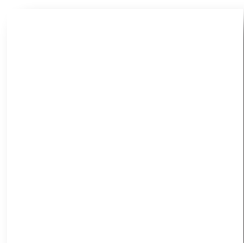
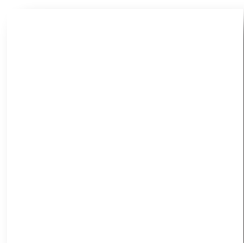


Getting better value from public sector research establishments

APPENDICES

Quentin Maxwell-Jackson



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: Appendix 1

Approach

This study was based on desk research, and a short interview programme. All current and future PSREs were invited to take part. The following agreed to give interviews with senior members of staff, and so we have consequently written up full case studies, which have been checked back with the establishments for factual accuracy:

- : Forensic Science Service**
- : Atomic Weapons Establishment**
- : National Nuclear Laboratory**
- : National Physical Laboratory**
- : Building Research Establishment**
- : Natural Resources Institute**
- : Transport Research Laboratory**
- : LGC**
- : QinetiQ**

In addition we held interviews with BIS, and with Battelle.

Where we were unable to undertake an interview we have produced a summary case study based on desk research of publicly available information. This was also checked back with the relevant PSREs, and where responses were received these were taken into consideration.

: Appendix 2

CASE STUDIES

This appendix contains Case Studies for the organisations we were able to interview during the study. These are:

GOGO

- : Forensic Science Service** Page 6

GOCO

- : Atomic Weapons Establishment** Page 15
- : National Nuclear Laboratory** Page 19
- : National Physical Laboratory** Page 25

Privatised – Non Profit Distributing

- : Building Research Establishment** Page 31
- : Natural Resources Institute** Page 37
- : Transport Research Laboratory** Page 41

Privatised – Profit Distributing

- : LGC** Page 45
- : QinetiQ** Page 56

For those organisations which declined to be interviewed by us, we have assembled shorter case studies from publicly available sources. We have given these organisations the opportunity to comment on the brief case studies, and where they have done so we have taken their comments into account. Short case studies are given for:

GOGO

- ⌚ Animal Health and Veterinary Laboratories Agency Page 66
- ⌚ Centre for Environment, Fisheries and Aquaculture Science Page 69
- ⌚ Defence Science and Technology Laboratory Page 72
- ⌚ Food and Environment Research Agency Page 75
- ⌚ Health Protection Agency Page 78
- ⌚ Health and Safety Laboratory Page 81

Privatised – Profit Distributing

- ⌚ AEA Technology Page 83
- ⌚ TUV NEL Page 86

Case study

Forensic Science Service (FSS)

What FSS does

Forensic Science Service Ltd provides a full range of forensic science services to customers across all types of crime. Although working primarily with the police forces and criminal justice agencies of England and Wales, the company also has a small international presence.

Most FSS services fall into one of two categories:

- basic commodity services such as DNA profiling or product line testing
- complex case work which requires interpretation of data and findings from a number of tests/sources and presenting them effectively in court

Status

FSS is a wholly owned Government company, with shares owned by the Home Office. The FSS Chief Executive reports to Ministers through the Home Office. Secretary of State approval, as well as that of the FSS Ltd Board, is required for issues such as salary levels, recruitment, disposal of assets, business plans, etc

Financial

The main client groups are police forces, HMRC, British Transport Police, the CPS, commercial organisations and international customers. FSS received approximately £50m in restructuring funds in 2010. FSS estimates that about £4m is spent annually on R&D in support of its services.

FSS receives no core funding from the Home Office. It must earn revenues from providing contract forensic services to customers, often in competition with other suppliers.

The table below gives summary financial details.

£m	2010	2005	2000	1995	1990
Turnover	113	150	77	29	n/a
Operating costs (before exceptionals)	126	138	76	26	n/a
Profit/(Loss)	(53)	10	1	1	n/a

Source: FSS

The following table shows summary staff number data.

	2010	2005	2000
Total Staff	1,836	2,562	2,555
PhD level scientists	71	94	87
Non-PhD scientists	1,064	1,407	1,308
Technicians	86	200	223
Managers	296	430	489
Administrators	319	431	448

Source: FSS

Historical overview

FSS has roots going back to the 1930s. In 1991 it became an executive agency of the Home Office and experienced significant growth. FSS merged with the Metropolitan Police Forensic Science Laboratory (MPFSL) in 1996. Where previously FSS services had been free to police forces, charging was introduced in the 1990s.

In 1995 the world's first DNA database was created in the UK, and the Home Office made major investments in setting it up. This created a significant spike in demand for FSS services to populate the database in its early stages. FSS staffed up to meet this demand, and at one stage the DNA database accounted for nearly a third of FSS's workforce. According to FSS it was in effect cross-subsidising complex case work from DNA funding. When the DNA database work declined in the mid 2000s, as the database was populated, it became impossible to cross-subsidise in this way, while at the same time FSS reported that customers were reluctant to pay higher prices for complex case work. FSS senior staff take the view that this has led customers to undervalue the expertise/cost of undertaking complex case work.

FSS achieved trading fund status in 1999. In the decade following Agency status its output increased five-fold; its case-load trebled and its work force increased from approximately 350 staff to over 2,500 and revenues of £150m by 2005.

The McFarland Review of the FSS reported in 2003. It found that the FSS had been successful, was "on the whole well regarded by its stakeholders" and had "consistently met most of the operational and financial targets set by the Home Office". McFarland noted however that the market for forensic services had become increasingly competitive, partly as a result of the need for police customers to demonstrate "best value" by competing their forensic service requirements. FSS management felt constrained by the trading fund framework, which it believed hampered its ability to compete successfully in an increasingly contested market.

In 2003 the Home Office accepted the recommendations of the McFarland Report, but it was not until 2005 that it established FSS as GovCo, a wholly owned company limited by shares. This was originally envisaged as an interim step before full privatisation in the following 12-18 months. The intention had been that FSS operations would be streamlined before a trade sale or flotation, and that the contract with Government and the new company would be put in place.

In the event no further progress on privatisation was made, and FSS has remained a wholly owned Government company.

A GovCo restructuring business plan was prepared by FSS management in 2008. This would have seen a reduction in the number of labs from 7 to 4, the loss of 600 staff, and a realignment of the business away from one organised on a geographical basis, to one based on national business streams, mirroring the categories used by the police and the National Procurement Framework.

FSS sought £100m restructuring costs from the Treasury in order to set up FSS on a sound commercial footing. The Home Office and Treasury took 2 years to consider this request, and eventually the Treasury agreed to allow the Home Office to allocate up to £50m towards FSS restructuring costs. We understand that the amount requested was halved because the Treasury view was that the market for forensic services was too small to sustain the level of activity set out in FSS's restructuring business plan.

In 2010 FSS characterised the externalised forensic market as £170m, with the following market shares:

- £100m FSS
- £35m LGC
- £15-20m Cellmark
- £5m Key Forensic Services

In early 2010, with the arrival of a new Finance Director, a revised business plan was prepared on the basis of the funding available. This showed that FSS would become financially viable by 2011 on the assumption that sites were sold off, business from UK customers was sustained, and the international business developed.

However, the key assumption that the overall market in the UK would remain static at about £170m, and that FSS would achieve 50% share (down from the 60% achieved in 2010) did not eventuate. The Coalition Government reduced police budgets and forces cut back on all discretionary spending.

Although forensic services comprise only about 4% of police costs, as a discretionary area it was subject to immediate reductions. As the FSS put it “by September 2010 our market had collapsed”. FSS expects the market for externally provided forensic services to fall below £100m in the near future.

As well as making significant reductions in the number of forensic tests they commissioned, by the second half of 2010 police forces had begun to do more tests themselves. So not only was the overall spend on forensic services diminishing, but FSS was in effect hit by competition from the largest part of its customer base – police forces. As an example, the Metropolitan Police which had originally incorporated its forensic service into FSS now has a forensic staff of 1,000 with a £50m budget.

FSS also found that it was losing ‘commodity’ testing work to competitors, but retaining complex case work. The price of the commodity service had fallen significantly by 2011 because of technical/scientific improvements, and better processes. So whereas in the early 2000s a commodity DNA test was priced at about £200, the market price is about £20 in 2011. However, the cost base of the more complex case work, which require interpretative/expert input, has not reduced in this way

Revenues unexpectedly dropped by 25%, so instead of achieving break even, FSS ran at a loss. By 2011 FSS had reduced to 1,400 staff (800 of them forensic scientists) on 4 sites

On 14 December 2010 the Government announced that the annual losses being made by FSS were unsustainable and that the service would be shut by 2012. This decision was criticised in early July 2011 by the Commons Science and Technology Committee on the basis that the Home Office had failed to appreciate the impact of the closure of FSS on forensic research and development, and the ability of the private labs to absorb FSS’s workload. There was also concern about police in-sourcing to largely unaccredited labs.

Performance assessment

The Forensic Science Service (FSS) has had a significant impact on the investigation of crime by updating and introducing many forensic science techniques. The most high profile example of this is the development of forensic DNA analysis, adapting and improving Sir Alec Jeffreys' discovery so it could be used in the forensic process, ensuring it was sufficiently robust and could cope with degraded samples. The FSS has continued to update and improve DNA profiling technology ever since, maintaining its position as a world leader in this area by introducing major innovations such as the full automation of the process, low template technology (enabling a profile to be obtained from a few cells), mitochondrial DNA profiling and familial searching.

To allow the criminal justice system to make best use of DNA profiling, in 1995 the FSS developed and implemented the world's first National DNA Database, which now contains over 5 million profiles and has been fundamental to the resolution of many high profile crimes. FSS has also provided expertise and assistance to a number of other countries in the setting up their own DNA Databases.

Additionally, FSS has led the way with the application of innovative and novel techniques to assist in the re-investigation of cold cases over the last ten years. A few examples of these include allowing specific cells to be harvested from old microscope slides; male cells to be separated from female cells with great specificity; and the development and recovery of formerly un-usable fingerprints from retained items. This has led to 220 convictions in previously unsolved rapes and murders dating back more than 40 years.

FSS has developed an expert system which dramatically speeds up the process of interpreting data and dealing with complex interactions between data. FSS has not made this publicly available, for which it has been criticised on the basis that FSS is in the public sector and should share its intellectual property. However, given the competitive market for forensic services, FSS feels it would be disadvantaged if it gave away a key competitive advantage.

FSS does a limited amount of research, including developing rapid DNA testing, matching software and probabilistic fingerprint evaluation.

FSS describes how its work has developed over the past 20 years:

“The research has become more focussed on a smaller number of more impactful projects; the focus has changed from a wide range of analytical methods to a greater emphasis on DNA analysis and a greater emphasis on interpretation research. This reflects also the nature of the change in the scientific focus of forensic science over the same period: use of DNA analysis has increased markedly, with concomitant reduction in the use of other analytical and comparative methods. The increasing emphasis on interpretation research reflects the fact that DNA analysis has been based from the start on probabilistic interpretation: such methods are now being extended to other evidence types such as fingerprints. The increased focus on a smaller number of projects reflects the requirement to provide a clear return on investment for research.”

The table below gives summary publication data.

	2010	2005	2000	1995	1990
Number of publications	15	32	10	20	15
Number of citations	150	350	576	421	227

Source: FSS

Awards won for research:

- 2010 BCS & Computing UK IT Industry Awards (3^d place medallist, IT Project Team of the Year for development of DNA INSIGHT software for forensic DNA interpretation)
- 1997 International Society for Forensic Genetics Scientific Prize (awarded to Dr Colin Kimpton and the UK National

DNA Database Group in FSS for research leading to establishment of the UK National DNA database)

The FSS currently has:

- ⌚ 34 Great Britain and European patent filings
- ⌚ 37 USA filings
- ⌚ 34 filings in other territories (Australia, Canada, New Zealand, Japan and/or South Africa)

Impact of Status

The decision to part-privatise FSS in order to prepare it for full privatisation, but in a market which was too small, was a fundamental problem. Moreover, retaining FSS as a government owned company for so long placed it in an awkward halfway house between government and the private sector, with all the constraints of government ownership.

Whilst FSS remained in the public sector, and without significant restructuring, it faced several fatal constraints:

- ⌚ decision making was too slow – it took months rather than weeks or days for the Home Office and other parts of Government to make decisions. There were reviews, scrutiny after scrutiny. “Civil servants have no ability to make a commercial risk assessment, so they want coverage of everything” we were told.
- ⌚ The overhead structure of FSS was unviable:
 - too many people
 - benefits too generous – e.g. 25% employer pension contribution (now reduced to 12%, but this is high by private sector standards)
 - high redundancy costs - £40-50,000 on average, with some costs in six figures
- ⌚ Unclear objectives arising from a lack of ownership of the FSS strategy, lack of political will/appetite, and an inability to take commercial decisions.

We asked FSS about the key lessons learned in its recent history as a Government owned company. We were told:

- They had underestimated the amount of restructuring and cultural change (for customer focus) required to deliver significant efficiencies. FSS considers that this change could have been delivered had sufficient restructuring funds been forthcoming
- There was a lack of due diligence about the market with its limited customer base, and the way public sector procurement slows down winning business
- Customers did not want the broader/complex case work offer from the market – they wanted to do this themselves, and outsource only a limited amount of commodity testing
- FSS was over-optimistic about wider markets (e.g. international) – they planned on the basis that they would develop much more rapidly than they in fact did.

Case study

Atomic Weapons Establishment (AWE)

What AWE does

AWE provides and maintains the warheads for the country's nuclear deterrent, Trident. AWE's work covers the full nuclear warhead life cycle, from initial concept, assessment and design, through to component manufacture and assembly, in-service support and finally decommissioning and disposal.

Status

AWE is managed by Defence Equipment & Support (DE&S), part of the MOD, through a Government Owned Contractor Operated (GOCO) arrangement. The sites and facilities are owned by government, while the day to day management of the UK's nuclear stockpile is contracted to AWE Management Ltd (AWE ML), which is a company limited by shares with three equal shareholders – Jacobs Engineering Group, Lockheed Martin and Serco.

Each shareholder brings particular expertise to bear:

- Jacobs – large-scale programme management and engineering
- Lockheed Martin – weapons systems expertise
- Serco – business processes and outsourced operations

In practice the contract is delivered by AWE plc, which is a subsidiary of AWE ML. AWE plc employs the staff, maintains the nuclear site operating licences and discharge authorisations, and is responsible for management and operations at AWE.

MOD holds a golden share in AWE plc and monitors AWE plc operations and performance under a contract signed in 2000 which currently extends, with 3-5 year priced periods, through to 2025.

Financial

AWE receives virtually all its funding from MOD under the 25 year GOCO contract. Turnover under the contract has grown very significantly since the contract was signed:

2000	£216m
2005	£470m
2010	£900m

AWE plc and AWE ML operate under an open book basis, so that MOD as their main customer has full visibility of costs and fees. Fees from the contract are shared by the three shareholders, and MOD benefits through “share line” that is derived via a Target Cost Incentive Fee (TCIF) arrangement, the details of which are commercially sensitive. This allows the MOD to benefit from efficiencies AWE makes in operating the contract by using best practices from industry to run the facility.

AWE derives a small proportion of income (£25m) from other government departments, including the Home Office, FCO, other parts of MOD, Cabinet Office and DECC, and a very small amount of private sector income.

Historical overview

AWE was originally contractorised in 1993 at a time when it was going into a phase of manufacturing production. The joint venture of Hunting BRAE were selected to manage AWE at that time.

In 1991 AWE employed 6,700 staff, but over the next decade funding and staff numbers decreased significantly, until in 2002 there were 3,300 staff.

In 2000 the current contract was let to a consortium which currently comprises Jacobs, Lockheed Martin and Serco. At that time the contract was worth approximately £200m per annum for 10 years, and was subsequently extended to 2025 with 3-5 yearly priced periods.

In 2003 an MOD review of AWE concluded that significant investment was required to ensure that AWE retained its

capability to support the UK deterrent. There had been few major investments since the 1950s, and many of the buildings and facilities were showing their age. MOD decided to reinvest in AWE's capability, renewing infrastructure and recruiting staff.

By 2011 this programme of investment and growth had seen AWE increase staff numbers to about 5,000 following a major programme of recruitment from 2005. Several major capital investments are being made, including the completion of the Orion laser facility.

AWE has developed close enhanced links with five universities, and funds PhDs and research.

AWE still has many ex-civil servants who transferred via TUPE. Pension arrangements have changed so that although there remains a final salary scheme, employee contributions have risen significantly. AWE benchmarks the pay of staff, and now pays a generally higher salary in line with industry.

Performance assessment

AWE ML has five advisory committees supporting AWE plc which are staffed by independent experts, including MOD, and provide oversight and advice on specific aspects – science and engineering, programme management, project delivery, health and safety and audit.

AWE receives its management fee from the MOD in two areas:

- Payment of fees against the delivery of specific strategic and sub-strategic milestones
- Payment of fees against the compliance with the Systems and Requirement Document, which covers standards which must be met on issues such as safety, site operation, etc.

All Fees are subject to the above incentivised regime

AWE told us that they had delivered on virtually all their milestones. MOD conducts regular reviews on the contract,

and major projects are benchmarked against other major capital/operational programmes.

AWE plc has a good track record of delivering major capital projects. For example, the Orion laser facility was delivered to time and on budget, benefiting from Jacobs' experience of running major capital programmes.

MOD, AWE ML and AWE plc work closely in partnership together, as evidenced by the production of material to support inputs into the recent Strategy Defence and Security Review (SDSR) and joint working on major capital projects. This partnership working arrangement is seen as important. "This is a long term business for national capability – we are definitely not a 'raid it and leave' type of business."

Impact of current status

AWE regularly seconds staff into Government departments - currently there are about 20 mainly junior secondees.

Lessons learned through the contractorisation programme include:

- Clarity and unity in the customer base is key as well as good partnership working between MoD/AWE ML/AWE plc to make the GOCO successful
- It is important with such a long life cycle product as nuclear warheads that mission is clearly stated so that there is a clear technical challenge, timescales and deadlines so that staff can see how they add value. "You have to make it real, or good people won't stay"
- Capability in this specialised field must be maintained to ensure Government requirements can be met.
- Reach back into the parent organisations is key to bringing commercial expertise to the nuclear weapons business.

Case study

National Nuclear Laboratory (NNL)

What NNL does

The National Nuclear Laboratory (NNL) is a nuclear technology service provider serving the whole nuclear industry. It aims to provide authoritative and independent advice on nuclear issues.

NNL's services cover the complete nuclear fuel cycle from fuel manufacture and power generation, through to reprocessing, waste treatment and disposal. Sectors include defence, new nuclear build and Homeland Security. NNL provides these services supported by a range of links with international research organisations, academia and other national laboratories.

Status

NNL is a government GOCO sponsored by the Department for Energy and Climate Change (DECC). It is managed by a consortium made up of Serco, Battelle and the University of Manchester and operates the Central Laboratory at Sellafield amongst other facilities.

The GOCO arrangement at NNL is an unusual one in that the contractor involvement takes the form of secondment of key senior managers into NNL, for which the contractor consortium receives a base fee, and an incentive fee based on the extent to which NNL outperforms the business plan agreed at the time NNL was established. This contrasts with the two other GOCOs (AWE and NPL) where all management and staff are normally employed by a vehicle wholly owned by the contractor.

DECC is NNL's sponsoring department, with oversight from the Shareholder Executive. As well as the NNL Board, which includes non-executive directors, the GOCO consortium operates a Contract Performance Review Board to oversee the secondees which is constituted from senior representatives of Serco, Battelle and the University of Manchester. This

results in dual but separate governance lines for the NNL Executive.

Managing NNL as a 'GOCO Lite' in this way is somewhat cumbersome, and it is in effect still a part of government, with the result that there is significant DECC and ShEx involvement in decisions about issues such as pay and capital investment. 'GOCO Lite' appears to be a compromise between private sector, GOCO and Government ownership options. It also results in less opportunity for incentivising the parent organisations than with the standard GOCO model. It may be that NNL's current status is just an interim step before the Government is in a position to take a longer term decision over its future.

Financial

Sellafield is by far the largest of NNL's customers, accounting for about 50% of its income.

Its other main customers include NDA, EdF Energy, Westinghouse (Springfields Fuel Ltd), the Ministry of Defence and various other customers in the UK, USA, Japan and Europe.

One of the objectives placed on NNL by DECC is that it operate on a sound commercial footing. This model for a national nuclear laboratory is different from those in other countries in that NNL is expected to operate commercially and compete for all its work. In order to maintain the UK's strategic nuclear capability the NNL does invest £1m per annum in its own R&D programme and generally realises gearing of five times this investment from third party sources.

In 2010/11 NNL's turnover was £78.3m, 50% of which was drawn from the Sellafield under a framework contract which is single source in view of NNL's unique capabilities. Funding from Sellafield and other existing customers has been relatively stable, but there is no guarantee that this will continue. Customers decide on the work programme they will fund; thus NNL must balance the role of maintaining strategic capability for the UK civil nuclear industry and short-term customer funded work.

The GOCO contracting consortium receives a base fee for the cost of secondees, plus an incentive fee for outperforming the business plan drawn up in 2009.

The table below gives summary financial data.

£m	2010	2008	2006
Turnover	78	75	77
Operating costs	68	68	70
Profit/(Loss)	9	7	7

Source: NNL

Staff number summary data is given in the table below.

2010	2008	2006	2004	2000
648	683	648	789	934

Source: NNL

Historical overview

NNL's roots date back to 1996 when a number of British Nuclear Fuel's (BNFL) research and development (R&D) departments were integrated into a single provider. In 2003 this R&D department was relaunched as Nuclear Science and Technology Services (NSTS).

Two years later, in line with the government's wider restructuring of the nuclear industry, BNFL was broken up. Its assets were either sold or transferred to the NDA. NSTS was relaunched in 2005 as a subsidiary company of BNFL, renamed Nexia Solutions Limited.

A review of the future of nuclear R&D was conducted by DTI, and a range of options was considered. DTI took the view that the Nexia Solutions' R&D capability was a strategic asset, and that a sale of the company would not be appropriate.

There had been discussion of splitting Nexia into an Assetco (which would own the assets) and an Opco (which would

employ the staff and manage the business), but it was concluded that it was important for the quality of research and services that people and assets should not be separated. International models were also considered, and the final outcome was influenced by the US experience of GOCOs.

In 2006 the intention to set up NNL was announced, and a competition was launched in 2008 based on the “GOCO Lite” model in which key individuals of the management team are seconded into the company from members of the successful consortium, with no transferable management entity created as is usually the case with other GOCOs.

In 2009 the company became a wholly owned subsidiary of NNL Holdings Ltd, owned by DECC, and a consortium of Serco, Battelle and the University of Manchester was selected to second in senior staff.

NNL includes the Central Laboratory which had only been partially commissioned because of policy and funding changes during the formation of the NDA. The NNL GOCO consortium has made the case for the plutonium active parts of the Laboratory to be commissioned based on a fully economic business case that would demonstrate sufficient value to Government to justify making the investment.

NNL has had to complete a transformation from in-house R&D support work for BNFL to one that is more commercial, in addition as all work across the NDA estate has become “projectised” the NNL has had to respond with becoming more project focused.

We have heard some criticism of DECC’s strategy in not providing core funding for NNL to support policy objectives and ensure critical nuclear capability is maintained. It has been pointed out that setting up NNL so that it simply “feeds off the nuclear supply chain” cannot provide the “mission support” the government needs in this area. Sellafield’s dominant role as NNL’s 50% customer means that NNL has had to adopt a “technical services orientation”, and is geared, managed and financed primarily for this narrow, short-term focus. Support which has been provided by NNL outside

its contract services remit has been self-funded by NNL: e.g. advice on the implications of the Fukushima incident in Japan.

Those who see a policy/strategy vacuum in DECC on nuclear issues point to the need to restructure (and fund) NNL so that it meets “the national mission needs of the UK” rather than just of the NDA (which is only concerned with one part of the nuclear supply chain – waste disposal, decommissioning and clean up).

The following areas which were highlighted as requiring urgent input from NNL:

- ⌚ disposal of the plutonium waste stockpile
- ⌚ evaluating new reactor designs and fuel cycle technologies
- ⌚ assessing the safety of next generation reactors
- ⌚ effective nuclear waste disposal

Performance assessment

NNL uses a range of non-financial KPIs covering safety, health and the environment.

NNL conducts regular customer surveys. The initial feedback was that NNL was not customer friendly, that responsiveness needed to be improved and that prices were too high. This has since improved.

The NNL Chief Scientist is responsible for scientific and technical assurance. There is also an external advisory board which advises on the NNL funded (£1m p.a.) research programme.

The key financial performance measures used by NNL are trading profit and underlying cash flow. Under the GOCO arrangement, the SBM consortium receives an incentive fee for exceeding the business plan agreed at the time NNL was set up.

Data on publications is given in the table below.

Publications

Year	Peer-reviewed Journal Publications	Conference Papers
2009	10	18
2010	19	49

NNL has invested in science learning, training and general support for young people through partnerships with: Smallpiece Trust, UK Youth, Engineering Development Trust and Arkwright Scholarships.

NNL has won the following awards:

- Cumbria CN Group Business Award for Innovation in October 2010 (HiRad project).
- Two IChemE Awards including Young Engineer of Year for the inventor, Dr Steve Stanley for Rad Ball and Excellence in Health and Safety 2008.
- Five consecutive RoSPA Research and Development Sector Awards.

Three patents were granted in 2010/11 and three patents are pending.

Case study

National Physical Laboratory (NPL)

Summary

NPL is operating successfully as a Government Owned Contractor Operated (GOCO) facility managed by Serco. NPL receives a comparatively high proportion of guaranteed Government core funding (over 60% of turnover), but has been successful in broadening its customer base, and increasing non-Government sources of revenue since GOCO status (16% p.a. growth since 2004). Turnover has grown steady in recent years, and NPL generates a surplus; any profit above 5% is shared equally between BIS and Serco.

Operating risks, such as restructuring and pension costs, have been transferred to Serco.

The GOCO contract has resulted in greater operating efficiency, while peer reviewed research papers have doubled since GOCO status, and citations by nearly 80% in the last five years. BIS and other NPL customers appear to be generally satisfied with the quality of service they are receiving.

What NPL does

NPL develops and maintains the UK's primary measurement standards, supporting an infrastructure of traceable measurement throughout the UK and the world to ensure accuracy and consistency. NPL provides companies with access to support and technical expertise, providing absolute measurement confidence required to realise competitive advantage from new materials, techniques and technologies.

NPL is the UK's National Measurement Institute and the principal organisation within the National Measurement System (NMS), which also includes the following Designated Institutes:

- The National Measurement Office (NMO)
- LGC Ltd

: TUV NEL Ltd (the National Engineering Laboratory)

Status

NPL has been operated by Serco - via its wholly owned subsidiary NPL Management Ltd - as a GOCO since 1995. NPL Management Ltd operates on an open book accounting basis. Profits above 5% are shared equally between BIS and Serco. In practice, BIS funded research breaks even; with most of the profit made on the other sources of revenue. All NPL staff are employed by NPL Management Ltd except for the Director of NPL who is a Serco employee.

BIS has stipulated that for continuity reasons NPL Management Ltd must remain separate and separable from Serco. This has practical ramifications (and costs), such as that NPL operates on an Oracle ERP platform, whereas Serco runs SAP.

NPL is managed by BIS via the National Measurement Office (NMO), an Executive Agency which is part of the Department. There has been significant staff turnover within BIS, so it appears to NPL that there remains little detailed knowledge of the laboratory within the department. NPL noted, for instance, that Measurement did not feature in the 2010 Innovation Report. NPL perceives that the potential benefits of NPL to government are not fully exploited (NPL is BIS's largest directly-owned science asset).

Financial

NPL receives a significant proportion of its turnover as guaranteed core funding from BIS in the form of a "minimum research commitment (MRC)". The current value of the MRC is approximately £48m per annum, subject to an annual efficiency reduction of 1%. Government funding in the initial years of the operation of NPL as a GOCO was above the MRC, but in recent years BIS funding has been reduced near to the level of the MRC.

Under the GOCO contract, NPL Management Ltd, a wholly owned subsidiary of Serco, bears any restructuring costs,

and associated costs such as pension contributions, which have been £2m per annum more than Serco envisaged when it most recently re-bid for the GOCO contract (in 2004).

Third party revenues comprised approximately £24m in the past year, and have grown at about 16% annually since 2004. Funding comes in roughly equal amounts from the EU, other government departments and industry (over 2,000 companies p.a.).

The tables below show key financial and staff data.

Turnover

£m	2010	2004/5	1999/00
Turnover	71	58	48
Operating costs	67	56	45
Profit/surplus	4	2	3

Source: NPL

	2010	2005
Staff numbers	611	596

Source: NPL

Historical overview (1990 – 2010)

NPL was founded in 1900 by the Royal Society with a mission to transfer technology and knowledge to industry. It has a string of major discoveries to its credit, including radar, computing, packet switching, bouncing bombs and the atomic clock.

In 1995 the decision was taken to run NPL on a Government Owned Contractor Operated (GOCO) basis. A competition was held for the management of the laboratory and Serco was selected in 1995 for a 5 year contract, which was extended through to 2004, when it was re-competed. Serco won a further 10 year contract which runs through to 2014. Serco estimates that the 10 year contract is worth approximately £600m. NPL staff numbers, at about 600, have been relatively constant since the GOCO arrangement was signed.

We asked NPL how the nature of their research has changed over the past 20 years. They indicated the main changes as follows:

- NPL's work has become more applied, so that instead of stopping at the development of a new measurement standard, embodied in the specification of a measurement technique or generic performance of a measuring instrument, NPL is now heavily involved in industry-funded work to apply that measurement know-how to the solution of specific industrial problems. 20 years ago this was already happening in several parts of NPL, but has become the norm. Before 1970 NPL had a wider role in developing new technologies in areas such as aeronautics, ship design, radar and computing, but this narrowed in the 1970s to a focus on measurement-related pre-competitive research.
- NPL's NMS work has become more tightly controlled, in that the approach to formulating new projects, and the analysis and consultation required to build a convincing business case, has become more systematic.
- Collaboration in R&D with universities and business, and with sister National Measurement Institutes in other countries, has further increased, driven both by the availability of grant funding from UK government and the EC, and as a means of managing the demands on NPL to provide measurement support to new areas of technology.

Performance assessment

When the GOCO was established there had been concerns about the risk of "asset stripping", and that the quality of science would diminish. Consequently a separate body, the Science Advisory Group for the NPL, comprising members of the Royal Society and Royal Academy of Engineering was established to monitor research quality, reporting to the Secretary of State.

In addition, NPL has a part-time Chief Scientific Advisor from the Royal Society who acts as NPL's "science conscience",

and provides independent reviews of NPL's research.

Peer reviewed papers and citation numbers have doubled in the last 5 years, and NPL also takes part in international benchmarking.

NMO formally reviews the NPL GOCO contract annually. We were not able to see this for commercial confidentiality reasons. We were, however, told by NPL about the outline results of a recent Insight survey carried out by an independent company with the NMO's programme manager.

Customer feedback is actively sought by NPL for all non-NMO customers (approximately 2,100 per annum). NPL's overall "Satisfaction Index" (based on achieving 4/5 or 5/5) is currently running at 86% (just over the 85% internal target). This is usually positive, although there are occasional customer concerns about value for money.

NMO and NPL have also commissioned independent economists to assess NPL's wider economic impact. This was based on three studies:

- work on the value of the National Measurement System indicated a value of approximately £410m from an additional £6m spent on NMS programmes
- work with NPL customers showing that NPL input added about £710m in one year to their profitability
- individual case studies indicating cost/benefit ratios of between 1:10 and 1:40

According to Serco, since 2004 status NPL has more than doubled its peer review papers and an 88% increase in citations. NPL filed 7 patents in 2009 (the latest data available), 5 patents were granted and 15 patents abandoned.

Argento Diagnostics Ltd is in the process of being spun off from NPL research.

Impact of current status

NPL told us that one of the key impacts of the GOCO has been on organisational culture. Leadership, empowerment of individuals, and the Serco values have helped ensure that NPL's scientists are keen to make a difference, and passionate about what they do.

Serco also described a further strength of the GOCO arrangement in that it allows "reach back" into Serco experience and expertise.

Serco highlighted the following advantages of the GOCO contract for BIS:

- 8% increase in staff utilisation, and better staff retention
- 50% reduction in NPL overheads
- £17m cash released to customer via sale and leaseback of assets
- £50m of capital investment in NPL to take place over the 2004-2014 contract period
- efficiency savings delivered to BIS of £22.5m, with 16% growth in non NMO revenues
- enhanced strategic research programmes (£2m per annum)
- doubling of peer reviewed papers, and 116% increase in citations

Case study

Building Research Establishment

What BRE does

Through its trading companies, BRE provides a broad range of consultancy, testing, certification, commissioned research and training services covering all aspects of the built environment and associated industries.

Status

BRE Trust is a company limited by guarantee and a registered charity. It has three wholly owned trading subsidiaries: BRE, BRE Global and FBE (Foundation for the Built Environment) Management Ltd., which together comprise BRE Group. All the main activities take place in the subsidiary companies, with the Trust providing oversight and strategic direction.

The individual operating companies do not receive core funding from government, but sustain their activities by competing in the market for contract R&D and testing activities. All profits (about £2m per annum in recent years) from the operating subsidiaries are covenanted to the BRE Trust, which uses these surpluses to fund a programme of research. It awards scholarships and bursaries to PhD and MSc students and provides financial support for the Chairs held by the Directors of the Centres that together form the 'BRE-Universities Partnership'.

Financial

BRE Group receives no core or guaranteed funding. Revenues stem from testing and audit, other contract work and competitive research funding. 60% of revenue comes from private sector clients while central government contracts make up 24%. The Department for Energy and Climate Change (DECC) and the Department for Communities and Local Government (DCLG) are BRE Group's biggest clients. Other revenue comes from Research Councils, the Technology Strategy Board and the European Commission.

Although BRE's profit and revenue has suffered significant dips since privatisation, recent figures show growth. Turnover in 2010 was £45m, £4m higher than in 1995. The group has moved from making a loss of £700k in 1995 to a profit of £5.6m 2010.

The tables below give details of turnover and revenue sources.

BRE Group

£m	2010	2005	2000	1995
Turnover	45	36	37	41
Operating Costs	43	37	34	41
Profit/(Loss)	6	1	3	-1

Source: BRE

A breakdown of BRE's revenue shows a slow but successful diversification away from central government. In its place there has been an increase in private sector contracts, which, in the last five years alone, has increased by 50%.

The table below shows staff numbers and breakdowns.

Staff

Number of Staff in:	Scientists w/phd	Scientists w/out phd	Technicians	Managers	Admin	Total
2010	170	205	80	70	15	575
2005	160	245	90	65	18	605
2000	150	205	90	60	25	545
1995	140	200	95	60	20	525

Source: BRE

Historical Overview

The Building Research Station, as it was originally known, was established in 1921 as a Government-funded laboratory.

In 1990, it operated as an Executive Agency of the Department for Environment, Transport and the Regions, before it was privatised as a company limited by guarantee in 1997. In order to retain the authority and independence that BRE had developed while publicly funded, a new body, the Foundation for the Built Environment (FBE), was formed to 'own' BRE. Members of the Foundation came from all aspects of the industries BRE worked with, so avoiding BRE being driven in any one particular direction by commercial pressures.

In 2005, the Foundation was renamed the BRE Trust. It is a registered charity, with a mission to support built environment research for the public benefit.

In 2006 BRE launched the Innovation Park, in Watford, a showcase of the future needs and opportunities in building construction. Parks have also been built in Scotland and Wales and a further two are planned for Beijing and Rio. In the last three years the parks have promoted sustainable building, introduced new customer to BRE s and brought in an estimated £10m.

In recent years the mix of work has changed gradually. Testing and evaluation work is declining in the face of greater competition from other providers, including universities. Corporate sustainability is a key growth area, for instance the work BRE has completed with Marks & Spencer on their sustainable construction manual. There has been an explicit drive to move to higher margin work, such as consultancy.

In a sector prone to business cycle fluctuations BRE struggled to manage its debtors and made significant losses 2-3 years ago. BRE experienced something of a "wake up call" when it had to make some large write-offs on contracts done at risk for government departments without contractual cover. This was because the previous informal structures had meant that senior staff took on work at risk without going through a disciplined acceptance process.

These difficulties caused BRE to re-evaluate its strategy: there were two waves of redundancies (primarily of support staff); the old public sector pension scheme was closed to

new members and activities were refocused towards its clients: BRE focused away from less profitable areas such as testing and evaluation towards more profitable areas such as environmental assessment, sustainability and training services.

BRE's financial position has improved since 2008: turnover was higher in 2010 than it was before privatisation and the company has moved into profit.

Culturally, BRE staff have had to sharpen up their commercial understanding and quality control, becoming much more client focused, which has been a hard lesson for some scientists and researchers to learn. "Time sheet culture" was also prevalent, leading to instances where staff undertook research which came into them, even though others were better qualified to bid/do the work. The Chief Executive has recently mounted a strategic exercise to determine BRE's strategy as a research-based organisation.

Performance assessment

The BRE Trustees provide challenge on the subsidiary companies' strategy and financial performance, and have instigated a more rigour planning process.

The annual number of BRE publications has doubled over the last five years. This is a direct consequence of the introduction of BRE publications programme in 2009, a £600k project aimed to coordinate publishing across the whole BRE group. A greater emphasis on publications is seen by BRE as an effective way to raise its profile in the industry. However, the number of publications in refereed journals remains low, reflecting the fact that few researchers at BRE are working on academic research. BRE has registered 25 patents since privatisation.

Impact of status

We asked BRE what advantages/disadvantages they saw in the privatisation of BRE as a company limited by guarantee. They gave the advantages and disadvantages set out below:

Advantages

- ⌚ No limits on the scope of products/services offered. For example, BRE was able to expand into training and innovation parks and established BRE Ventures (exploitation of intellectual property).
- ⌚ The increased amount of money reinvested into its 'University Centres of Excellence' programme has expanded knowledge of BRE and its values and provided a new source of staff
- ⌚ Opportunities to form strategic partnerships with others to deliver better products, services and research
- ⌚ Not-for profit and company limited by guarantee status:
 - Tax advantages
 - The redirection of BRE's surpluses into important research prevents its activities from being purely market driven. This allows the retention of some of its capabilities as a national asset
 - As its trustees include representatives from throughout the Built Environment industry, BRE is able to act on behalf of the industry and, in theory, in the national interest.

Disadvantages

- ⌚ Lack of capital – it is a challenge to get capex investment to maintain strategically important facilities. Commercial contracts often do not have the need for these unique but expensive facilities
- ⌚ Relatively high overheads compared with rival smaller organisations.
- ⌚ More short-term contracts:
 - ⌚ This does not provide the financial security of long-term contracts. There is potential, as happened in 2008, for various contracts to end at once and not be replaced
 - ⌚ Difficult to attract and maintain the best staff who want long-term research projects

- Reliance on profitable sectors of research inhibits BRE's ability to act in the – often unprofitable - interests of UK. However, these problems are somewhat diminished by BRE Trust's research funding

Case study

Natural Resources Institute (NRI)

What NRI does

The Natural Resources Institute (NRI) undertakes research, consultancy, and teaching in support of sustainable development, economic growth and poverty reduction. Most of NRI's activities focus on the harnessing of natural and human capital for the benefit of developing countries, although NRI expertise has proved to be of growing relevance to industrialised nations.

NRI's work is grouped under four themes:

- making agriculture work for the poor
- food and trade
- change and vulnerability
- capacity strengthening

NRI focuses on the practical application of science rather than "high level research".

NRI reports that customer perceptions of them are that they can be relied on to deliver, and that they are regarded as excellent technically. However, NRI could perhaps do more to promote its expertise and achievements.

Status

NRI is now part of the University of Greenwich, a company limited by guarantee.

Financial

Before privatisation, NRI received 90% of its revenues as core funding from government. Since privatisation it has had no guaranteed funding, and the proportion of ODA/DFID income has fallen steadily since privatisation, while at the same time overall revenues have until recently fallen very significantly.

Today NRI derives about 30% of its revenues from DFID contracts with 20% from charitable foundations. It also

receives teaching income, with about 50 PhD students currently being supervised.

The University of Greenwich benefits, through additional HEFCE grant funding, from NRI's participation in the national Research Assessment Exercise.

Historical overview (1990 – 2010)

In 1988 the Land Resources Development Centre and the Tropical Development and Research Institute merged and relocated to former naval barracks at Chatham. In 1990 the new institute was renamed the Natural Resources Institute (NRI), which became a Next Steps Agency in 1991. At that time it received 90% core funding from the then Overseas Development Administration (ODA), and the rest from other public sector organisations.

In 1992 ODA began to consider NRI's future status, and concluded that it wished to privatise NRI in the process of moving to a customer/contractor relationship with the Institute. In the run up to privatisation, ODA reduced the size of NRI from about 540 staff down to 350 by means of voluntary redundancy.

A competition was launched, and two bidders – Serco and the University of Greenwich – were shortlisted. The Greenwich won the competition in 1996, and NRI became a part of the University. At that time 70% of NRI's work was from the Department for International Development (DFID – which succeeded the ODA).

NRI was able to take part in Greenwich's Research Assessment Exercise (RAE), and scored 4 in Agriculture, and 3B in Food Science, with the consequence that £1.6m of additional funding flowed to Greenwich from the Higher Education Funding Council for England (HEFCE).

2001 was a crisis year for NRI. It made an operating loss which had not been foreseen. A new Director and senior team were appointed, and an urgent restructuring exercise followed to bring NRI's costs in line with its projected income. A large

number of staff were shed at that stage, to leave headcount at 100. At the same time, NRI did less well overall in the 2001 RAE, and there was a significant drop in contract income, some of it stemming from a change in government policy in DFID towards buying non-UK goods and services for overseas work. As a result, further drastic action had to be taken, and headcount halved again to reach 50.

There is little doubt that NRI would not have survived its 2001 crisis without the financial and management support provided by the University. By 2008 the downward trend had been halted, and NRI began to grow. NRI had needed to become much better at winning business, and won some significant contracts, including with the Gates Foundation, as a consequence. There was also a better result in the RAE.

Today NRI has grown slightly so that there are about 65 scientists/academics. We understand that publications per-staff member have increased; and NRI continues to make significant impacts in the developing world. For instance, in 2008 a technique developed by NRI to fight the tsetse fly was adopted in countries across Africa and was named as the eight best UK university discoveries of the past 60 years. Moreover, the 80 postgraduates NRI has trained since 2001, drawn mainly from developing countries, have since gone back to their home countries and applied their knowledge and skills within their local communities.

Impact of status

The way in which NRI was privatised is felt by some to have had an adverse impact on NRI's future. When NRI was privatised, ODA had decided to separate out the business development and programme management elements of NRI into a separate vehicle, which became NRI International (NRIL). Those who are critical of this move point to the following problems which this created:

- it stripped NRI of its business development capability at a time when it became totally dependent on winning contract income for its survival

- it created tensions between NRI and NRIL because NRI had to bid to NRIL for all ODA/DFID funded programmes, which NRIL managers then programme managed
- NRIL often preferred to let contracts to freelance staff or niche companies rather than to use NRI because this was cheaper

We asked a senior member of staff at NRI about the lessons learned from the privatisation process, and the following were listed:

- it would have been better if NRI had retained at least some core funding to balance with the funding it receives by competing in the market
- without core funding, the risk is that NRI becomes simply a service delivery organisation - "having to bid for everything is a relatively inefficient way of doing research because of the amount of time taken to win the work rather than to do it."

Case study

Transport Research Laboratory (TRL)

What TRL does

TRL works with organisations from the public and private sectors on all aspects of transportation: safety; vehicles; environment; sustainability; infrastructure; software; certification; and a range of related niche specialisms. TRL competes for its work, including against engineering consultants and universities.

TRL has a strong brand, but it is aware of the need to maintain its differentiation by generating knowledge as well as applying existing knowledge.

To this end, it has established the TRL Academy which is affiliated to the Open University, supervises 10-15 PhD students, operates the TRL Academy Fellowship and hosts the Transport Research Foundation (TRF) Fellowship, and directs internally and externally (research councils, EU) funded R&D programmes. Staff are also able to charge "science time" for non-project scientific activities such as writing papers or attending conferences.

Status

TRL is a fully independent private company. TRL is wholly owned by the Transport Research Foundation (TRF), a non-profit-distributing company limited by guarantee, enabling profits made by TRL to be passed to TRF and re-invested in scientific research. TRF comprises over 80 sector members from the transport industry.

Financial

TRL receives income from UK public sector bodies (about 60% in 2011) and the rest from the private sector and international customers. Most work is won under competitive tenders.

TRL reports that its turnover has roughly remained constant in real terms over the past 10 years, while the number of staff has fallen. It has made a profit in each year.

In 01/02 turnover was £33m with 530 staff, in 09/10 it was £42m with 400 staff. 2011 accounts are still in preparation, but it is estimated that turnover will be lower than in 09/10, and staff numbers approximately 390. Recent turnover has been adversely impacted by reductions in public sector spending.

TRL has a pension scheme deficit reported as £20m on FRS17 basis in 2010.

Historical overview (1990 – 2010)

Originally established in 1933 by the UK Government as the Road Research Laboratory (RRL) and later the Transport and Road Research Laboratory (TRRL), TRL became an Agency of the UK Department for Transport in 1992 and changed its name to Transport Research Laboratory (TRL).

TRL was privatised in 1996 and at that time around 90% of TRL's revenues came from the UK Government. There was a tapering mechanism so that guaranteed Government income fell to zero over four years and TRL now has no guaranteed government core funding. With recent spending cuts, TRL has seen a significant reduction in the size of the public sector market, and this has been reflected in a reduction in TRL's overall revenues in 2010/11 compared to 2009/10.

TRL reports that the nature of UK government commissioned work has changed significantly since privatisation. There are now few multi year projects, and overall contract size has reduced significantly. TRL's work for government is now much less basic-research focused and more applied/ implementation focused. Contracts are shorter and smaller than they used to be, and always competed. Also, TRL works much more in partnership with the broader supply chain, for example engineering consultancies and systems suppliers, to deliver innovative solutions to the clients.

One of TRL's key challenges has been to adapt to sudden fluctuations in Government funding, including the way it uses key assets. For example, the impact sled test rig which simulates car crashes was originally established to undertake

research, but now is used also as a certification rig to test product (e.g. child seats) conformance with standards.

TRL has pursued a strategy of diversification away from its UK Government clients. The focus has been on international clients (Europe, Middle East and Africa) and the private sector. There has also been an expansion into the rail sector, and into non-transport areas (such as security fencing and sustainable construction) which build on TRL expertise.

TRL remains unionised and has an Employee Council with a good working relationship with management.

Performance assessment

TRL still employs many staff who are recognised as world experts, and sit on international advisory/standards committees.

Customer feedback is regularly gathered, using both internal and external means, and feedback is considered and recommendations acted on. Feedback has generally been positive, with repeat business underlying satisfaction with TRL's services. TRL's expertise is valued by customers, and they are ranked well in relation to their competitors.

Last year 130 articles were published, of which about 25 were in refereed journals. TRL is also able to point to wider societal/economic benefits from its work, including the reduction in road fatalities, and congestion scheme success, to give two examples.

Impact of current status

The independent structure of TRF and TRL gives the opportunity for the company to work for a wide range of clients with a broad range of services. It has allowed TRL to diversify its customer base, work with a range of partners and maintain a strong reputation for high quality and independent advice and services.

Before privatisation there was more scope for scientists to do longer-term research around the government requirements.

Research needs are now much more closely defined so there is less scope for more speculative research..

At privatisation, TRL devised a final salary pension scheme along the lines of the previous civil service arrangement. Market conditions have led to a significant pension deficit, which it is planned to pay off over a number of years.

Since privatisation there have been changes in culture and operating practices. For example, it proved necessary to remove the old civil service flexitime system, which had rigid rules about entitlement, but which only applied to staff who had previously been civil servants, and replace it with a consistent policy of flexible working managed at the local level rather than through a set of rigid rules.

TRL commented that although they are not a mutual, staff have a strong sense of "ownership" and identification with the values and activities of the company.

Case study

LGC (Formerly the Laboratory of the Government Chemist) Case Study

Summary

LGC was privatised in 1996. It has thrived ever since.

After an initial period of consolidation, process and culture change, LGC has seen its revenues and profitability increase dramatically since privatisation, growing turnover by a factor of 800%, with staff numbers rising from 270 to over 1,400. LGC's customer base has grown substantially in that period, from dependence on a small number of UK Government Departments to a customer base of over 10,000, a high proportion in the private sector and outside the UK.

The good quality of LGC's service offerings is demonstrated by the strength of the brand the company has developed, which has underpinned its impressive growth. Our own discussions with BIS indicate that a major UK Government client rates LGC's performance highly.

Following a transformation programme, LGC adopted a very successful strategy of expansion through acquisition and organic growth in areas which it identified as having high potential. Access to shareholder capital, and absence of the constraints of Government ownership, have been important factors in LGC's success. LGC has continued to perform the role of the statutory Government Chemist under contract to BIS.

Lessons learned from LGC's successful privatisation include:

- The early years will be tough, as management gets a grip on operating processes, and a more commercial culture is developed
- It is important for a research laboratory to continue to invest its own funds on R&D in areas with high growth potential

- : Access to shareholder and bank capital enabled the company successfully to implement its strategy and business plans
- : Wide employee shareholding has been recognised as an important driver in the company's successful growth.

What LGC does

LGC provides laboratory services, measurement standards, reference materials and proficiency testing services in the UK and internationally. The company is the UK's designated National Measurement Institute for chemical and biochemical measurement, the National Reference Laboratory for a range of key areas, and is also the host organisation for the UK's Government Chemist function.

LGC provides services and products in addition to internally and externally supported research. The type of work done has not changed significantly since privatisation, and remains focussed on measurement and metrology. The breadth of research has expanded to encompass projects on health, security and environment sectors, as well as a significant international dimension.

Status

LGC is a privately owned company limited by shares. Bridgepoint, a major international private equity group has a controlling shareholding.

Financial

At privatisation virtually all revenues were from the public sector, including DTI, HMRC and MAFF. In the three years after privatisation, core funding was provided by Government. There is no longer any core funding from Government.

LGC now has over 10,000 customers globally, most in the private sector. LGC provides BIS with the statutory Government Chemist role under contract.

The tables below give summary turnover and staff number information.

Turnover

£m	2010	2005	2000	1995	1990
Turnover	124	60	23	15	12
Operating Costs	110	55	22	15	12
Profit/(Loss)	14	6	1	0.1	0.2

Source: LGC

Staff table

	2010	2005	2000	1995	1990
Total Staff	1332	722	405	290	353
Scientists	949	Not available	Not available	216	271
Non-scientists	383	Not available	Not available	74	82

Source: LGC

Historical overview

The LGC's roots go back to 1842. In 1991 it was established as a Next Steps Agency in the Department of Trade and Industry, having moved to Teddington in 1988 where it is still headquartered. At that time its focus was on precision measurement for a wide range of Government Departments, including DTI, MAFF, HMRC and DOE and some organisations in the wider public sector.

By 1996 it employed some 270 staff, with a turnover of about £15m. In 1994 the Government decided to privatise LGC to enable it to diversify its revenues and capabilities without the constraints of being part of a Government Department. A sale process was begun, but it stalled. A Management Buy Out was then developed led by the CEO, with involvement of senior LGC management and staff and with support from 3i and the Royal Society of Chemistry. This bid was successful. LGC was established as a company limited by shares in 1996.

At the time of privatisation DTI guaranteed about 40% of LGC's revenues in recognition of its national role as the Government Chemist. This core funding was guaranteed for three years. In 1996 LGC was not making a profit, and in spite of the DTI core funding it was in a precarious position, with more accommodation than it needed. The four years to 2000 saw turnover grow to £23m, and a small acquisition, but LGC was finding it challenging to continue growing. Moreover some key contracts had been lost on price, for example HMRC forensic work was lost to the Forensic Science Service. At this time the Royal Society of Chemistry (RSC) withdrew. The RSC had been involved from the start in order to assure the quality of the science, which it had audited. Once it had seen sufficient improvement the RSC concluded that there was no further need for its involvement. This left the company with a 50/50 shareholding between 3i and management/staff.

LGC grew strongly in the early part of the decade, and by 2005 turnover had more than doubled to £60m with 722 staff. In 2004 3i sold their stake to LGV, with management/staff retaining about 30% of the share capital. In 2010 Bridgepoint acquired 82.5% of LGC equity. At that time LGC had an enterprise value of £257m, on a turnover of £124m, profit of £13m and EBITDA of £21m.

LGC's turnover rose significantly following privatisation, growing by nearly 800% to £124m in 2010, an increase of 80% in the revenue per employee since privatisation. Profitability grew slowly at first, with low margins in the early years, and £1m profit on £23m turnover in 2000, £6m on £60m in 2005 and £14m on £124m turnover in 2010. Profitable growth has been achieved through a strategy of expansion through acquisition and organic growth. LGC has invested in areas with potentially broad commercial value, and leveraged the capital of its shareholders to make small, strategic acquisitions to bolster capability. LGC's growth has been helped by increased levels of Government and private sector outsourcing, an increasing regulatory regime and concerns for safety and security.

LGC's profitable growth became possible as it developed into a highly commercial organisation, with a strong brand and core of scientific excellence. In 2003 LGC expanded outside the UK through the acquisition of a German company, and it has continued its expansion into Europe since then. LGC remains the UK's designated National Measurement Institute for chemical and biochemical analysis, and provides the UK Government Chemist, a statutory role, under contract with BIS.

Underpinning LGC's successful privatisation was a major culture and organisational transformation programme. The Pentagon programme was launched in the early years following privatisation with the objective of transforming LGC culturally and operationally in five key areas:

- Brand development (a change to LGC)
- Process improvement
- Customer focus
- Science
- People

A significant investment was made in the programme. Although implemented over a decade ago, we were told that the results and cultural ethos instilled by Pentagon endure today. The Process and Operational Efficiency Team (POET), established as part of Pentagon, remains in operation as a prized corporate knowledge base on Lean work practices, actively supporting delivery teams to leverage maximum value for the business and for LGC's customers

The level of shareholder involvement has varied. 3i were comparatively non-interventionist, while LGV and Bridgepoint have been more actively involved in the company's strategy and management. Management report that Board members, especially non-executives, have provided insight on the business and made useful introductions.

The UK Government is able to outsource some sensitive/critical national functions to LGC under contract. This includes areas such as medicines control, and the Government Chemist

function. LGC uses transparent accounting, and a partnership arrangement, with appropriate governance structures in place to ensure that these functions are delivered fairly and securely.

The various division in LGC have developed as follows:

■ LGC Standards

- LGC Standards is a supplier of laboratory quality control products and services.
- LGC Standards has grown dramatically over the last few years. In 1996, LGC was producing reference materials with a turnover of c.£200k per annum. In 2010 the business generated over £50m of turnover and is now represented in more than 30 countries.
- LGC Standards has made a number of acquisitions over time in order to broaden its capabilities, increase the commercial focus around the reference material business, and to gain greater market presence.
- LGC Standards now offers over 100,000 products including reference materials, pharmaceutical impurity reference standards (produced in accordance with ISO Guide 34), biological standards and reagents, and proficiency testing. Over a third of these products are prepared in LGC's own laboratories
- Over 60% of revenues come from the private sector

■ LGC Forensics

- Turnover was approximately £40m in 2010
- Competition in the market for forensic services has driven the need for significant improvements in the costs and speed of forensic tests, especially those involving DNA technology

- Portable DNA analysis kits are now being developed which will be able to be used outside the laboratory in custody suites
 - After 10 years of growth LGC has recently seen the impact of spending cuts hitting police forces, which has meant a significant decline in the UK market as more selective use is made of testing. However, the announcement in December 2010 of the closure of the government-owned Forensic Science Service and subsequent tendering of their work means that LGC is now the market leader and will grow by more than 50% during the next year
 - The LGC response to the shrinking UK market has been to diversify into international markets, such as Germany, where LGC has been helping to clear testing backlogs
- LGC Genomics
- This is a newer area, but one where LGC sees a huge opportunity for growth globally
 - Recent acquisition of a specialist genotyping company in the UK (KBioscience, Hoddesdon, Herts) makes the combined business the European market-leading genomic services and solutions provider
 - In addition to the well-understood role in biomedical and health-related applications there is a particular opportunity for the genomics business in agricultural biotechnology. Novel DNA extraction and genotyping technologies and the provision of 'next generation' DNA sequencing services for use in marker assisted breeding programmes are aimed at improving agricultural yield, produce quality, drought tolerance and disease resistance in crops of major economic importance

- LGC Science and technology
 - Turnover is about £35m, with several UK Government Department clients, including BIS, Department of Health, Defra and the FSA, and has increased following the acquisition of the HFL sport testing business in December 2010.
 - LGC operates the Medicine and Healthcare Products Regulatory Agency (MHRA) laboratory. MRHA owns the equipment and workload, whilst LGC provides people, training and quality assurance in a partnership arrangement
 - BIS provides funding under contract of £5-6m for specific activities and programmes, including the Government Chemist programme, and LGC's role as the designated National Measurement Institute for chemical and biochemical measurement. This work is seen as being core to the LGC brand, and its reputation for high quality in markets where the costs of failure are high
 - This division also provides programme management services (seen as an important role by some UK Government clients), and other services including race horse testing and supplement testing for athletes

We discussed with LGC the lessons the company had learned from the privatisation process. These included:

- Accept that the early years following privatisation will be difficult as the organisation goes through the necessary culture change, and changes processes to move to profitability. LGC could have grown more quickly in the early years with greater investment, knowledge of markets and international sales resources; but management had to develop a lot of this from scratch and a customer experience that was limited to a few Government

departments. "In the early days it was tough. Government took away a safety net, and we lost job security".

- Invest in R&D in promising areas of science, providing the seed capability to grow areas with high potential
- Access to capital from shareholders and banks was very valuable in allowing LGC to pursue its eventual strategy of growth by acquisition and investment in developing organic capability. "We have a capability to invest that we never had before. Purchasing equipment was an onerous task. Now, provided you've got a good case, you can just get the equipment you need quickly."

It is clear that LGC had to develop a more commercial culture to survive. As LGC told us "there is now no place to hide if your business is not going well. It's definitely a less secure environment than it was."

One LGC senior manager who had worked for LGC before and after privatisation commented that "from my point of view the value the Government gets from LGC is greater. We are much more customer focused. People don't go off at tangents to work on things they happen to find interesting. Our purpose is to deliver. That doesn't mean we won't fund tangential ideas, but we'll think about it carefully first. It's a more focused approach to getting the output which customers want. I'm very positive about what has been achieved. I'm very positive or I would not still be here."

Performance assessment

The main change in the last twenty years has been the breadth of services LGC provide. While twenty years ago LGC were focusing on consumer safety (products, food) and law enforcement (tobacco, drugs) they now offer a wider breadth of forensic services, laboratory solutions for accurate measurement (reference material, proficiency testing schemes, training and consultancy), health services and measurement services for industry.

LGC point to some examples of tangible effects they have had on the wider economy and society:

- Reduced the cost on the public purse of BSE testing by 60%
- Reduced the cost of providing forensic services by up to 50%
- Reduced turnaround of DNA Database samples from 7 months to 5 days
- Enabled the police to solve complex cases that have been open for a number of years (Rachel Nickell, Damilola Taylor)

LGC contributes to the critical role of the NMS (National Measurement System) in providing measurement standards and protocols and a legal framework to ensure confidence in measurement for Government, business, and the general public. The value of the NMS to the UK economy has been demonstrated in several influential economic studies. In a single year, the NMS helped businesses introduce new products and processes that increased profitability by more than £700m from an investment of £65m. BIS economists have estimated a return of between £300m and £410m for the UK economy from an additional Government investment of £6m in the NMS. Studies also show that the intensity of innovation activity in sectors of business increases with the acquisition of measurement knowledge.

LGC, in its role of Government Chemist ensures that consumer products are taken off the shelves when there is a possible danger for the customer and inversely, prevents the recall of products which are safe but have been incorrectly analysed. This activity minimises the economic impact of releasing or recalling products on consumers, producers, retailers and ultimately the government.

The table below set out data on publications .

	2010	2005	2000	1995	1990
Number of publications	39	37	9	18	18
Number of citations	N/a	N/a	N/a	N/a	N/a

LGC does not collect information on citations, since it is not one of their key performance indicators. Instead they place more importance on their visibility within their own community and in maintaining their position as a National Measurement Institute.

LGC have consistently published 30-50 peer reviewed articles annually, although they do not publish in many areas because of commercial/customer confidentiality. LGC benchmark their performance against other measurement institutes globally, and are mostly in the top 3 when it comes to measures around accuracy and uncertainty.

There is a formal process for eliciting customer views and measuring these. Regular customer service reviews and meetings are held.

LGC has a small patent portfolio. They only apply for a patent if they are planning to develop from it. Much LGC intellectual property takes the form of know how rather than products.

BIS/Government benefit is not in the form of a profit share, but in the specific contributions to efficiency and effectiveness LGC provides through improving process and techniques in the services it offers. LGC takes a customer case study approach to evaluating the benefit its customers derive from its services. For instance, LGC has reduced the cost of BSE tests by about 60% since 2001, which LGC estimates has saved Defra over £45m in costs. LGC has also been able to expand its test capacity levels, enabling Defra to meet its European legislative obligations.

The Royal Society of Chemistry has recognised several LGC scientists, including the 2007 RSC Atomic Spectroscopy Group Alan Ure Prize, an award for services to the RSC in 2008, and LS Theobald Lectureships in 2010 and 2011.

9 patents have been registered by LGC.

Case study

QinetiQ

What QinetiQ does

QinetiQ provides a very wide range of technical services, technical assurance and safety related services. It also does a small amount of highly applied R&D for MOD.

Financial

The MOD and UK business now represents just over half of QinetiQ turnover, with the rest in the US and other international markets.

MOD funding comes via Defence Equipment & Support (DE&S) for technical services, testing and evaluation, and through DSTL for applied research.

MOD funding is mainly contracted via the Long Term Partnering Agreement (LTPA), which was signed in 2003 for a 25 term, with reviews every 5 years. It covers technical services, evaluation and training support. The “non tasking” element of the contract is worth £180m per annum to run MOD ranges and other facilities. The “tasking” element covers specific services, and is generally let by DE&S. QinetiQ is incentivised to reduce costs for the “non tasking” element, and this is shared back during each quinquennial review. Most LTPA work is awarded non-competitively because QinetiQ is already running the facilities needed.

There are other long term MOD contracts, such as the Maritime Strategic Capability Agreement (MSCA) which has a 15 year term.

QinetiQ’s market share of MOD’s research budget has declined (and the overall size of that budget has declined significantly), but QinetiQ’s share of the advice market has sustained because of QinetiQ’s strength in depth.

The UK business accounted for just over half of QinetiQ Group revenue in 2009/10, and over 80% of that related to R&D according to QinetiQ. Of this 72% was from MOD and

3% from other government departments. Globally non-government income has increased to 17% of the Group's total revenues.

The table below gives summary financial details.

£m	2010	2005
Turnover	1,625	856
Operating Costs	1,508	789
Profit/(Loss)	86	58

Source: QinetiQ

In 2005 the UK business of QinetiQ had some 9,000 staff, which is similar to the number originally vested in QinetiQ in 2001.

QinetiQ floated on the London Stock Exchange in 2006 at 200p per share, and after reaching peaks of nearly 230p it was trading in November 2011 at a little under 120p.

Historical overview (1990 – 2010)

The Ministry of Defence's research and technology arm, the Defence Evaluation and Research Agency (DERA) employed some 12,000 staff in 1998, but was facing an uncertain future in the face of reducing levels of funding and competition from private sector providers. The MOD concluded that DERA would not have the access to capital, or the operating freedoms, required to survive in the long term as a significant science and technology player.

In 2001 DERA was divided into two – QinetiQ and the Defence Science and Technology Laboratory (DSTL). It was agreed that the preferred option for QinetiQ would be to establish it as a Public Private Partnership (PPP) in the first instance. With the technology bubble affecting markets, it was agreed that conditions were not right for flotation on the stock market at that time, so a competition was opened for a minority stake in QinetiQ. In 2003 the private equity company Carlyle Group was successful, and acquired about 35% of QinetiQ's share

capital for a return to Government of about £150m in share proceeds and debt repayment.

Carlyle worked closely with QinetiQ's management to expand into new markets, particularly in the US. This involved a number of strategic acquisitions to enable QinetiQ to broaden its reach, funded by Carlyle capital.

MOD retained 65% of the share capital in order to benefit from future growth of the business.

In 2006 QinetiQ was successfully floated on the London Stock Exchange, raising a further £360m for the taxpayer. In 2008 MOD sold its remaining 19% shareholding, raising £254m.

MOD retains a golden share in QinetiQ which allows it to step in if there are concerns about security or conflict of interest which would jeopardise the quality or integrity of the work QinetiQ undertakes for MOD.

MOD still retains some assets (e.g. ranges) while others were part of the QinetiQ separation deal (e.g. Haslar), but this is mainly historical, and QinetiQ is now discussing transferring further MOD assets to QinetiQ.

In 2009 and 2010 QinetiQ issued profit warnings. The underlying causes were a significant (up to 20%) cut in MOD funding as a result of the budget crisis, and timing delays on US Government contracts resulting from the change in Presidential administration.

A new Chief Executive, Leo Quinn, joined QinetiQ at this time, and quickly grasped that there was an urgent need for change. He initiated renegotiation of the terms and conditions of ex DERA staff, which was inhibiting restructuring of the business because of the very generous redundancy and pension terms written into these contracts which QinetiQ had inherited.

Quinn personally held face to face meetings with over half of QinetiQ's staff to drive home the serious issues facing the company, namely that the market was shifting significantly, that QinetiQ would need to restructure, and that up to 10%

of staff would need to go. He put it to staff that he wished to ensure that the 90% of staff remaining in the business would be rewarded, rather than the 10% who were no longer needed. Following negotiations with the Trades Unions, 75% of staff voted in favour of a package of measures which reduced redundancy and pension terms in return for pay increases and more leave.

This was followed by a 24 month restructuring programme with the following key components:

- focus the business better – understand which services were making money, and adopt a single streamlined business model, rather than the multiple ones which existed
- deleverage – QinetiQ had high levels of debt, so better cash management was introduced which improved working capital requirements and allowed debt to be repaid
- culture change – there were sweeping changes to the senior management and top 100 managers in order to drive culture change from the top by leadership:
 - more visible leadership to avoid the culture of secrecy
 - new performance management system with behaviours/performance dimensions
 - ideas/business improvement suggestions scheme which saved £ millions
 - cost reduction, including in-sourcing IT and Facilities Management.

QinetiQ's has through this and previous programmes achieved significant reductions in manager and administrator roles through re-evaluation of legacy civil service processes and procedures, and retaining only those posts which added value to the organisation and its customers. There has also been an improvement in the "teeth to tail" ratio, with more technical staff focused on solving customer problems, and removal of layers of management and duplication of

administrative support. There has also been an increase in the proportion of engineers to scientists, reflecting the need to commercialise technology.

Since privatisation QinetiQ has acquired a number of businesses in North America which now form QinetiQ North America (QNA). QNA accounted for 49% of revenues in 2010. Diversification into the US market has enabled QinetiQ to maintain skills and expertise in the UK, which has seen a significant decline in its core MOD market, with MOD expenditure on research and technology falling from £540m in 2007/08 to £439m in 2010/11, and further cuts likely.

Performance assessment

QinetiQ is able to offer a very diverse range of services to customers. MOD ranks its top 20 suppliers on the basis of their performance, and QinetiQ is currently ranked 7th.

Whilst technical staff are rewarded and measured at a local level for the production of refereed journal papers, the information is not collected centrally. Although QinetiQ recognises the importance of technical staff producing papers to ensure that they are recognised as being at the forefront of their fields, they told us that they are not required to produce this information to demonstrate to their clients that they are thought-leaders in their fields of expertise.

QinetiQ formally recognises technical excellence through its Fellowship Scheme. To be appointed to a Fellowship individuals must have achieved exceptional technical standing or be recognised as broader experts in their field; often this is demonstrated through an extensive list of referenced journal papers. Critically Fellows must show that their work has had demonstrable impact and significance for QinetiQ and its customers. Each Fellow receives an annual allowance to be used at their discretion in furthering the Company's future technical direction. Fellows lead QinetiQ's technical and business innovation and participate in shaping the Company's technical strategy and future business success.

QinetiQ holds 1,500 patents and has 1,000 patents pending.

QinetiQ's biggest contribution to spinning out knowledge from research is from using the skills and capabilities developed to provide services to government and industry, whether in the form of technical advice or 'intelligent customer' interpretation of trials data, for example.

Spin-offs which were transferred to Cody Gate Ventures in 2007 included:

- Aurix
- Metalysis
- Stingray Geophysical
- Intrinsic materials
- OmniID
- Quintel
- ZBD Displays

These had a valuation at the time of £40m. In 2010/11 QinetiQ collected royalties of £7m.

An example of technology QinetiQ has 'spun-in' to the defence programme through their research is the application of Commercial-Off-The-Shelf (COTS) warfare games to support training the armed forces. QinetiQ is the appointed MOD representative for the serious games industry, liaising with developers and publishers on MOD's behalf, as well as being the principal advisor to UK MOD on games technologies, including: game engines, middleware and hardware.

QinetiQ has key strategic partnerships with over 20 academic organisations and works with many more. These universities are often partners in consortia based research contracts but QinetiQ also has less formal alignments to provide support and/or a route to market for their products and services. In certain circumstances QinetiQ also provides test facilities for universities working on MOD projects.

QinetiQ works with all of the primes based in the UK as partners and suppliers. Many of these are part of consortia

on research contracts and provide a valuable path to pull through technology from the research programme into the supplier base for the UK Government.

Impact of status

We asked QinetiQ what advantages and disadvantages they saw in their current status. Their response is given below:

“QinetiQ’s development has been shaped by three broad influences:

- **Policy.** As part of MOD, QinetiQ’s antecedents were directly controlled by MOD policies and initiatives and thus did not have the freedom of movement to respond to events enjoyed by the commercial defence industry.
- **Income.** The creation of QinetiQ was predicated on the belief that defence facilities and capabilities can be maintained at lower cost through selling excess capacity in the market place. This has been particularly important for QinetiQ, as direct MOD research work has declined significantly throughout its history.
- **Inheritance.** QinetiQ inherited a civil service organisation that exhibited a wide range of behavioural, structural, systems and infrastructure problems and very little appreciation of, or indeed interest in, the commercial world.

“Major MOD structural changes, leading to the expansion of DRA to become DERA and later the splitting of the organisation into two parts, QinetiQ and Dstl, caused great turbulence throughout the organisation. Nevertheless, QinetiQ has followed its own path, satisfied MOD’s changing requirements and transformed itself dramatically. Key to our continuing success is ensuring that funding is maintained for future UK critical capabilities, no matter whether located in the private or public sector.

“Funding capabilities in the private sector enables greater transparency as hidden or sunk costs become more visible and this leads to be better decision making as the cost can be clearly evaluated against value. The key challenge is not

whether a capability is located in the public or private sector but the funding of that capability. By transferring work to the private sector the real cost becomes clearer as the costs of maintaining the knowledge, expertise and assets are against the capability to be delivered. Better informed decisions should lead to not only greater efficiency but also better targeting of resources on key priorities.

“The transition from a public sector research institution to the private sector has been a challenging for our staff. As a public sector organisation our staff had the freedom to pursue academic interest without regard for its future application; pursuing pet projects with little regard for their pull through into frontline uses or programme. Many would argue that fundamental research of this type is more appropriately carried in academic institutes and in effect parts of DERA had been acting as if they were a secretive university, closed to wider interest groups. Indeed through the early years of QinetiQ many staff left to work in the academic sector.

“Since being privatised QinetiQ has moved away from fundamental research towards research which has application, and hence economic return, within a defined time period. In many cases we take the fundamental research from universities and work with them and the prospective end users to develop solutions to particular issues faced by our customers. Our need for economic return ensures that our scientists and engineers are focussed on the task in hand, rather than being distracted by pet projects.

“QinetiQ is the UK’s largest Research Technology Organisation and within the defence market is relatively unique in its market position between academia and manufacturing industry, providing the conduit between basic research and real-world application. This independence enables us, through partnerships with industry and academia to deliver knowledge-based research, assessment and assurance to our customers in order for them to manage the risks and costs associated with exploiting technology in future capability.

“As stated above, the defence research industry has shifted its paradigm from generating co-incidental ‘spin-outs’ to ‘spinning-in’ technology from other fast-paced markets. Having QinetiQ as an independent provider within the supply chain means our core customers in defence have confidence that these ‘spin-in’ technologies can be adapted to the defence environment, which is often far more challenging than other markets.

“Our previous position in Government constrained alignment with industry due to the need to preserve total independence of the supply chain. Now we are able to ‘back the winners’ and work closely with industry from the inception of an idea through to delivery. Thereby reducing the risk that investment is wasted due to a lack of knowledge of what is realisable.

“Working closely with industry has also enabled us to leverage MOD research funding against funding from third party sources. Reducing MOD income has forced us to create cross-discipline teams whose innovative solutions to non-defence problems have provided our customers with competitive advantage.

“An example of leveraging MOD research funding is our stealthy wind turbine product. This is being developed in conjunction with a civil company to overcome the interference with radar caused by wind turbines. The project will use radar absorbing material, originally developed within the MOD research programme, reducing interference with defence radar, which has led to a number of wind farm applications being refused or delayed and thus in time should enable more areas to become available for such developments.

“Our change in status has led to a decline in capability in certain low readiness technical areas that were classed as highly innovative. With a requirement to generate profit in order to fund future products and services it has not been possible to maintain private funding in areas which would take many years to generate a return. Arguably this would undermine our ability to bring highly innovative solutions to market or provide game changing technological development

in the UK. It is important to note, however, that government has also decided not to fund a number of these areas drawing into question the future of these areas as markets.

“Such commercial drivers also underpins the requirement on us to develop our unique place in the supply chain further to ensure we continue to offer our customer innovative solutions to their problems.

“Being free of the civil service based Terms and Conditions of employment enables us to respond more quickly to changes in demand from our customers and compete more effectively with other providers.”

“Employee share ownership is considered an important incentive and motivator. Most QinetiQ employees own shares in the company.”

QinetiQ claims to have saved MOD £180m in the first 7 years since it was set up, on top of the £700m savings which are built into the LTPA over 25 years.

QinetiQ achieve both cost reductions and improvements in the service. For example, at Shoeburyness ranges through better management of the facility QinetiQ has been able not only to increase the utilisation of the facility significantly, but has done this in such a way that complaints about noise from local residents have reduced from 1,000 to 100 a year, and they have received a ROSPA gold award for the safety aspects of the range.

As a private company, QinetiQ has had to learn how to understand the economics of its business – what things cost, and where it makes its money. Government accounting, management of resources and culture are not conducive to running a business in the view of those we interviewed at QinetiQ.

■ SUMMARY CASE STUDIES

Case study

The Animal Health and Veterinary Laboratories Agency (AHVLA)

What AHVLA does

AHVLA's remit is to "protect public and animal health, animal welfare and standards of production in the farmed animal sector". It is the "national regulator in GB responsible for the delivery of the policies of Defra and the Devolved Administrations for Scotland and Wales on the prevention, control and eradication of notifiable disease, upholding public health on farms and maintaining the welfare of farmed livestock."

AHVLA works in collaboration with a range of government and scientific institutions to deliver a wide range of veterinary research, surveillance, consultancy, laboratory and epidemiology services as well as an emergency response capability to the UK, the EU and the private sector. AHVLA is the designated international reference laboratory for many infectious and non-infectious diseases and is represented in over 70 international committees.

Status

AHVLA is an Executive Agency of the Department for Environment, Food and Rural Affairs (Defra).

Financial

AHVLA receives 77% of its income from its parent department Defra and 15% from the devolved administrations. Around £21m (10%) of its income is in relation to its R&D work. At its inception in 2011 AHVLA employed 2,700 staff had an annual turnover of £217m.

Historical Overview

VLA's roots date back to 1894, when its forerunner, the Central Veterinary Laboratory (CVL), was established. On 1 October 1995 CVL merged with the Veterinary Investigation Service, part of the State Veterinary Service (SVS) in England and Wales to form the Veterinary Laboratories Agency (VLA). The remainder of the SVS became an Executive Agency of Defra from 1 April 2005 and it was renamed Animal Health on 1 April 2007 following the merger of the SVS, Dairy Hygiene Inspectorate, and Egg Marketing Inspectorate and the Wildlife Licensing and Registration Service.

The two agencies achieved their financial targets (after adjustments) in 2010/11, historically revenue grew at a flat rate before falling back in the second half of the 2000s. As required by its Framework Agreement, VLA operated within 2% of the full economic costs of its services, by charging for its services to Defra and other customers.

The Animal Health and Veterinary Laboratories Agency was created on 1 April 2011 by merging VLA and Animal Health.

VLA had a central facility and 15 regional laboratories while Animal Health had a presence at over 60 sites. Both agencies already had outline plans to rationalise their office and laboratory estates footprint and these are now being progressed based on the merged agencies requirements. Under the terms of the merger it was announced that overheads would be cut by a target of 33%.

Performance assessment

The key objectives for AHVLA during its first year of operation, as set out in its Corporate and Business Plan, are to:

- ⋮ Confirm and detail its responsibilities
- ⋮ Deliver the savings required as part of the Spending review settlements through improvements in ways of working
- ⋮ Define the business strategy and ongoing delivery model for the future

- Deliver sound and robust evidence to its policy customers underpinned by excellent science
- Maintain on-going business functions including exotic disease emergency response capacity and capability to respond appropriately to new and emerging disease threats.

In 2007 VLA's science was subject to an independent audit as part of Defra's Quinquennial Science Audit Programme. Overall its science was rated good and exceptional in some areas and it was acknowledged as a "recognised centre of excellence".

After setting a baseline for Customer Satisfaction rating of 70%, apart from 2003/04 when the result was 69%, VLA has consistently achieved increased ratings with the latest being above 90%.

Case study

Centre for Environment, Fisheries and Aquaculture Science (Cefas)

What Cefas does

Cefas is a multidisciplinary scientific research and consultancy organisation that provides impartial advice, evidence and applied science to government departments and other customers on marine, coastal, estuarine and freshwater organisms and environments. The Agency directly supports government decision making, provides long term assurance on performance against strategic objectives for marine and closely related environments, and helps ensure that EU/ UK legislation and obligations are fulfilled. It also maintains an emergency response capability.

There are two main UK sites: Lowestoft and Weymouth. Each has a range of specialist laboratories and aquaria facilities. Cefas also has eight satellite centres and a purpose built research vessel that undertakes estuarine, shelf seas and deep water oceanographic and fisheries surveys.

Status

Cefas is an Executive Agency of the Department for Environment, Food and Rural Affairs (Defra).

Financial

Cefas receives a core of committed work from Defra, commissioned as a range of individual contracts with associated deliverables and/ or service level agreements. In 2007 Defra agreed to purchase approximately £30m per annum as a long-term commitment "to provide funding stability for core services required by government" with no annual inflation mechanism. This together with an additional £4m of competed Defra work accounted for some 63% of Cefas turnover in 2010/11. Other competitively tendered clients include the Foods Standards Agency (£5m), other public sector bodies (£4m), private sector companies (£8m) and EU funding (£2m).

In 2010/11 Cefas turnover was £54m, and it made a surplus of £1.9m.

Staff numbers have remained relatively constant over the past 10 years, and stand at about 550 today.

Historical Overview

Cefas was established on 1 April 1997 from the former Directorate of Fisheries Research. In 2001 Cefas launched Cefas Technology Limited (CTL), a private limited company providing technology to Cefas' customers and exploiting its intellectual property. In 2010–11 CTL traded profitably, making £0.07m before tax.

In June 2006 Ministers agreed a transformation plan for Cefas which provides for its sustainability and required Cefas to:

- consolidate activities out of facilities at Lowestoft and Burnham on Crouch into a new fit for purpose site
- develop its ability to generate income from external customers
- provide efficiencies as set out in the Transformation Plan.

As part of this same plan, Defra committed to a 10 year funding profile, detailed in a High Level Agreement, "to provide important stability for Cefas during its period of major change." It was agreed that Cefas would remain a public body. It was further agreed that once implementation of the transformation plan was sufficiently underway, Defra would consider whether there would be benefit in another model of fully public ownership. The Chief Executive of Cefas would lead the development of any such proposal. We are not aware of any proposal.

Only objectives two and three were fully successful. While Cefas successfully closed and relocated its unprofitable and ageing Burnham-on-Crouch laboratory (without major disruption to capabilities), its project to build a state of the art site was aborted in 2009, a year before the proposed opening. The decision, attributable to the challenging economic

climate, cost Cefas £2.5m and its partner, Waveney District Council, £3.9m.

In 2008 the Lowestoft site also underwent major building works, creating new labs and offices to accommodate relocating and new staff. In 2007-09, Cefas was restructured into four customer facing divisions with a smaller corporate centre. The greater autonomy and responsibility afforded to each team has increased Cefas' ability to develop individual strategies for different programmes, reflecting market dynamics in the different sectors in which it operates.

Cefas has experienced strong annual revenue growth, particularly since 2007/08. However, turnover in recent years has been inflated by programmes which Cefas manages, where in 2009 £7m flowed through to subcontractors.

Cefas' has significantly increased its non-Defra income, which has risen from £6.3m (18% of total income) in 2003/04 to £19.9m (37%) in 2009/10, a more than 200% increase. Most non-Defra income was drawn from the energy sector.

The Centre made small net surpluses in 2007/08 and 2008/09. 2007/08's slight fall is attributable to the unexpected maintenance fees of Cefas' ageing Lowestoft and Burnham-on-Crouch laboratories while 2008/09's was after expenses of £2.5m from the dissolution of its Waveney campus project.

Performance assessment

Progress is monitored monthly against key strategic aims. Plans, objectives and targets are regularly updated according to customer and staff surveys.

There are six annual ministerial targets divided into three sections (science delivery, value for money and capacity and capability): customer satisfaction, science quality, recover full costs, effectiveness gains, sustainability indicators and staff satisfaction. These are reviewed annually to ensure continued relevance to the business. Except in its maiden year, Cefas has met its targets every year.

Case Study

Defence Science and Technology Laboratory (Dstl)

What Dstl does

Dstl describes its work as follows in its 2009/10 Annual Report:

“Our work is divided into several categories. We:

- lead the formulation and delivery of MOD’s non-nuclear research programme
- undertake applied scientific research in sensitive areas that need to be kept within Government
- provide independent and high-quality advice and support in areas as diverse as policy formation, equipment development and current in-theatre operations
- undertake horizon scanning to identify and help customers to understand and exploit the opportunities and threats offered by advances in S&T
- transfer knowledge to and from industry and the university sector while supporting the wider S&T community to understand defence requirements
- spin off knowledge for civil applications and undertake collaborative research with other institutions, in accordance with MOD policies.”

Dstl exists “solely to provide those science and technology services that it would be inappropriate to source from the private sector and those activities that must be carried out in Government to sustain MOD’s capability to be an intelligent customer and to build productive relationships with suppliers and others.”

In 2010 MOD's Chief Scientific Adviser undertook a review into research, development and support across MOD. This resulted in a strengthening of Dstl's position as MOD “single Science and Technology (S&T) delivery organisation” and the creation of the S&T Programme Office to manage MOD's entire S&T programme.

Status

Dstl is a Trading Fund within the Ministry of Defence (MOD).

Financial

Some 89% of Dstl's income derives from MOD, with 7% from other Government Departments, and 4% from non UK Government sources. The table below shows that total turnover dipped after Dstl's establishment in 2002. Turnover in 2011 is forecast by Dstl to be £321, reflecting a very significant decline in MOD funding as spending cuts take hold.

£m	2010	2005	2002
Turnover	435	353	499
Operating Costs/costs of sales	414	333	484
Profit/(Loss)	21	20	15

Staff numbers, as shown in the table below, have shown a significant decrease since 2000.

	2010	2005	2000
Total Staff	3640	3328	5204

As MOD's in-house science and technology provider, Dstl is highly reliant on the levels of MOD spending. The current Dstl Corporate Plan is projecting a relatively modest decline in net income, which may be optimistic given the recent pressures on MOD's budget.

Historical overview

Dstl was formed by the Ministry of Defence (MOD) in 2001 when the Defence Evaluation and Research Agency (DERA) was split into two separate organisations – Dstl and QinetiQ. About 3/4 of the DERA staff, and most of the facilities, were transferred to

QinetiQ, with a view to becoming privatised through a Public Private Partnership (PPP) – see the QinetiQ case study.

MOD concluded that there were some aspects of DERA's work which, as Dstl's Framework Document puts it, "are inappropriate for the private sector". So for this reason it decided to retain an in-house science and technology capability – Dstl. Of course, deciding exactly which activities and capabilities are "inappropriate for the private sector" is a judgement call.

It appears that there are broadly three areas of work regarded as "inappropriate for the private sector":

- those where independence and objectivity would be compromised by the commercial interests of private sector organisations;
- those activities which are needed to sustain and develop MOD's ability to be an "intelligent customer" by sustaining and developing MOD's scientific, analytical, technological and engineering research understanding and capability;
- work in sensitive areas that need to be kept within Government.

Performance assessment

Dstl's 2009/10 *Annual Report* gives performance against 7 Key Targets. This shows strong performance, with 6 out of the 7 targets achieved, with partial achievement of the efficiency target.

Dstl reported 94% of projects on budget, 93% on time, customer satisfaction at 94% of ratings at 7/10 or over, and a profit for the year of £21m on a £435m turnover, giving a reported Return on Capital Employed of 9%.

Dstl has a wholly owned technology transfer vehicle called Ploughshare Innovations Ltd which achieved a modest revenue in 2009/10 of just over £1m. In 2009/10 18 new patent applications were filed, 47 applications published, and 29 patents granted.

Case study

The Food and Environment Research Agency (Fera)

What Fera does

Fera’s overarching purpose is to “support and develop a sustainable food chain, a healthy natural environment, and to protect the global community from biological and chemical risks”. It provides evidence, analysis and advice, primarily to the government, but also to international organisations and the private sector on matters relating to the environment, the food chain and chemical and biological risks. It provides operational policy and regulation in support of these activities, particularly in respect of plant and bee health, crop varieties and seeds.

Fera has a response and recovery capability to protect the UK environment from chemical, biological, radiological nuclear (CBRN) accidents.

Status

Fera is an Executive Agency of Defra.

Financial

Two thirds of Fera’s funding comes from Defra, of which it is a part.

- In 2010/11 Fera's turnover was £67m. 61% of Fera’s income in 2010/11 was from Defra, with 19% derived from commercial and other income.

In 2010/11 FERA FTE staff numbered 855, including about 150 plant and bee inspectors.

Fera has customers, partners and stakeholders spread over 102 countries primarily drawn from government, academia, industry and commerce. Fera’s other customers are broadly located in the fields of food safety, climate change, the environment, and chemical, biological and radiological threats.

Historical overview

FERA was established on 1 April 2009, following merger of the Central Science Laboratory (CSL), the UK Government Decontamination Service (GDS), the Plant Health and Seeds Inspectorate (PHSI), Plant Varieties and Seeds Division (PVS) and Plant Health Division (PHD).

Much of the past year has been spent embedding the processes of these four organisations into one way of working under Fera. CSL, established in 1992, is its largest predecessor and was also an executive agency of Defra. While CSL was focused primarily on research and advice, Fera has diversified its activities to include regulation, policy and risk advice, and assessment, response and recovery capabilities.

Fera has sought to increase its commercial contract work. Income from private sector customers is projected to increase by a further 30% this year.

Performance assessment

In spring 2010 Fera started streamlining unprofitable parts of its structure as part of a continuous review process. For instance, vacant space in its Hutton Sand site will be leased out. It is estimated that this will achieve efficiencies of up to 30% over the next few years, freeing up resources for reinvestment and improving the agency's responsiveness.

In 2009/10 Fera was assessed on seven of its ministerial targets: strategy, time efficiency, safety, finance, sustainability and communication with stakeholders. Fera met all its targets.

In February 2011 Defra commissioned an independent external review of Fera's science. The review, chaired by Professor Sir John Lawton, examined Fera's role and capability, concluding that "Fera provides an essential national capability in translational research, monitoring and emergency responses for major UK problems in agriculture, food and the environment". The team concluded that "most parts of Fera's work is 'excellent', some of it is 'good', and rather little is simply 'satisfactory'; none is 'unsatisfactory'.

For a new Agency that is less than three years old this is a remarkable achievement.”

In 2009/10 FERA scientists published 137 papers in peer-reviewed journals. This was down from 156 the previous year and against the trend of increasing or staying at a similar level.

Customer satisfaction measured by questionnaire averaged at 4.4/5. Customers were positive about Fera’s accessibility, responsiveness, and quality of staff.

In HM Treasury’s Reforming Arms length Bodies (ALB) Report of March 2010, the working relationship of Defra and Fera was cited as an example of best practice and commended to other ALBs.

In November 2009 BeeBase, which was developed by Fera’s Knowledge Management team, won the Civil Service Award for Technology and Innovation.

Case Study

The Health Protection Agency (HPA)

What HPA does

The Health Protection Agency's role is to provide an integrated approach to protecting UK public health through the provision of support and advice to the NHS, local authorities, emergency services, other Arms Length Bodies, the Department of Health and the Devolved Administrations. It provides round the clock essential services, support and advice across the United Kingdom to protect against infectious diseases and other environmental hazards including radiation and chemicals. These services are provided to the NHS, local authorities and the public through local and regional health protection teams.

The HPA has a large network of approximately 3,800 staff based at four major centres (Colindale, Porton, Chilton and South Mimms) and regionally and locally throughout England. There is a small central office based in London. The Agency works closely with locally based colleagues employed within the Devolved Administrations.

The National Institute of Biological Standards and Control (NIBSC) merged with the HPA on 1 April 2009. NIBSC was a world leader in the standardisation and control of biological medicines such as vaccines and products made from blood and tissues.

Status

The HPA is a Non-Departmental Public Body sponsored by the Department of Health (DH).

In 2010/11 the HPA reorganised its management structure. The organisation now has four frontline operational divisions:

- Microbiology Services - this division consists of the laboratory groups that are located at the HPA sites at Colindale and Porton, plus the national network of microbiology laboratories

- ⌚ Health Protection Services - this division consists of two elements: teams of health protection experts working at a local level and a nationally organised integrated epidemiology service
- ⌚ Radiation, Chemical and Environmental Hazards- this division comprises the Radiation Protection Division and the Chemical Hazards and Poisons Division
- ⌚ Biological Standards and Control - this division assures the quality and safety of biological medicines.

There is also a small corporate support function, which is an integrated part of the frontline operations and ensures effective working and use of resources.

Financial

Total revenue in 2010/11 was £341m, a reduction of some £51m over the previous year. After adjusting for additional one-off revenues received in 2009/10, this represented a 10% reduction in funding as government funding cuts began to bite. The HPA receives core funding from DH and the devolved administrations (£151m in 2010/11, plus £36m capital grant). In 2010/11 the breakdown for other revenues was £71m laboratory and other services, £39m research grants and contracts, £35m products and royalties, and £2m grant in aid from the devolved administrations.

Historical overview

HPA was first established in 2003, as a Special Health Authority (spHA). Following the Health and Safety Act, a year later, the organisation merged with the National Radiological Protection Board (NRPB) to become HPA, a Non-Departmental Public Body. In 2009, HPA merged with the National Institute of Biological Standards and Control (NIBSC).

At its establishment the spHA was orientated principally around infectious diseases. When it integrated with NRPB to become the HPA in 2004 its capabilities expanded to include dealing with environmental hazards, emergency preparedness and radiological protection.

Performance assessment

Following recommendations made by the DOH in 2004 (Dixon Review into R&D), the HPA made a number of operational changes: a protocol was established for the independent review of all research areas; staff were consulted on how they would improve professional development and training programmes in research; a subgroup was established to translate research findings into healthcare processes or products.

In order to increase research funding, the HPA also adopted a policy of expanding its external income. Over the past five years, total expenditure on R&D has risen from £16 million to £29 million, with income from external sources rising from £9m to £15m.

The HPA has created four spin off companies - for example, Synatxin Ltd, a venture capital firm established to develop the commercial potential of its technology programme.

HPA's staff numbers have increased by over 50% since its establishment in 2004, reflecting its expansion.

Case Study

Health and Safety Laboratory (HSL)

What HSL does

The research and development work of the Laboratory underpins the activities of HSE, which are to protect the health, safety and welfare of employees and to safeguard others, principally the public, who may be exposed to risks from work activities.

HSL offers research, scientific and forensic services, primarily to HSE, but also to other public and private organisations in the UK and overseas.

Status

HSL is an Executive Agency of the Health and Safety Executive (HSE). HSE, a non-departmental body sponsored by the Department for Work and Pensions, is responsible for the performance of HSL.

Financial

HSL is part of the HSE, and receives nearly 80% its funding from its parent.

In 2010/11 turnover was £38m, with £30m from HSE, £7 from external customers and grants (up 10% on the previous year), and small amounts from the EU and royalties. In 2010/11 HSL had begun to feel the impact of government budget cuts, with turnover down £1m.

Of its 405 staff, 300 were scientific, engineering or technical/investigation staff.

Historical overview

HSL, originally an HSE division with roots going back more than a century, became an Executive Agency of the HSE on 1 April 1995. Agency status was intended to give HSL greater exposure to the market in order to improve its effectiveness and efficiency and to reinforce its position as HSE's prime provider of science.

In 2004, with funding from the Private Finance Initiative, HSL opened a new state of the art laboratory that made a significant difference to its research capability.

In 2004 HSE conducted a review of HSL's status with a view to increasing its competitiveness and efficiency. Although many options were considered - including trading fund and GoCo – it was decided that HSL would remain an executive agency of HSE but attempt to expand its revenues and activities in the external market.

In January 2010 HSL adopted an enhanced agency status model with a view to providing additional freedoms and using a five year as well as annual planning horizon.

Performance assessment

The volume of HSL publications has fluctuated. Numbers for 2008/09 and 2009/10's of 59 and 62 are below the 66 and 70 papers published in 2001/02 and 2002/03.

In 2003/04 a customer satisfaction survey carried out by ORC International found that 89% of customers were happy with the service. The same survey in 2009/10 found that HSE's satisfaction levels of HSL had increased by 3% from the previous year.

In 2009 HSL's senior management team carried out a thorough review and examination of the laboratory's performance. Issues highlighted for improvement were: levels of delegation, the speed of decision making and the amount of time senior management time devoted to external activity.

Case Study

AEA Technology

What AEA Technology does

According to its web site “AEA is a global sustainability consultancy. We combine world-leading energy, climate change and environmental expertise with powerful IT, knowledge management and economics capability. We help policy makers understand complex issues and empower business leaders with award winning consultancy advice”. AEA Technology works with national and local government, governmental bodies and global businesses.

Status

AEA Group Plc is quoted on the London Stock Exchange.

Financial

Revenues in 2011 were £114m (over half from the USA), showing no growth on 2010 (although with a significant reduction in European revenues balanced by increase in USA), with an operating loss of £6m. When the loss is adjusted for the one off costs of restructuring (including redundancies in Europe), acquisitions and other adjustments the accounts show an adjusted profit of £9m.

Share performance since privatisation, initially strong, has been very poor over the past 10 years. The shares floated in 1996 at 280p and rose steadily to reach 860p in 1999. Since then there has been a steady and steep decline, and in August 2011 the share price hit a new low of 2p.

Historical Overview

AEA Technology was originally the commercial arm operating within the UK Atomic Energy Authority (UKAEA). In 1994, it was spun out of the UKAEA and in 1996 it was privatised and floated on the London Stock Exchange.

Originally AEA Technology had expertise in a wide variety of areas, mostly the products of nuclear-related research

from its UKAEA days. These included nuclear safety, nuclear engineering, environmental protection, battery technology and non-destructive testing. It mainly acted as a contractor organisation for UKAEA and other governmental and private customers.

In the early 2000s a programme of divestment was started. In a radical reframing of its strategy, the company divested all of the nuclear-related business and other non-core businesses such as its Rail business through two portfolio sales to secondary private equity investment firms in September 2005 and in September 2006 respectively to create a business focused on environmental consultancy. Of the original 21 operating units and 4,000 staff in AEA, following divestment only 2 of those operating units (and about 400 people) remain in AEA Group Plc.

In 2008, AEA Technology was almost exclusively working for the UK Government and its principal customers were Defra and DECC. Concerned about a heavy reliance on UK government, AEA Technology decided to diversify and in 2008 the Group purchased PPC based in Washington, and then in late 2010, acquired US company ERG. Both of these US businesses, like AEA in Europe, had government as their principal customer.

Performance assessment

The combined Group is now a technical advisor to the US and UK Governments in energy, sustainability, emissions and waste. About two thirds of AEA's business is planned to be in the growing US market compared with virtually nothing in the twelve months to March 2008.

This journey - which in view of the low share price and operating loss is far from complete - has been a difficult one so far, as AEA notes in its latest Annual Report:

“This transformation has not been achieved without pain for our shareholders and employees. Whilst performance was strong in our existing business in the US ... the business performance last year was

disappointing in Europe. The Board acknowledges this underperformance and is focused on improving trading results. Following a review of the European business at the start of 2010/11, the decision was taken to continue the existing 5% reduction in salaries until the end of the year.”

Case Study:

TUV NEL

What TUV NEL does

TUV NEL provides technical consultancy, research, testing, flow measurement and programme management services to global clients across energy, environmental, aerospace, defence, manufacturing and government sectors.

TUV NEL is a designated National Measurement Institute for flow measurement, and part of the UK's National Measurement System (NMS). There is one main site in Glasgow.

Status

TUV NEL is a company limited by shares, wholly owned by the TÜV SÜD Group, an international service organisation headquartered in Germany which employs over 16,000 people in 600 locations in 50 countries.

Financial

In 2009 TUV NEL revenue was £13.4m, with EBIT of £2.1m. TÜV SÜD Group revenue in 2010 was €1.5 billion with EBIT of €123m. BIS, as customer for the National Measurement System, continues to be an important customer of TUV NEL, but we were unable to obtain a breakdown of key customer revenues.

Historical Overview

The company was first established in 1947 as the Mechanical Engineering Research Laboratory (MERL) under the auspices of the Department for Trade and Industry (DTI). As the National Engineering Laboratory it became an Executive Agency of DTI before being sold to Siemens in 1995. An ownership change in the same year brought the lab under the control of the TÜV SÜD Group.

Performance assessment

Revenue has increased more than 1½ times since 2001 and growth has been profitable. UK revenue makes up for 89% of revenue of TUV NEL.

Staff numbers have increased slightly since 2001, from 133 to 155.