is waiting list of volunteers. For those staff involved in providing support through reachback and UORs it is apparent that they value the opportunity to deploy their skills on an issue that is going to have an immediate demonstrable impact in the field. Dstl has encountered nothing but good will from staff, a willingness to be called-out without notice, even during unsocial hours and holidays, in areas where there are skills shortages to get the job done. Dstl takes great care not to abuse this good will.

Operational support can impact on Dstl's core defence research work. During all phases of Operation TELIC large parts of the lab were directly supporting the operation and as a consequence resources were diverted from the core activities. This was agreed with the affected customers. Some areas of the laboratory are still heavily committed to supporting UORs and in these areas the core research programme has had to take second place. Dstl seeks to spread the impact of UOR activity by utilising appropriate resources from across the laboratory. Reachback and related activities tend to be of a short duration and are often unpredictable but do not have a major impact on Dstl's core programme.

(Q vi) *On the FRES programme Dstl is part of the integrated team. What is Dstl's role in this team and is it clear to Dstl what the military customer wants from the FRES programme? Will Dstl be involved in the programme once the Initial Assessment Phase is finished and, if so, in what role?*

Dstl has been supporting FRES since its inception in 2002 with significant contributions to the FRES Requirement Definition and Initial Gate Business Case through the exploitation of previous research and experience gained from other programmes. The FRES programme is now reaching the end of the initial Assessment Phase (iAP), the objectives of which were to define the optimum FRES capability, its boundary and constituent elements, the risks associated with achieving the required capability and an optimised acquisition strategy.

With the appointment of the Systems House (Atkins) in 2004, Dstl became part of an integrated FRES "One Team" comprising Dstl, the IPT, and the Systems House, working with DEC GM. Dstl experts contribute to an extensive range of FRES activities, including requirements definition, operational analysis, programme planning, systems engineering, independent technical assurance, technology maturity/technical risk assessment, definition of associated Technology Demonstrator Programmes (TDPs), threat assessment, risk management, systems optimisation, trade-offs and option analysis. More than 130 Dstl staff drawn from across Dstl were involved in supporting FRES during 2006.

Through its long-standing and extensive engagement in FRES, and its close working relationship with the military customer, Dstl has an in-depth understanding of what the military customer wants from the FRES programme.

Dstl involvement in future phases of FRES is set to continue and is likely to increase. The extent and detail of future Dstl involvement is currently being quantified as part of the strategic planning led by the IPTL, and is captured within the FRES Strategic Implementation Plan which will execute the endorsed FRES Acquisition Strategy. Dstl will continue to provide a high level definition of the FRES capability and related systems issues. This will involve undertaking an independent technical assurance role, including exploitation of the S&T programme as an intelligent customer, and supporting key programme reviews and verification. Dstl will provide a fundamental role in supporting the key programme decision points, through the continuation of a significant Government Operational Analysis programme, whose purpose is to provide evidence for the FRES capability and force mix, and to support the business case.

(Q vii) *In what ways has the MoD improved its measurement of defence research outcomes since the publication in March 2004 of the NAO's report on the Management of Defence Research and Technology?*

We have:

- made it clearer what our priority S&T areas should be, emphasising the outcomes we want and increased joint planning with industry, Dstl and academia;
- reviewed our programme for alignment, quality and exploitation and stopped misaligned or low quality work to make headroom for new work; and
- taken steps to improve our process and linkages with the new DE&S organisation to improve exploitation of defence R&T.

S&T strategy and priorities—The Defence Technology Strategy was developed with industry and academia. The outcome has been a clearer and widely available unclassified Technology Strategy that enables us to plan defence R&D more effectively with industry and academia. This document has been greeted very favourably. In addition, the S&T Board have endorsed those 10 priority areas that they wished Dstl to pursue this year as key targets on Dstl. We are now better able to see whether the research programme is meeting the priorities we have identified.

Programme review—We have used some of the metrics suggested by NAO and have recently completed a study checking the alignment of our defence R&T programme against strategic priorities (the capability and alignment study) and examining the quality and exploitation of the programme. This study included significant external peer review. Checks against these three suggested areas established that the programme was in good health and that 95% of some £470 million pa of work was well aligned and of good quality. This was considered a first class result, with resulting confidence that our R&T programme is very strong. We have terminated the misaligned and lower quality work and released the resource to fund other more useful research. In addition, we continue to make use of DSAC and are putting in place processes to make peer review a larger component in our day to day research management.

Technology exploitation—The DIS and DTS contain actions on how MOD will achieve greater technology exploitation. For example, we are increasingly ensuring that our research has exploitation plans and technology roadmaps. We are also developing the SIT interface with the new acquisition organisation (DE&S) to boost exploitation of R&T into defence capability. It will be some time before we are able to measure the effectiveness of these actions and see if the desired outcome of greater technology exploitation has occurred.

(Q viii) *How does the MoD assess whether value for money has been achieved from the defence research it funds?*

The Research Acquisition Organisation carries out regular reviews of all ongoing research programmes to confirm that they are running on time, to budget and providing value for money in meeting MoD's needs. Management action is taken on any which are failing against any of these three criteria. An increasing proportion of research projects are also subject to post-project evaluation so that any lessons identified can be taken into account in the planning and management of future tasks.

External peer review of our research programmes is carried out on a rolling basis by the Defence Scientific Advisory Council. DSAC aim to review approximately one third of the major programmes in each financial year. Membership of DSAC includes a wide range of highly skilled and respected experts from both industry and academia. Their reviews focus primarily on research quality—their findings are used to inform value for money decisions.

The Maximising Benefit from Defence Research report presents the results of a recent study into the defence research programme. This reviewed a significant percentage of the ongoing projects, finding that over 90% were of appropriate quality (22% were world-class) and at least 85% were well-aligned to MoD's overall needs. Some of the approaches used in this study have now been incorporated into the ongoing management of the programme, thus allowing us to better judge value for money as work is carried out. We anticipate repeating the study in 2008–09.

(Q ix) *The MoD report, Maximising Benefit from Defence Research, was published on 3 October 2006. How does this report fit with the Defence Technology Strategy published on 17 October 2006? Will the proposals in the Maximising Benefit from Defence Research report require additional money to implement and, if so, how much?*

Both the Maximising Benefit from Defence Research report and the Defence Technology Strategy were produced as actions in the ongoing implementation of the Defence Industrial Strategy. The teams delivering the report and the DTS cooperated closely and the two documents are fully coherent. We do not expect the proposals in the Maximising Benefit from Defence Research report to require additional funding.

(Q x) *On what evidence did the Maximising Benefit from Defence Research report come to the judgment that the "exploitation of MoD research is acceptable"? In what areas did the review find that there was room for improvement, and who is responsible for making the required improvements?*

The Study's Terms of Reference interpreted "exploitation" as "all effective uses of research". These included developing scientific understanding and advice to policy and decision making, not just the development of technology for the equipment programme. Due to the long timescales often involved in research exploitation, the study assessed both the effectiveness of current exploitation planning and actual exploitation from the mid-1990s research programme. Over 75% of a sample of current projects had effective exploitation plans involving the end-user—a key factor in helping ensure plans are actually carried out. Over 75% of a sample of completed projects from the mid-1990s were judged as successful and 64% had been exploited. While noting that these results should be treated with some caution given the relatively small samples, the study report concluded on the basis of this evidence that exploitation was acceptable.

The study suggested several changes to present practice which could improve exploitation. These included: extending the use of technology road maps; better exploitation plans with clear responsibility for their implementation; a closer and more thorough stakeholder management process; improved visibility of the research programme as a whole, especially within the Defence Procurement Agency; and greater cohesion between different research funding areas in order to improve pull-through from basic research to capability-related research and ultimately the supplier base. Implementation of the study recommendations

is underway under the direction and oversight of the Chief Scientific Adviser and his Management Board. A further recommendation for a reduction in the number of research Outputs, with a single Output for technology development in order to provide clearer ownership of exploitation responsibility, improved end-user engagement and better MOD-wide visibility of the research programme is being carried forward under the Defence Acquisition Change Programme.

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