Science & Technology Facilities Council

Delivery plan
2008/9-2011/12

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SECTION 1 INTRODUCTION

Formed by Royal Charter in 2007 the Science and Technology Facilities Council's (STFC) mission is to:

- deliver world class science;
- achieve a step change in the economic impact the UK derives from its science through knowledge exchange and the training of skilled people.

The STFC supports, through various delivery mechanisms, much of the research base. This support spans a broad spectrum of fundamental research which generates intellectual capital and the application of this knowledge for public good and economic gain. There is a high degree of synergy between the techniques and technologies we deploy. We are therefore well-placed to support underpinning technology development, the cross-Council multi-disciplinary programmes and deliver a distinctive contribution to knowledge exchange and increased economic impact.

Our overall strategy consistent with our mission must be to:

- provide access to world class facilities and infrastructure both internationally and nationally which will sustain the UK's scientific competitiveness across the science and engineering base; and provide key underpinning technologies and expertise which will enable advances in science and technology transfer;
- support a healthy and vibrant university community to develop and exploit these facilities and technologies, enable multi-disciplinary programmes and sustain the health of disciplines in the university sector;
- engage with European and global partners in developing shared strategies on how to achieve timely and affordable investment in large scale facilities and hence increase the UK's international impact and credibility;
- contribute to increased economic impact particularly through the development of the Harwell and Daresbury Science and Innovation Campuses. These Campuses will, through public and private sector investment, create an environment and act as hubs for high added value knowledge exchange between universities, industry, and our national laboratories.

This Delivery Plan sets out how and the extent to which we will move forward on this strategy over the next three years within our financial allocations. This period coincides with

- a number of major new facilities coming on line – i.e. Diamond, the Large Hadron Collider and ISIS Target Station 2;
- the need to prioritise the UK's large facility requirements and help shape Europe's large scale facility plans; and
- the creation of the Science and Innovation Campuses.

We must exploit these major scientific and economic opportunities. Success will depend on our ability to plan for long-term investment (both capital and operating costs) in facilities, which are increasingly internationalised, take years to build and have operational lifetimes of decades.

Investment in university departments is of strategic importance to the long-term health of a competitive science and engineering base. With the introduction of Full Economic Cost (FEC) many of these departments, particularly in physics, will be increasingly dependent on Research Council funding and we must aim to provide sustainable investment that enables them to continue to deliver world class science and highly skilled people.

The implementation of our strategy will require us to think in new ways about how we focus our investments. We must ensure that we are continuously looking for high added value for the UK from the total R&D system i.e. universities, laboratories and industry. Working with our stakeholders – the other Research Councils, the Technology Strategy Board, industrial companies, the Regional Development Agencies – we will seek to develop and harness our expertise more effectively, focus on exploiting synergies, and avoid inefficient duplication of investment and infrastructure. This will require a programme of change, particularly in how we invest in and manage our infrastructure and the skills required to support our programme.

Our capacity to move forward on this strategy and to address the issues described above must be set in the context of our financial settlement, the details of which are given below. Within this settlement we will focus on those elements of our programme that are of highest strategic importance. To accommodate the major facilities coming on line and create sufficient financial flexibility to enable us to pursue some existing high priority planned programmes and new opportunities, we will implement a substantial programme of organisational restructuring. It will be necessary to withdraw from, or cut back on, other planned programmes and facilities. Some of these programmes will be able to bid back for funding in competition with new opportunities within the degree of financial flexibility achieved but we have to recognise that some opportunities will be lost. It will also be necessary to constrain our investment in exploitation grants.

This process will require tough choices on priorities tensioning various elements of the programme and will necessitate considerable disruption and change in the next three years. However, this change is unavoidable and necessary if we are to move forward on a stronger sustainable financial footing and deliver the strong vision we have for the Council.

In developing detailed implementation plans we will draw on advice from Council's science advisory structure and output from the current programmatic review. We will work with our staff, the research community through our science advisory structure, national stakeholders and international partners to manage the process of change and limit disruption.

The achievability of this planned programme and the aggressive targets we have set to deliver savings will be contingent on the degree of flexibility we have in managing cash flow and the availability of sufficient non-cash provision. We also recognise that our plans carry a number of risks to delivering our mission: political, commercial (existing and potential partners), scientific, international and reputational. We will work with DIUS to address these issues.

1.1 FINANCIAL FRAMEWORK

Our CSR07 Science Budget Allocation is:

	2007-08	2008-09	2009-10	2010-11	CSR07 Total
Allocation	Baseline	£'000	£'000	£'000	£'000
Near Cash	400,658	432,250	428,932	432,741	**1,293,923**
o/w own EYF is:		*9,202*	*6,393*		***15,595***
o/w other EYF is:		*4,702*	*7,725*		***12,427***
Non-Cash	75,438	92,838	100,191	114,947	**307,976**
Resource DEL	**476,096**	**525,088**	**529,123**	**547,688**	**1,601,899**
Direct Capital	53,475	53,475	54,919	56,402	**164,795**
Capital Grants	43,893	45,078	46,295	47,545	**138,919**
Capital DEL	**97,368**	**98,553**	**101,214**	**103,947**	**303,714**
Total	**573,464**	**623,641**	**630,337**	**651,635**	**1,905,613**
Forecast Income		71,000	74,000	76,000	

This allocation represents an increase of over 13.5% over the CSR period. It includes earmarked funding:

- to support research on the basis of 80% FEC;
- a minimum of £5m to be committed in collaboration with the TSB over the CSR07 period;
- participation in the cross-Council, multi-disciplinary research programmes at a level agreed with RCUK;
- participation in the Shared Services Centre at a level of £11.2m;
- resource to enable us to increase our contribution to ESA by £5.7m pa by the end of the CSR07 period.
- resource at the level of £28.1m to cover the costs of the closure of the SRS;
- funding for the STFC's share in the costs of RCUK including the programmes on research careers and diversity, science and society, the RCUK International fellowships scheme, the secretariat, RCUK International offices and other agreed joint activities;
- Capital and Capital Grants, excluding those funded through the Large Facilities Capital Fund – plans for capital expenditure are set out in our Capital Investment Strategy.

Our allocation also includes funding to complete approved projects supported through the Large Facilities Capital Fund – Diamond Phase 2 (£37.2m) and Phase 1 of the Muon Ionisation Cooling Experiment (MICE) (£1.0m) – plus the costs for VAT on Diamond Capital (£10.5m).

For this CSR period, the arrangements for international subscription compensation have been amended. From 31 March 2008 onwards, any significant increases in international subscriptions resulting from adverse movements in exchange rates and/or NNI rates will be dealt with in the same way as uninsured risks i.e. STFC will be expected to absorb the increase up to £6m, with increases over and above this amount to be subject to discussion with DIUS.

We will also contribute to the central targets for Value for Money savings (3.65% across the Science Budget), administrative efficiency (around 3% pa) and asset disposals.

Our non-cash allocation, based on returns made during 2006 as part of the Asset Management Strategy exercise, covers depreciation, cost of capital charge and provision changes.

Within this settlement we need to provide the operating costs for new Capital facilities that are coming online, i.e. Diamond and ISIS Target Station 2.

1.2 PRIORITIES FOR THE CSR07 PERIOD

We outline below our priorities over the CSR07 period. We will:

- give highest priority to exploiting recent investments in major national and international facilities which will tackle some of the most exciting science challenges of the next decade;
- maintain our international subscriptions in CERN, ESA, ESO, ESRF and ILL. Continued membership of these organisations is crucial to the delivery of our science strategy and our international credibility and leverage;
- invest in targeted R&D to achieve the necessary leverage for the UK to be a significant partner in a small select number of timely and affordable major large-scale facilities and to host at least one in the longer-term;
- target our investment in science exploitation through grants taking account of facility availability;
- invest in a prioritised programme of innovative, underpinning technology development, including accelerator science and technology, detectors, sensors etc. which enhance the effective exploitation of major national and international facilities and our programmes;
- develop, in close partnership with the RDAs, the TSB and private sector partners, the Harwell and Daresbury Science and Innovation Campuses, as national hubs of knowledge exchange between university groups, the international R&D sector and high added value industries. Our aim is to move rapidly to a Joint Venture model for both Campuses;
- plan to create 5 new 'technology gateway centres' at the Harwell and Daresbury Science and Innovation Campuses to provide a step-change in engagement with industry and academic users. An Imaging Solutions Centre aimed at transforming access to facilities into access to solutions; new centres to make available expertise in computational science and in sensor and detector development; and a Joint Institute for Materials Design to aid materials discovery with a focus on energy applications. Negotiations are also well advanced to site a European Space Agency centre at the Harwell Campus;
- seek, with our partners in BNSC, to establish a national space technology programme which will enable the UK to increase its leadership in space science and its global market share in space products and services for telecommunications, climate change, global security and resource management;
- develop ways of encouraging our research community to exploit the intellectual property from their research and embed within the STFC a culture of entrepreneurship and a reward system that provides incentives for innovation and knowledge exchange as well as high scientific endeavour;
- seek, with our Campus partners, to implement a skills and training strategy to identify and address core skills gaps regionally and nationally;
- embed public engagement as an integral part of our science and technology programmes; focus, working with RCUK and other stakeholders, on high impact campaigns on key science and technology themes which excite and inspire as well as demonstrate the social and economic value of science; and explore how best to use modern, more diverse media to engage and excite the young.

In establishing a robust programme which is sustainable into the future we will:

- develop and promote both the Harwell and Daresbury Science and Innovation Campuses as JV partnerships and explore alternative options for running the UK Astronomy Technology Centre;
- as part of this process, reduce our infrastructure and overhead costs, seek opportunities for rationalising and consolidating core competencies and capabilities and creating a more flexible workforce;
- reduce significantly the proportion of in-house staff funded through Direct Vote;
- set an overall target for efficiency savings across our laboratories over the CSR period;
- withdraw from major facility programmes which are not of the highest priority;
- reprioritise our investment in other high priority science programmes and facilities informed by our ongoing programmatic review;
- set a target for reduced spending on exploitation grants.

1.3 MEASURING PROGRESS

Progress against the objectives described in this Delivery Plan will be reported against a Scorecard and reviewed quarterly, with an annual appraisal of outputs against a generic set of metrics established for the STFC – the STFC Economic Impact Framework.

SECTION 2 DELIVERING WORLD CLASS SCIENCE

Our world class science and facilities programmes enable our research community to address a wide range of Big Science questions that are fundamental to the advance of knowledge and are of high societal and economic impact.

- *Why is there a Universe?*
- *How did galaxies form?*
- *Was there ever life on Mars?*
- *How do planetary systems evolve?*
- *How are the chemical elements created?*
- *How does our climate work?*
- *How can we create new materials to store energy?*
- *How can we meet mankind's need for abundant clean energy?*
- *How can we design smart materials?*
- *How do cells work?*
- *How do degenerative diseases develop?*
- *How can we design better treatments for cancer?*

The science programmes and facilities needed to answer these questions all build on, and are connected by, common technological foundations. World leading capabilities in particle accelerators, sensors and detectors, advanced engineering, space technology, and cutting edge computing, simulation and modelling underlie the whole range of the Council's capabilities, and are made possible by a strong collaborative skills base in universities, industry and our laboratories. These capabilities will also enable us to contribute to the planned cross-Council programmes, building naturally on our core competencies and to contribute a step-change in economic impact.

2.1 SCIENCE AND TECHNOLOGY STRATEGY

Particle physics

Particle physics aims to discover the fundamental building blocks of the Universe, how they interact, and how this has shaped the structure of the cosmos.

Our highest priority will be to exploit the Large Hadron Collider (LHC) at CERN, which starts operation in 2008; this is because discoveries are guaranteed. This accelerator is the first with sufficient energy to access the regime where our existing knowledge breaks down: at the very least, we hope to find the Higgs Boson, which is postulated to give particles their mass; theoretical models suggest we will likely observe new symmetries of nature, new particles and forces beyond those known.

With the commissioning of the LHC, CERN will be for at least the next decade the world's most advanced particle physics laboratory. Our membership of CERN gives us a strong and central role in this transformative project: one of the two major experiments at LHC is UK-led. If CERN Council agrees the proposed uplift in the CERN subscription to enable the LHC to be operated optimally. This uplift will be funded from the particle physics grants line.

The UK research community has been a major player in constructing the LHC and the highly advanced computing infrastructure to handle the data. The community is now prepared and ready to exploit the results from the machine and we will support the community to do so, within our financial constraints.

We will cease investment in the International Linear Collider. We do not see a practicable path towards the realisation of this facility as currently conceived on a reasonable timescale.

The recent discovery that neutrinos (a type of fundamental particle) have unexpected and unique properties, may ultimately account for the very existence of our Universe. UK researchers have played an important role in these discoveries. There are a range of opportunities for taking this area of science forward, including a programme of neutrino experiments building on the MINOS project at Fermilab in the USA, leading to the T2K experiment in Japan, due to come online in 2009; a programme of R&D for the SuperNEMO experiment, which will test whether neutrinos and anti-neutrinos are actually the same thing; and continuation of the MICE experiment which is addressing some of the technical challenges in the design and construction of a neutrino factory, which will fully uncover the neutrino's properties. We will decide through the programmatic review our strategy for further investment in this area. The level of future funding will be dependent on the success of our restructuring plans.

Nuclear Physics

The goals of nuclear physics are to understand why atomic nuclei exist, how the forces that hold them together behave, and how the chemical elements on which life depends were made in stars. The UK has an active research community. The first accelerators capable of producing beams of unstable nuclei are now becoming available, which opens an important new window to explore these questions. We will focus our investment in nuclear physics on the highest priority programmes.

Particle Astrophysics

Particle astrophysics explores the connections between the fundamental constituents of the Universe and its large-scale structure and evolution. The recent discovery that the bulk of the Universe is not made of normal matter (like you or me) but dark matter and dark energy, whose nature is entirely unknown, has emphasised the science opportunities in this area.

We will revisit the on-going level of our investment in a number of projects, including the experiments for the direct detection of gravitational waves i.e. GEO600 and Advanced LIGO; experiments in the direct detection of dark matter i.e. Zeplin III using the Boulby mine; and the cosmic microwave background experiment, CLOVER. We will cease to invest in high-energy gamma ray astronomy experiments.

Astronomy

The astronomy programme seeks to understand the origin and evolution of the Universe, the stars and galaxies that it contains and the origin and evolution of our solar system.

In ground-based astronomy, our highest science priority is to focus on galaxies – exploring how they form and are arrayed in large-scale structures. Through our membership of ESO, UK astronomers now have access to the world's most productive 8m class telescopes and when commissioned in 2008 the UK-built VISTA telescope, giving world-leading capability in surveying the sky. Without membership, the UK, indeed Europe, would not have been able to afford joint participation with the USA in the ALMA project. ALMA is a giant, international observatory currently under construction on a high-altitude site in Chile. It will be the world's most powerful sub-millimetre telescope in the next decade and will begin operation in 2009.

We will continue to invest, in collaboration with European and other global partners, in design studies for two future instruments with transformative potential: an Extremely Large Telescope ten to a hundred times more sensitive than present instruments and the Square Kilometre Array, the next generation radio telescope, fifty times more sensitive than current facilities. Such increases in sensitivity will transform our view of the Universe by allowing us to see planets around distant stars, the formation and evolution of galaxies, and the nature and distribution of the dark matter and dark energy which dominate the evolution of the Universe, with unprecedented clarity and precision. Decisions on investment in construction of these facilities will not be needed before 2010.

We plan to withdraw from future investment in the twin 8-metre Gemini telescopes and we will work with our international partners to retain access to Gemini North. We plan to continue to invest in the JCMT to exploit SCUBA 2, a revolutionary millimetre wave camera being developed in the UK. We will finalise plans for the rundown of our investment in the Isaac Newton Group of telescopes in the Canary Islands. We will cease all support for ground-based solar-terrestrial physics facilities.

We will target our investment in astronomy grants taking account of reduced facility availability.

As part of the programmatic review we will consider the case and our financial capacity for further investment in the operation of the UK infrared telescope (UKIRT) in Hawaii, Merlin, the Liverpool Telescope, Astro-Grid and whether and at what level we should invest in the US-led Dark Energy Survey.

In space science the UK research programme is primarily delivered through the European Space Agency (ESA). It provides the infrastructure to enable member states to pursue an independent European space programme and is a vehicle to enable Europe to collaborate with NASA and other leading space agencies on major space missions. Through its membership the UK has maintained its position at the forefront of space science and through juste retour the UK receives a direct industrial return enabling UK industry to develop new technologies and services particularly in telecommunications

In terms of domestic space science investment our priority will be to complete projects for three major ESA missions: completing construction of UK instruments for the Herschel telescope (launch 2008) and the James Webb Space Telescope (2013); developing scientific data analysis capability for the GAIA mission to unpick the history of the formation of our Galaxy, and participating in the BepiColombo probe to Mercury. Subject to programmatic review, we will reduce our post-launch support for existing missions by around 30%.

Space Exploration

Space exploration has emerged in the last few years as one of the highest priorities globally in the developed world. All major science nations plan to increase their investment substantially in the area because of the combined scientific, technological and commercial opportunities. Our strategy will be to develop programmes both through our membership of ESA and bilaterally, principally with the USA. These plans should be viewed within the overall scope of our plans for a National Space Technology Programme (Section 3.5) i.e. they will contribute technology and economic benefits in the short to medium term.

The UK has already decided to take a leading role in the European AURORA planetary exploration programme. We are currently going through the detailed design phase for the first major mission, ExoMars, which will give a new level of understanding of Mars and its potential to have ever supported life. As anticipated, the UK is demonstrating that it is well-placed to achieve both the scientific and industrial return from its planned investment, and to boost Knowledge Exchange. We will therefore plan to maintain our current level of investment in Aurora. The ExoMars programme will be reviewed prior to the ESA Ministerial at the end of 2008 and this will be the opportunity to review our future investment in the Aurora programme.

We plan to develop our engagement in space exploration by working with the US as part of a Global Exploration Strategy. The UK and NASA have signed a joint statement agreeing to pursue a bilateral partnership focussed initially on a joint programme of early robotic exploration of the Moon which, in addition to specific lunar science goals, will prepare the way for human exploration of the Moon and develop technology that will be needed for robotic exploration of Mars and near-Earth asteroids. A programme will be developed and considered for funding in due course. This is an excellent and timely opportunity to forge an influential and cost-effective role in what is likely to be one of the most exciting scientific endeavours of the early decades of the 21st Century. This programme also has major potential to stimulate and add momentum to the Campus development at Harwell, and will leverage the planned ESA centre.

Light Sources

The Diamond Light Source at the Harwell Campus is the largest scientific facility built in the UK in over 40 years. It has the potential to be the best medium energy light source in the world and uses an electron storage ring to produce beams of X-ray, infrared and ultraviolet light. These photon beams are used to probe the structure of matter and materials, for applications in biosciences and medicine, the environment, nanoscience and nanotechnology, materials processing, energy, and engineering as well as fundamental physics and chemistry.

State of the art instrumentation is being constructed for Diamond, with an initial seven beamlines now complete. Phase II provides for a further 14 beamlines and one test beamline phased in over the period 2007 to 2011. All the new beamlines have been selected following wide consultation with the user community, and will provide new opportunities for multidisciplinary study in the priority fields of energy, the environment and healthcare.

In supporting Diamond as the major stakeholder on behalf of the Research Councils we will work with our partners to ensure that the facility is operated as cost-effectively as possible and that, where possible, the facility takes full advantage of the opportunities to share expertise and infrastructure costs across the Harwell Campus, achieving the best science within the overall funding limits. Our ability to fully exploit the facility will depend on the success in making the savings elsewhere in this plan.

The European Synchrotron Radiation Facility (ESRF) in Grenoble, France, operates the most powerful and successful high-energy synchrotron light source in Europe. We are considering, with our partners, an upgrade programme over the next 7 years to refurbish the accelerator complex and to renew and upgrade the beamlines to significantly improve their performance and exploit new areas of science. This programme will be tensioned against other programmes for further investment.

Looking to the future, a new generation of light sources will be able to deliver synchronised, extremely short pulses of light, which can stimulate and then image chemical processes as they occur. This will permit us to explore not just molecular and chemical structures, but dynamics and functions too.

The International Review Panel for Light Sources emphasised that the UK could take advantage of its substantial expertise and capabilities in accelerators and lasers to develop a new proposal for a next generation light source. The first step will be to work with the community to identify the key science drivers and technology required. The second will be to identify the resources and milestones to produce a focussed, sustainable science-driven proposal. The third will be the delivery of a proposal for decision by late summer 2009.

In parallel, the UK will participate in the European X-ray Free Electron Laser (XFEL) to be built at DESY in Hamburg, a source of high brilliance coherent X-rays with high repetition rates and very short pulse lengths to open up new areas of research in many scientific disciplines, including femtochemistry, structural biology, materials research, cluster physics and plasma physics. The facility is projected to become operational during 2012. We have provided funding to enable our staff and the UK science community to participate in the preparatory R&D activities. The UK contribution has been earmarked in the Large Capital Facilities Fund and we have a goal to maximise the fraction that is contributed in-kind.

We will run down the Synchrotron Radiation Source at Daresbury as planned with a closure date of 31 December 2008.

Neutron Scattering

Neutron scattering is a vital research and analysis technique in exploring the structure and dynamics of materials and molecules; it provides unique and complementary information to that available from light sources. The STFC provides access to the two world-leading neutron facilities, ISIS and ILL.

ISIS is the world's most productive pulsed neutron spallation source. In the short-term, given financial constraints, we may have to consider reducing availability to UK users in universities. The precise scale of this reduced provision will be determined over the next 3 months. Facility development on Target Station (TS1) will continue to be needed to ensure the facility remains world-leading and agile enough to address new scientific priorities. The scale of such investment over the next three years will be tensioned against other programmes as part of the programmatic review.

ISIS Target Station 2 (TS2) complements the facilities already operating at ISIS and enables the science programme to expand into the key research areas of soft matter, advanced materials and bio-science. It will keep the UK at the forefront of neutron research and enable scientists to continue to make breakthroughs in materials research for the next generation of super-fast computers, data storage, sensors, pharmaceutical and medical applications, materials processing, catalysis, biotechnology and clean energy technology.

The TS2 experimental programme beginning in late 2008 will provide 7 state-of-the-art instruments to make use of the enhanced flux of long-wavelength, low-energy neutrons. The second phase of development will begin in 2008, to deliver a cohort of advanced instrumentation exploiting developments in beam optics, focusing devices and advanced detector technology. We will review the phasing of this programme within our overall financial flexibility.

The reactor-based neutron source at the Institut Laue-Langevin (ILL) in Grenoble, France, is highly complementary to ISIS. In the CSR period we will develop new partnership programmes in soft condensed matter, materials science and engineering, and continue to invest in instrumentation enhancements through the ILL 20/20 upgrade programme.

On a fifteen year timescale the UK research community will require access to a new, competitive neutron facility. We will over the CSR period explore the options for future investment.

Lasers

The Central Laser Facility (CLF) provides an internationally leading capability in the provision and application of ultra-fast and high intensity lasers. The strategic direction of the CLF is to exploit the links between its facilities in the areas of fusion energy research, plasma-based particle acceleration, and ultra-fast spectroscopy for bioscience and nanotechnology applications, whilst maintaining a sufficiently flexible capability to encourage innovative research in other areas.

The priority in the CSR period is to exploit the Astra Gemini laser system. Within the resources available, we will aim to carry out a programme of planned upgrades which will maintain the competitive performance of the other major laser systems. These upgrades, which will again be tensioned against other planned programmes, are:

- Astra-ARTEMIS, working with Diamond and a consortium of universities, will enter the regime of extremely short (few-femtosecond or shorter) pulses for the first time, opening new science opportunities.
- ULTRA, in collaboration with the BBSRC. This will provide the world's most sensitive vibrational spectrometer for applications in bioscience, energy, nanoscience, etc.
- Completion of the 10 petawatt upgrade programme for VULCAN which will maintain the CLF's lead in ultra-high power lasers.

In parallel we will seek to pursue R&D towards a longer-term possibility of building HiPER, a high power laser designed to demonstrate practical energy generation from nuclear fusion, the 'holy grail' for sustainable energy production for human needs. This is made feasible by the advent of a revolutionary laser driven fusion technique known as fast ignition, which reduces the scale of facility required by a factor of ten. The UK is leading on this European project and given its potential we will pursue vigorously the opportunity for the facility to be built in the UK.

SECTION 3 A STEP CHANGE IN KNOWLEDGE EXCHANGE AND ECONOMIC IMPACT

STFC is uniquely placed to facilitate knowledge exchange and economic impact to the benefit of the UK, building on:

- the Science and Innovation Campuses at Harwell and Daresbury, which can act as focal points for collaboration and knowledge exchange with industry and academic researchers;
- the ability to use our challenging science programmes to inspire new ways of thinking about wider problems;
- the ability to mobilise our in-house expertise and that of the communities we support to address challenges of economic and societal relevance;
- the ability to mobilise the technology expertise and skills base embodied in our own staff and in the research communities that we support;
- our role in the training of scientific and technically skilled people.

Our knowledge exchange programme consists of four main strands of activity:

- Science and Innovation Campuses and wholly owned laboratories
- CLIK
- STFC Shareholder facilities
- HEI funded programmes.

3.1 THE HARWELL AND DARESBURY SCIENCE AND INNOVATION CAMPUSES

The Harwell and Daresbury Science and Innovation Campuses form the most innovative and ambitious aspect of our KE strategy and will be recognised as internationally leading centres of excellence for science and innovation. The vision is to create multi-partner, mixed-economy campuses with STFC facilities and science and technology programmes embedded at the heart of the model. Our programmes will be further enhanced through co-location of HEI and international science and technology programmes which, together, will act as a primary catalyst for innovation.

Our vision for the Science and Innovation Campuses is that they will be:

- national focal points for interaction between:
  - world class 'Embedded Science' facilities
  - ultra-high technology capabilities
  - world leading researchers in universities
  - a strong and rapidly growing business base;
- internationally-regarded centres of excellence in science and technology;
- centres for world class interdisciplinary expertise which promote open innovation;
- powerful attractors of inward investment from the international R&D sector and multi-national companies;
- developed around a positive planning policy framework.

Our aim is to create **genuine** internationally-competitive critical mass.

In the first year of the CSR period, we will establish the Joint Venture Company for the Harwell SIC and explore a range of options for Daresbury SIC, including a JV model. Masterplans for both sites will be informed by the Campus business plans and will be underpinned by the development of our estate, as we will set out in our capital investment strategy. A 'mixed economy' approach will be adopted in populating the Campuses to provide a unique environment for collaborative research and development, training and innovation.

Our vision for the two Campuses differs. In the case of the Daresbury Campus our focus will be on creating a national technological capability in the areas of computational science and accelerator and detector R&D for next generation facilities. The Harwell Campus will be more broadly based but at its core will be our major facilities i.e. Diamond, ISIS and the Central Laser Facility and technological capabilities in space systems, imaging and sensors.

Both Campuses will also offer a high quality environment for new industrial research activities and knowledge intensive businesses through the formation of new technology gateway centres both to act as foci for these activities and to coordinate work with the new TSB. These plans are described in more detail in the following paragraphs. The extent to which we can pursue them will be contingent on funding through the Large Facilities Capital Fund and external funding from other stakeholders.

3.2 TECHNOLOGY GATEWAY CENTRES

As an inherently multidisciplinary organisation with strong technological competences, the STFC is strongly placed to contribute naturally to both technology development and to cross-Council multidisciplinary programmes.

The STFC contributes to advanced technology in two ways:

Our science goals *drive* the development of cutting edge technology to meet our programme requirements:	Our facilities and capabilities enable the development of technology by HEI and industry researchers:
• Sensors and instrumentation	• Access to facilities
• Advanced materials	• Imaging
• Computing	• Simulation and modelling
• Engineering and space technology	• Campuses as focal points for collaboration

Our current spending on technology development is about £20m per year. In one area alone (space technology) our investment of about £5m per annum leverages more than £100m spending in industry.

We plan to work with the newly re-established Technology Strategy Board and other stakeholders to deliver a step change in:

- connections with industry and exploitation of our in-house technology requirements and capabilities for the benefit of the UK;
- facilitating and maximising the impact of our facilities and campuses as locations for research and collaboration by and between industry, HEI researchers and laboratory scientists.

STFC has developed a technology strategy, which identifies five areas of strong internal capability and relates them to six areas of societal and economic relevance chosen to correspond to the cross-council, multi-disciplinary programmes. These capabilities and applications, together with the mapping between them, are shown in the table below:

	Access to facilities (ISIS, CLF, Diamond…)	Computer simulation and modelling	Advanced materials*	Design, engineering, space technology	Sensors, electronics and photonics
Bioscience and healthcare*†	Dark	Dark	Dark	Light	Dark
Energy technologies*†	Dark	Dark	Dark		Dark
Climate change, environment †	Dark	Dark	Dark	Dark	
Global threats to security †	Light			Dark	Dark
Nanoscience, nanotechnology †	Dark	Dark		Dark	Dark
The digital economy †	Light	Light		Light	

* indicates a Technology Strategy Board theme area;
† indicates an area related to a cross-council multi-disciplinary theme
Dark shaded boxes indicate areas of strong relevance;
light boxes indicate areas of moderate relevance.

In each of the five capability areas we have identified a new initiative to strengthen the technology impact of our activities and facilitate a step-change in their effectiveness. We will work with other Research Councils, the TSB and other potential partners to provide the infrastructure for these ‘gateway centres’ and to populate them with world-leading science programmes.

These new initiatives will also strengthen the position of the Harwell and Daresbury Campuses as focal points for collaborative exchange and will enhance the connection to and delivery on the objectives for the multidisciplinary cross-Council programmes.

A new **Imaging Solutions Centre** will transform ‘facilities access’ into ‘solutions access’. It will provide a gateway and consulting services to deliver ‘one-stop’ problem-solving capabilities to industry and HEI researchers, by bringing together access to STFC facilities together with access expertise in computer simulation, detectors, data acquisition and analysis, and providing a focal point for collaboration and interaction.

The **Hartree Centre** at the Daresbury Science and Innovation Campus will be a new kind of computational sciences institute for the UK. It will bring together academic, government and industry communities and focus on multi-disciplinary, multi-scale, efficient and effective simulation. The goal is to provide a step-change in modelling capabilities for strategic themes in energy, life sciences, the environment, materials, and fundamental physics.

A novel **Joint Institute for Materials Design** will be co-located with the ISIS neutron source, the Central Laser Facility and the Diamond Light Source at the Harwell Campus. It will exploit these facilities to offer world leadership in the area of materials discovery, characterisation and imaging, with key areas of focus being materials for energy applications (storage, fuel cells, batteries, catalysis, solar energy, and lightweight structures) and for electronics. It will serve as a focus of knowledge exchange between industry, academia and the scientific facilities of the Campus.

The **Detector Systems Centre** will act as a conduit to bring together academic and industrial collaborators together with STFC's world class detector capabilities and knowledge base. It will support fabrication, prototyping and characterisation of sensors both for research applications and industrially applicable markets (such as security and biomedical imaging), and will develop and commercialise both sensors and integrated detector solutions.

Negotiations are well advanced to locate a European Space Agency centre on the Harwell Campus. The UK is currently the only major partner in ESA that does not host a significant ESA facility. This centre will provide complementary capability in three areas: the co-ordination of ESA activities in support of global/ climate change research and environmental impacts; identification of opportunities for new applications and services, primarily for public good, drawing on both space and non-space assets, systems and data streams; and a facility for exploration, novel power and robotic technologies.

Our decision to develop a new light source proposal, to cease investment in the International Linear Collider and the need to consider how to take forward a programme in neutrino physics all impact on our overall investment in accelerator and detector R&D. We will seek to refocus these activities so as to develop a strong set of core competencies with broad relevance to future facilities and to rationalise our investment in accelerator R&D, working with the Cockcroft and John Adams Institutes and ASTeC.

3.3 GOALS FOR INTERACTION WITH TSB AND OTHER AGENCIES

We propose to work with TSB (and other Research Councils) to identify jointly priorities for collaborative partnerships between technology expertise on the Harwell and Daresbury Campuses, university groups and industry. We aim to secure matching funding from the TSB especially in support of commercialisation of technologies and to promote and support academic and industrial users of the technology centres. We will invest at least £5m over the CSR07 period on agreed priority areas.

3.4 CONTRIBUTIONS TO MULTIDISCIPLINARY, CROSS-COUNCIL PROGRAMMES

Our contribution to the multidisciplinary, Cross-Council programmes will primarily be through the provision of access to our world-leading facilities and provision of underpinning technology for projects in priority areas. The establishment of the proposed technology centres will provide a focus for these priority programmes. Figures in the table below are based on historic facility access levels.

Summary of STFC Contribution to Multi-disciplinary, Cross-Council Programmes

	£m
Energy	up to 14
Living with Environmental Change	up to 2
Global Threats to Security	up to 2
Ageing: Lifelong Health and Well-being	up to 12
Digital Economy	0
Nanoscience: Through Engineering to Application	up to 8

Energy

Our contributions to energy technologies will include the development of new materials for fuel cells, photovoltaic devices, and hydrogen storage; the development of renewable energy sources and clean burning of coal. We will work with both industry and HEI researchers; our proposed Joint Institute for Materials Design and Imaging Solutions Centre will act as gateways to our facilities and as a focus for interdisciplinary collaboration. For the longer term we will lead in investigating the physics underlying inertial fusion energy, which offers the potential for abundant clean energy.

Living with Environmental Change

Our focus will be to provide support in the areas of molecular studies of greenhouse gases, satellite technologies for earth observation, and high performance computing for modelling environmental change, exploiting the proposed Hartree Centre. The new European Space Agency centre at Harwell will also play an important role; climate change is an explicit part of its mission.

Global threats to security

We will exploit our technology base in relevant areas such as the use of lasers to detect explosives and nuclear materials; the use of laser spectroscopy (in conjunction with a new STFC spin-out company, LiteThru Ltd) to detect counterfeit drugs; the development of more effective x-ray detector systems for airport security (in partnership with a major manufacturer, CXR); and the use of novel terahertz imaging technology for the security market (with ThruVision, another STFC spin-out company).

Ageing: life long health and well-being

We will develop techniques within our facilities to explain drug actions in diseases like cancer, osteoporosis and neurological disorders and to tackle crucial biological problems like aberrant protein folding in Alzheimers, motor neuron and prion disease.

Digital economy

We will support (but not directly attribute funding to) this programme through the deployment of the grid technologies that we have developed for particle physics to allow large numbers of computers to be used collaboratively for large-scale data processing, data mining, information curation and preservation.

NanoScience through Engineering to Application

We will build on our existing networks in nanoscience and technology to support this programme, and use the Joint Institute for Materials Design, Hartree Centre and Imaging Solutions Centre as gateways for collaboration with HEI and industry researchers.

3.5 NATIONAL SPACE TECHNOLOGY PROGRAMME

Space is a high added value, high technology, highly skilled industry. A recent study by Oxford Economic Forecasting has confirmed Space as one of the highest value adding sectors of the economy and calculated that the Space Industry contribution to UK GDP is in excess of £7 billion. Independent estimates predict annual growth of 15% in the global space market over the next decade and the UK has the opportunity to increase its market share in both systems and services.

The UK has suffered in the past from the lack of a coordinated approach to the development of emerging space related technologies and applications. As a consequence the UK has not optimised its scientific and industrial return from membership of ESA and has not realised its full potential in the market.

We have developed within the BNSC partnership a proposed National Space Technology Programme (NSTP), which will remedy this situation, stimulate innovation and facilitate UK leadership in emerging space related technologies and applications. The NSTP will stimulate and manage the knowledge transfer process for space technologies to the benefit of all the BNSC partners and UK industry.

The core activities, in partnership with universities and industry, will be to:

- identify opportunities for knowledge transfer, and the exploitation of established and emerging space technologies;
- perform ‘proof of concept’ and technology risk reduction to establish the viability of candidate technologies and systems;
- focus on shortening development and implementation timescales for new technology to boost UK competitiveness;
- provide newly trained people in space technology;
- exploit opportunities for collaboration and technology demonstration, including flight heritage, and to stimulate private finance investment;
- coordinate and provide formal reports and other advice to partners to inform their investments and the delivery of services.

3.6 EDUCATION AND SKILLS TRAINING

There is substantial evidence that highly skilled people are the most powerful vector in knowledge exchange. We intend over the CSR period to sustain as far as possible our output of trained people from technicians through to post-graduates. The objective will be to increase the pool of people trained particularly in the highly analytical skills our research demands, in advanced technology, computing and international project management. These skills are highly desirable in employment sectors such as finance, IT and high-tech industry, as well as sustaining the health of our academic community.

Effective and efficient high technology KT is delivered through the movement of skilled people between research establishments and industrial sectors. The STFC offers a unique training ground for developing highly skilled technicians and dynamic researchers who will populate academic posts and positions in industry, thus driving the wider economy. We aim to develop strategic partnerships both regionally and nationally to establish a skills development and capacity building programme which will become a key component of the STFC Campus initiatives and KE implementation plan.

Plans include the establishment of Science and Innovation Resource Centres within the Harwell and Daresbury Science and Innovation Campuses to provide the capacity and infrastructure to support our sites in the delivery of training, knowledge transfer, entrepreneurship and innovation to its customers and collaborators in business and academia. We will interact with schools on a regional and national level to engage with the science curriculum, become an employer partner in specialised advanced diplomas and promote science, technology and engineering as a career choice. We will also continue to support and build on existing apprentice and studentship schemes.

3.7 INTERNAL AND EXTERNAL AWARENESS

One of the key activities that underpins the KE programme is the establishment of the correct culture and environment which will support and facilitate its delivery. The development and delivery of an awareness and communication programme is required in order to facilitate this cultural change which will raise the profile of the STFC's KE responsibilities and activities both internally and externally.

We will roll out a series of staff training programmes which will aim to educate STFC staff in the importance of the KE programme and their role within it, and seek opportunities to promote STFC KT achievements in the regional, national and specialist press.

3.8 CLIK

Central Laboratory Innovation and Knowledge Transfer Ltd (CLIK), was established in 2002 to identify, develop and exploit commercial opportunities at the laboratories now incorporated into STFC. CLIK is wholly-owned by the STFC. The development of the Harwell and Daresbury Science and Innovation Campuses offer an opportunity to expand CLIK's activity to deliver its service to the wide range of Campus tenants that will be attracted to the sites over the coming years. A strategy will be developed to take full advantage of this opportunity.

3.9 STFC SHAREHOLDER FACILITIES

The nature of large facility research programmes presents the opportunity for UK industry to engage as contractual suppliers for high technology design, construction and maintenance to large research facilities throughout the world. Our business extends beyond operation of our large facilities to shareholdings in CERN, ESO, ESA, ESRF, ILL and DLS Ltd. Together with BBSRC, NERC and UKAEA, we are a key sponsor partner in the TSB Sensors and Instrumentation Knowledge Transfer Network. The Research Facilities programme of the KTN will improve UK industry engagement with scientific Research Facilities around the world in terms of supply opportunity, knowledge transfer and access as users. We intend to fully engage with this programme to encourage the creation of a large facilities sector in industry.

We will continue to measure and grow UK contract return through the Business Opportunities Manager jointly funded by UKTI and will develop a one-stop-shop web site to standardise our processes. We will explore opportunities to work with UK industry to encourage innovation in the development and construction of large-scale research facilities through the use of appropriate procurement strategies and joint action with the TSB. The STFC sales team will promote our research facilities to commercial users and we will work closely with the Technology Transfer offices of international laboratories to promote KE to the UK. We will also aim to develop the cross-facility apprentice-training scheme between STFC and the ILL/ESRF.

3.10 HEI FUNDED PROGRAMMES

Our primary external funding role with regards to KE is to support UK academic and industrial leadership through technology development and to roll-out STFC technologies to broader market areas (industry and public sector including other academic disciplines) through industry and interdisciplinary collaborative research. The funding mechanisms also encourage entrepreneurial activity in our community, longer-term science and technology planning, enterprise, and a partnership mentality.

We have refocused the STFC Industrial Programme Support Scheme (PIPSS) on knowledge transfer and mobilisation and extended it to include a wide range of funding support. Increasingly PIPSS will be used as a brand to identify STFC's contributions to schemes involving other partners, including Follow-on Funding. We will expand this to cover the whole range of STFC supported programmes and capture the increased demand arising from growth in the brokering programme. The brokering team will maintain the initiative of encouraging take up of the technology skills of STFC's university groups and laboratories by new user sectors. We will continue to promote commercialisation from our wider research community; play an active role in RCUK activities such as the Business Plan competition; and harmonise arrangements for follow on and proof of concept funding across the laboratories and the research communities it supports. We will continue to support the Knowledge Transfer Partnerships programme and will support Discipline Hopping awards, which facilitate KE.

3.11 MONITORING ECONOMIC IMPACT

In 2006 the 'Warry' Economic Impact Group made a number of recommendations about how the Research Councils can deliver, and demonstrate that they are delivering, a major increase in the economic impact of their investments. The Warry report recognised that Research Councils have pivotal roles, both as funding bodies and as leaders of the research base. It adds that Councils are already increasing their emphasis on knowledge transfer and the economic impact of their work but must increase this emphasis further without sacrificing the research excellence for which the UK is rightly admired. A much-improved description of existing economic impact is clearly essential before improvements can be recognised.

In response to the Warry report, we will prepare a demonstration of the economic impact that we have generated to date, using one of our Large Science Facilities as an example. A methodology will be developed that can be applied to further annual assessments of general activity which will demonstrate the increased economic impact we have made. This will enable understanding of the longer term impacts of research investments, which will ultimately inform our strategy and operations.

Through the programme and developments described above we will contribute to the Governments objectives for increasing the economic impact of the research base. Attached at Annex 1 is a Baseline for Economic Impact which sets out our contribution against the following goals:

- Providing highly skilled people
- Improving UK business competitiveness
- Improved products and processes
- Creating Opportunities for UK business
- Attracting investment in the UK
- Commercialisation
- Improving Public Services.

SECTION 4 RELATIONSHIPS WITH STAKEHOLDERS

4.1 STAKEHOLDER ENGAGEMENT

STFC Council has established an advisory structure comprising a Science Board and two Science Committees – Particle Physics, Astronomy and Nuclear Physics Committee (PPAN) and the Physical and Life Sciences Committee (PALS). These bodies and the structure of committees sitting underneath them form the primary focus for advice on science and technology priorities and strategy. An ad hoc international advisory committee will provide an international perspective.

Our science strategy team has responsibility for developing strategic science and technology priorities and for developing links with key stakeholders both internally and externally – in other Research Councils, with the Technology Strategy Board and with other, similar organisations nationally and internationally. The science strategy team will deliver a Science and Technology Strategy for the STFC, including a prioritised list of future facilities to feed into the UK Large Facilities Roadmap. It will also be the focus for consultation on science and technology issues with the community, including leading on major reviews such as the Light Source Review and the programmatic reviews.

We will also establish an Economic Impact Advisory Board and an Education and Public Outreach Committee to provide advice to Council.

4.2 PUBLIC ENGAGEMENT

The STFC is extremely well placed to make a significant and distinct contribution to increase public engagement in science. Our strategy, which will be closely linked to the RCUK Science and Society programme, will be to focus on four key areas:

- embed public engagement into our highest impact science and technology programmes. Each of these programmes will have an engagement plan. This model will build on the success of our current major campaign focussed on the Large Hadron Collider at CERN which is due to begin operations in 2008.
- work with media professionals to exploit the wider and more diverse range of media which are now accessed by the young.
- forge stronger partnerships with formal and informal education sector organisations (such as Science Learning Centres) to link STFC science and technology with teachers, schools and young people.
- lead in public engagement with space which is one of the most powerful attractors for the young.

SECTION 5 EFFICIENCY SAVINGS

5.1 ORGANISATIONAL CHANGE

Underpinning the strategy for world class science and economic impact will be a restructuring of the organisation as well as the programme.

The aim of this restructuring is to ensure that the STFC in-house effort is complementary to the national skill base in universities and industry, is focussed on the delivery of core operations support and key technology development, is run with a high degree of efficiency and flexibility.

To achieve this we have set efficiency targets and will seek, working with public and private partners in the Harwell and Daresbury Campuses and at the ATC to develop new business models for the running and infrastructure support of each of our laboratories. We will also link our overall efficiency savings to the service provided by Swindon HQ.

As part of this process, the STFC is committed to the delivery of the efficiency targets set out in section 1.1. We will work with the other Councils to provide our share of the 3% target reduction in research council administration costs taking advantage of the implementation of the Shared Services Centre and other improvements in our internal business processes.

ANNEX STFC BASELINE FOR ECONOMIC IMPACT

A BASELINE FOR ECONOMIC IMPACT

STFC delivers economic impact throughout the whole range of its diverse programme and since 2006 has required Knowledge Transfer/Exchange plans to be included with applications for research funding. STFC plays a dual role as a funding agency supporting research in universities and major international centres as well as operating the two national Science and Innovation Campuses (SIC) at Daresbury and Harwell, the research facilities based at the two sites and the UK Astronomy Technology Centre at Edinburgh.

- Over 4,500 people work on the Harwell SIC in some 80 organisations.
- Daresbury Innovation Centre currently hosts 55 companies co-located alongside STFC's laboratory.
- STFC is establishing joint venture partnerships at both sites to take forward the delivery of the Campus initiatives.

Through our research programmes, facilities and wholly-owned exploitation vehicle CLIK, STFC has created spin outs and enabled companies to develop new capabilities which they can exploit commercially in wider markets;

- ThruVision is looking to secure our airports through novel imaging technologies to identify hidden objects.
- STFC contributes to CERN through international subscriptions. One of the largest economic impacts this Century, the World Wide Web originated from CERN labs.
- LiteThru, a RAL spin-out, is exploiting optical technology for screening applications (PA Consulting case studies).
- Astex, a UK based biotechnology company, has used the SRS facility to further its science. Astex has raised over £51m funding and has external collaborations valued at over £500m.

PROVIDING HIGHLY SKILLED PEOPLE

Through its facilities STFC plays a key role in education, training and skills provision at all levels from schools and apprentices to PhD and fellowships, both within its programmes and through the provision of courses.

- 999 people engaged with training courses (2006/07).
- There was an increase of 73% for qualified scientists using facilities in 2006/07 compared to 2005/06.
- 150 individuals from 7 SMEs have received NVQ level 3-5 training in advanced instrumentation and engineering at the Harwell SIC.
- 110 work experience placements at RAL and Daresbury in 2006/07.

STFC is the funding agency for PhD studentships at a national level for key areas of physics and will maintain this to ensure a strong flow of trained researchers both to maintain the health of the research discipline and to feed out into the wider economy, where evidence shows that students are highly desirable in high technology, computing and financial industries.

- Over 45% of PhD students enter university research on completion.
- 16% enter public sector/government (2003)
- There has been a steady increase in entering private sector by over the last ten years (28% in 2003)

STFC has a strong record of scientific publication by the scientists it supports and the researchers who use its facilities which can be used as an indicator on research output efficiency.

- On average there were 1070 multidisciplinary publications from the large facilities for 2005-07.
- 44% increase in publications from the astronomy community for 2006/07.

The STFC programme is contributing to the production of highly trained people and the knowledge base on which long term economic development will depend.

- STFC directly funds over 200 PhD students per year.
- STFC provides training for over 900 PhD students from a range of disciplines.
- 21 joint appointments with HEIs.
- 56 visiting fellows (from and to) large facilities.

IMPROVING UK BUSINESS COMPETITIVENESS

Improved products and processes

Commercial use of the STFC facilities and technology programmes has grown;

- CLIK has increased industrial Synchrotron use from £130k in 2006/07 to £173k in the first 6 months of 2007/08.
- 75 collaborative projects with industry with a value of £11.9m.
- 72 facility beam days used by commercial partners in 2006/08 (across all the facilities).

There are clear examples of new or enhanced products resulting from use of the facilities for industrial research.

- CLIK records on average 17 ideas/technology prospects per year (2005/07).
- 11 Proof of concepts are funded per year (average 2005/07).
- There are growing numbers of partnerships between university researchers (21 joint appointments with HEIs) and our laboratory based staff (41 collaborative projects).

Creating opportunities for UK business

STFC has played an active role in ensuring that UK companies are able to tender for work at major research centres. Through an initiative with UKTI and sponsorship of the SIKTN it is promoting a coherent national programme to ensure that UK companies get the widest knowledge of the opportunities open to them and early intelligence about new developments.

- Value of contracts placed with UK companies from ESA: €39.2m.
- Value of contracts placed with UK companies from ESO: €2.7m.
- Value of contracts placed with UK companies from CERN: CHF 26.5m.

Attracting investment in the UK

Our facilities and Campuses are already attracting investment in commercial and outreach activities, and our grant-based programmes have attracted co-sponsorship from other RCs and OGDs who wish to access our knowledge base.

- NWDA provided £8.5m towards Daresbury SIC for laser and HPC initiatives (2006/07).
- SEEDA provided £500k towards Harwell SIC to establish a Regional Resource Centre (2006/07).

Commercialisation

STFC has a strong track record of spin out formation through CLIK, which has incubated a number of companies including L3 technology Ltd, ThruVision Ltd, Microvisk Ltd, Oxsensis Ltd, Petrra Ltd, LiteThru Ltd, Quantum Detectors Ltd and, Bi-Au Ltd. It has also worked closely with universities and international centres to encourage an entrepreneurial approach which has yielded success.

- On average eight licences created each year (2005-2007).
- Average commercial income (non-sales) from licences is £56,274 per year (2005-2007).

IMPROVING PUBLIC SERVICES

Research that originates from STFC can be used to improve health and security.

Health

- Reduce the risk of strokes: Metropolis Data Consultants is a spin out company using techniques originally used by astronomers to give doctors clearer pictures from MRI images of patients' neck arteries which can lead to faster diagnosis and treatment (HEI involved: Cambridge University).
- Radio therapy: The accurate calibration of radiotherapy equipment is essential but time consuming and reduces the number of patients that can be treated. STFC's scientists have developed a solution and are working in collaboration HEIs, companies and the NHS (HEIs involved: Sheffield and Glasgow).

Security

- Public protection: Gamma-ray detectors help astronomers understand huge events deep in space. On Earth, this technology helps security forces look out for radioactive materials that could be used by terrorists (HEI: Southampton).

STFC Economic Impact Highlights

Economic impact area	Activity and measure
Highly skilled people	• Collaboration – qualified scientists using UK facilities: 4139 • People flow – Large facility staff involved with international collaboration and visiting fellows: 215 • PhD students directly funded: 207 • CASE studentships hosted in STFC departments: 40
Attracting and retaining investment in the UK	• Income from international collaboration: £5142k • Harwell SIC has >80 companies on site • Daresbury SIC has 55 high-technology companies on site
Improved products and processes	• Major user satisfaction measure presented by academic and private sector responses for large UK facilities: 88% (target 85%) • Number and value of collaborative projects with HEIs: 41 (£11.0m) • Number and value of collaborative projects with industry: 75 (£11.9m) (2005/06) • Percentage of projects reporting successful technology output or transfer in final report (PIPSS, FoF & Faraday): 80% • Successful completion of the PRI, PIPSS or Faraday project as demonstrated through a viable proposal for industrial engagement: 19 out of 21 • 19 companies collaborating on PRI, PIPSS and Faraday covering 6 commercial sectors
Commercialisation	• Creation of new businesses : 10 (2005-2007) • Licences: 23 (2005-2007) • Licence revenue: £56,274 pa • Proof of concept funding: 31 (2005-2007)

All figures are 2006/07 unless otherwise stated.

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