



Science & Technology
Facilities Council

Particle and Nuclear Physics Town Meeting

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University of Glasgow, 2011

Outline

1. Who we are, what we do, and why
2. The 2010 Comprehensive Spending Review
3. Our programme priorities 2011-15
4. The new STFC grants system

Discussion



HM Government & HM TREASURY



BIS | Department for
Business Innovation & Skills



Arts & Humanities
Research Council



**Science & Technology
Facilities Council**

Making the case for particle and nuclear physics

- Knowledge economy
 - STEM skills
- Inspirational power of these science areas
 - 90% of undergraduate physics students . . .
- Value of PhD students to economy



Impact through inspiration

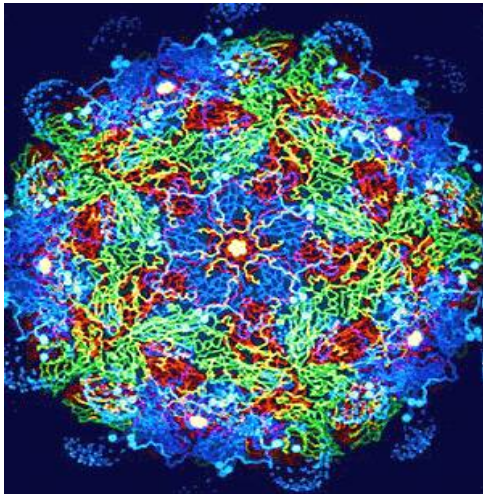


- This science also drives technological innovation:
 - detectors
 - data intensive science
 - ...



Making the case for big science facilities

- The key challenges of the 21st century – energy, global climate, health and security concerns – will be linked to our ability to manipulate and image matter at the scales from single atoms (10^{-10} m) to living cells (10^{-6} m).

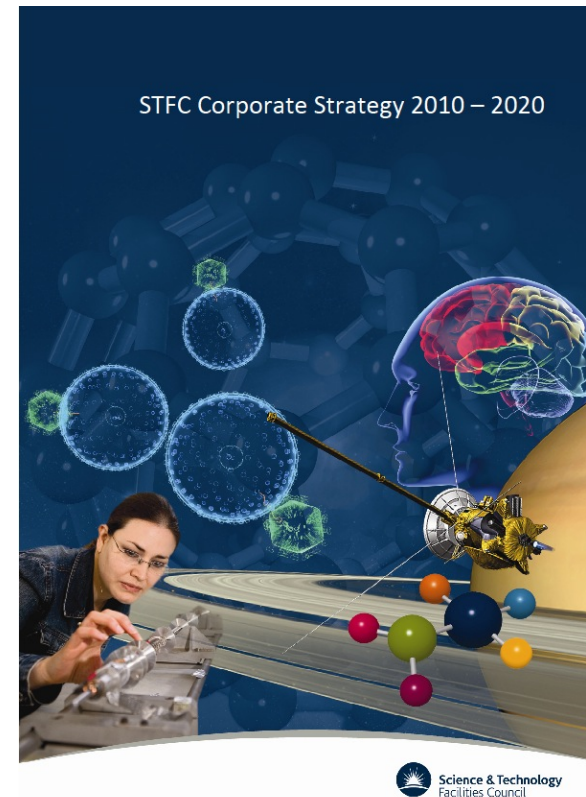


- This research requires large scale research infrastructures that are beyond the capability of any single university or research group, sometimes any single nation. STFC's role is to plan, develop and operate these facilities for the UK.



STFC Strategy

- STFC's corporate strategy brings these strands together to support three strategic goals:
 - **World Class Research**
 - **World Class Innovation**
 - **World Class Skills**
- Supported by six strategic themes:
 - Sustaining Research Excellence and Leadership
 - Solutions for global challenges
 - Inspiring and Involving
 - Effective Knowledge Exchange
 - Strengthening Strategic Partnerships
 - Building International Influence





Comprehensive Spending Review Outcome

- Overall the settlement is a good one for STFC, and an extremely good one compared to what we were expecting earlier in the year
- The outcome partitions our programme into three areas:
 - international subscriptions
 - UK large facilities
 - the “core” programme.

Our Allocation

Science and Technology Facilities Council (STFC)

Breakdown of the allocation

	£000	2011-12	2012-13	2013-14	2014-15	Total
RESOURCE						
International Subscriptions		108,598	119,515	121,697	123,071	472,881
Facilities		77,170	79,280	81,410	89,470	327,330
STFC Core Programme		190,060	172,200	172,200	172,190	706,650
CAPITAL						
International Subscriptions		46,221	30,293	28,530	27,667	132,711
Facilities		21,070	21,919	22,463	22,931	88,383
STFC Core Programme		19,630	21,981	14,237	14,169	70,017
Diamond I & II VAT – LFCF		4,600	3,300	3,300	3,300	14,500
Diamond III – LFCF		8,900	16,700	19,900	19,200	64,700

... this obviously needs some interpretation

Operations Plan

- We have now translated the statements and commitments in the Delivery Plan into an Operations Plan for 2011-12
- Has been informed by discussions with science communities, Science Board
- The process was much more straightforward than it would have been if the settlement had been less good:
 - No need for any major reassessment of our science priorities
- We have now resolved most major open issues but there are (still) plenty of devils in the details



International Subscriptions

- International subscriptions are fully funded at the levels which have been agreed with our international partners.
- The planned reduction of ESRF exploitation from 14% to 10% is included.
- Bought forward 90% of our currency requirements for FY11/12 and FY12/13 to manage foreign exchange exposure (60% for FY13/14 and FY14/15)



Diamond Light Source

- The largest scientific instrument built in the UK in > 40 years.
- Aims to be the best medium energy light source in the world.
- State of the art instrumentation, 22 beamlines by 2011.



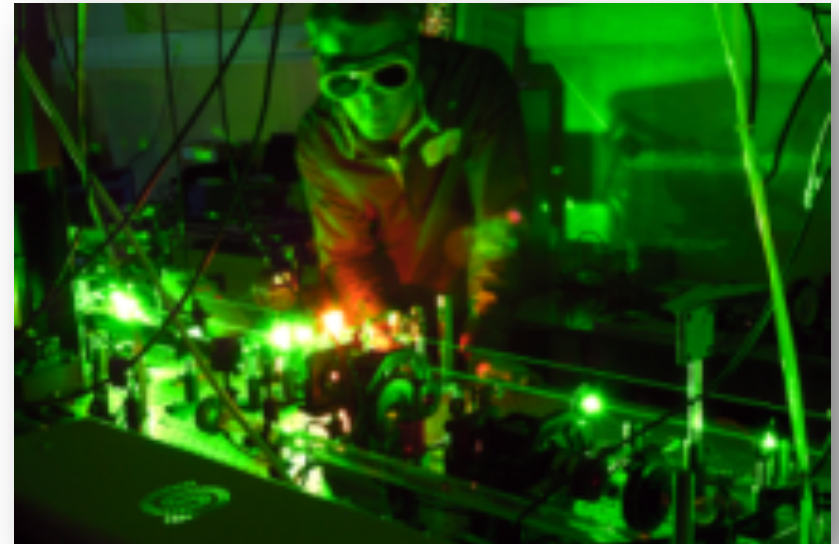
ISIS

- ISIS is the world's most productive pulsed neutron spallation source.
- Target Station 2 expands the science programme into soft matter, advanced materials and bio-science
- 2nd phase of TS2 instrument development now funded



High Power Lasers

- The Central Laser Facility (CLF) provides an internationally leading capability in the provision and application of high intensity lasers.

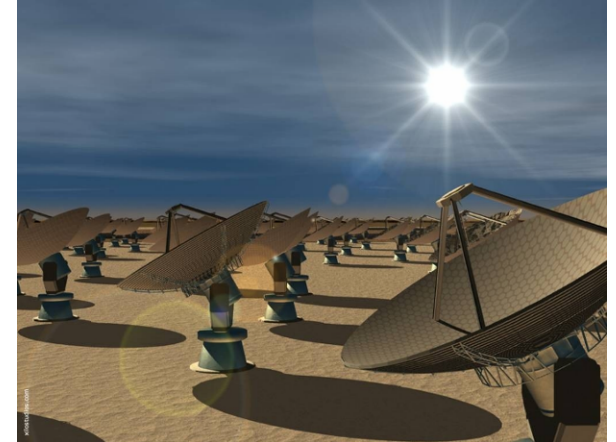


CSR support for UK Large Facilities

- ISIS, Diamond and Central Laser Facility operations are supported at the levels agreed with the other Research Councils:
 - £77M plus capital in 11/12
- This includes full operation of Diamond, operation of ISIS at 120 days per year, and operation of the CLF with the high power laser programme as the priority.
- STFC will support the Lasers for Science Facility in the Research Complex at Harwell
- The overall capital allocation does not allow us to go ahead with the Vulcan laser 10PW upgrade

Large Facilities Capital Fund

- The LFCF is substantially reduced (though not eliminated) during the CSR period.
- Funding for Diamond phase 3 has already been announced.
- Funding for about half of ISIS TS2 phase 2 (to cover the cost of CHIP-IR and associated infrastructure) was announced by the minister last month
- Channel 38 funding for SKA is also included
- Additional £20M capital announced in budget last week including 2nd phase of ISIS TS2



The Core Programme

- During 2009 we re-prioritised our entire programme
- Started with community consultation
- Based on advice from PPAN, PALS and Science Board, we constructed a programme with a 10 year planning horizon assuming flat cash budgets
- Required tough decisions and some unpalatable choices, but ensures our programme is on a firm footing
- CSR support (£190M in 2011/12) is sufficient to maintain this prioritised programme in the grants supported areas.
- No additional reductions in grants or in the programme are expected as a result of the CSR

Programme delivery

- Studentship numbers will be maintained at 220 per year
- New enhanced studentship scheme (“STEP”)
- Advanced fellowships programme is relaunched as Ernest Rutherford fellowships with the possibility for awardees to bid for (modest) research funding
- New and simplified grants system is being introduced (see later)
- We have not set any targets for “research concentration”
- *i.e. reducing the number of research groups supported*
- The core programme will not be adversely impacted by any restructuring that is carried out in 2011/12.

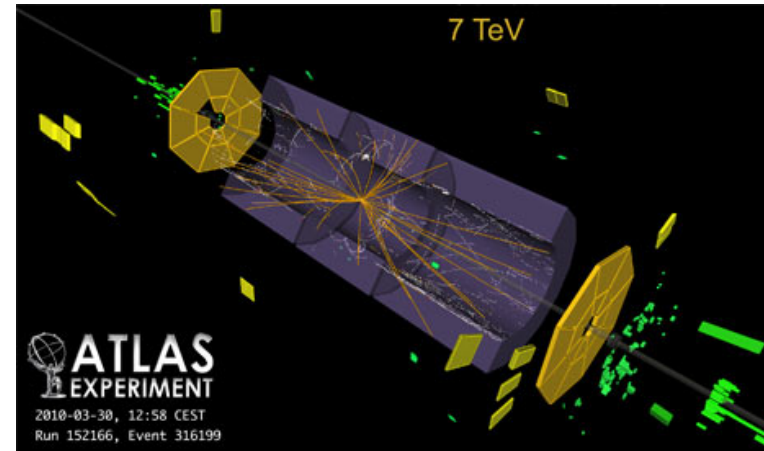
Capital

- Capital for the core programme is sharply reduced, which will impact on projects such as accelerator R&D and future instrumentation
- Capital components of grants will be limited by available funding
- “Wakeham” efficiency savings in indirect costs will be imposed (RCUK)

This will all require careful management

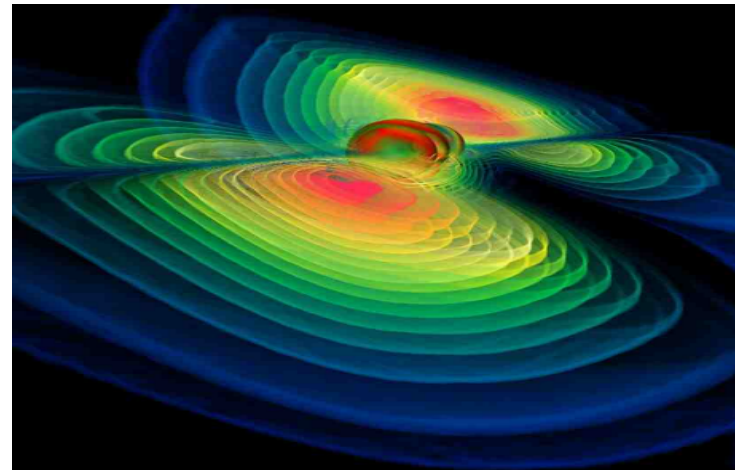
Particle Physics

- Our highest priority in particle physics is the exploitation of the **Large Hadron Collider** at CERN. The LHC will reveal how nature operates at energy scales where the standard model of particle physics breaks down and will transform our understanding of the fundamental rules of the universe
- Exploring neutrino mass and mixing with **MINOS, T2K** and **SuperNEMO**



Particle Astrophysics

- In the coming decade we expect to directly detect, for the first time, gravitational waves from distant cosmic phenomena
- Advanced LIGO



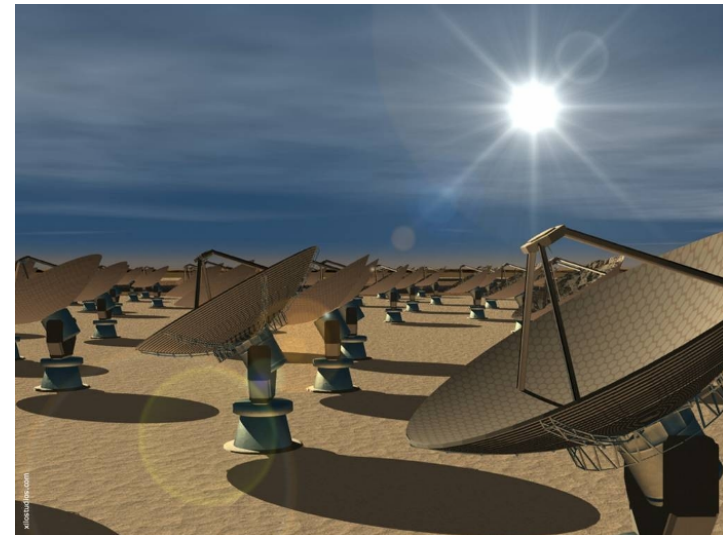
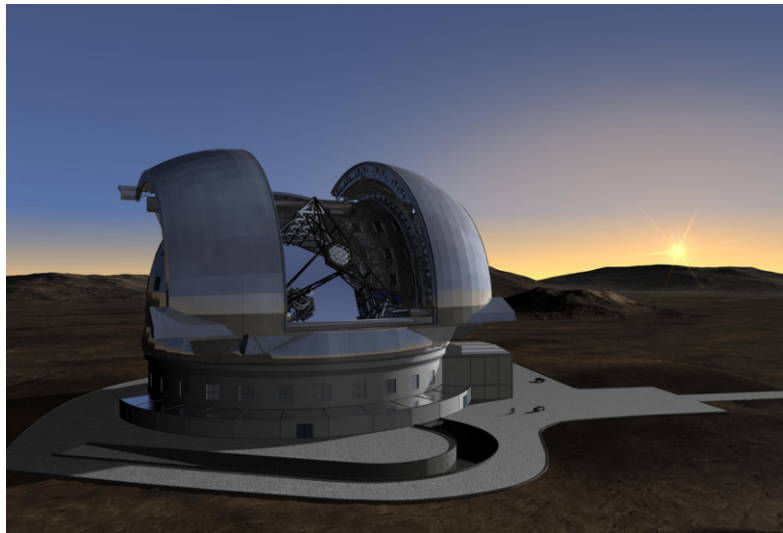
Nuclear Physics

- A new generation of facilities offering beams of highly unstable ions promises breakthroughs in understanding the behaviour and origin of hadrons and nuclei
- Our highest priority in nuclear physics is to participate in the **NuSTAR** experiment at the Facility for Antiproton and Ion Research, the new European laboratory being constructed at GSI in Darmstadt



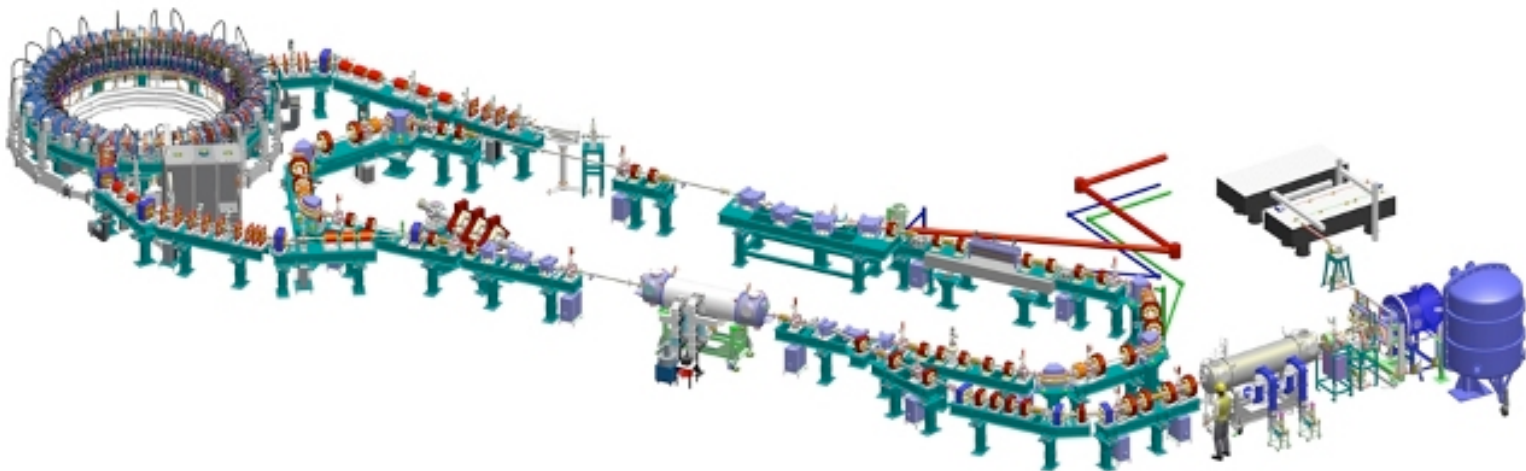
Astronomy and Cosmology

- Our highest priorities in ground-based astronomy are to exploit our membership of ESO, which gives access to the world-leading **VLT telescopes** and to the new **ALMA** millimetre astronomy array, and to carry out R&D towards the next generation **European Extremely Large Telescope (E-ELT)** and the UK-led **Square Kilometre Array (SKA)** radio telescope project.



Accelerator R&D

- The Accelerator Strategy Board continues to provide strategic programme advice
 - Set out the programme and future funding level for electron, laser-plasma and proton accelerator R&D
 - Will be reviewing future funding for John Adams Institute and High Power Proton Accelerator work this summer, along with a mid-term review of the Cockcroft Institute later this year



Technology Support in Universities

Statements in the Delivery Plan about support for technology and instrumentation, especially in the universities, have generated a great deal of feedback.

Keith Mason at Select Committee:

“... the mission of our national laboratories ... is that they are there to support the scientific communities, and in particular in these capital intensive areas of building large detectors—not doing the detector R & D but building large instrumentation.”

“What we were trying to capture ... was not ... that we were going to prevent the universities from doing technology development, but we were going to encourage our in-house researchers ... to concentrate on their core mission, which is to support the university communities in their endeavours.”

Keith Mason at Select Committee:

“As RCUK, we are adopting a clear policy, which is, I think, a very sensible policy, of not duplicating large technical capabilities unnecessarily.”

“We are encouraging universities to share facilities, unless that is justified in another way such as putting in bespoke capabilities in a particular place, and we are also encouraging them to use our national laboratories, which is, after all, what they are there for, to support their research efforts.”



Particle Physics at RAL

- During 2011/12, the existing Particle Physics Department at RAL will be transformed in line with the mission of providing the *national technical capabilities needed for the UK particle physics programme*.
- This new and more distinctive role will be coupled with the provision of a new funding mechanism outside the Particle Physics grants system, in recognition of the national support role that it is intended to provide.



Particle Physics at RAL

- The more focused mission will require that some downsizing takes place, but any savings will be retained within the UK Particle Physics programme.
- Though its mission is driven by the need to assure technical capabilities, we realise there is also a strong need to connect with, and be part of, the particle physics research enterprise, and so we will continue to support a number of staff with scientific research leadership roles within the new structure.
 - Staff will normally be members of collaborations and sign physics papers, just as now

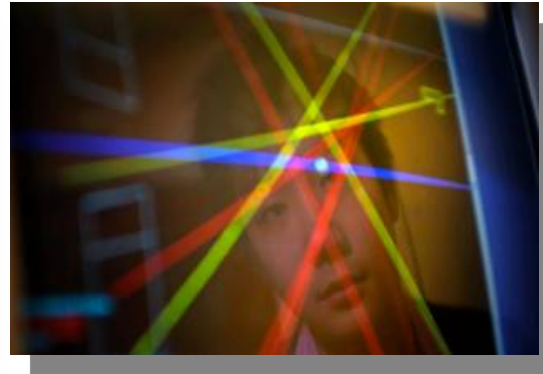


Restructuring

- Our programme is a good one, but it doesn't contain everything we wanted, and it doesn't allow us to support all of the current staff in the STFC laboratories
- We have informed STFC staff that a reduction in numbers of up to 10% is required
 - includes a reduction in senior staff
 - Must be completed in 2011/12 to balance across the SR period
 - Funding has been made available
 - Consultation with the unions will commence shortly

Innovation and skills

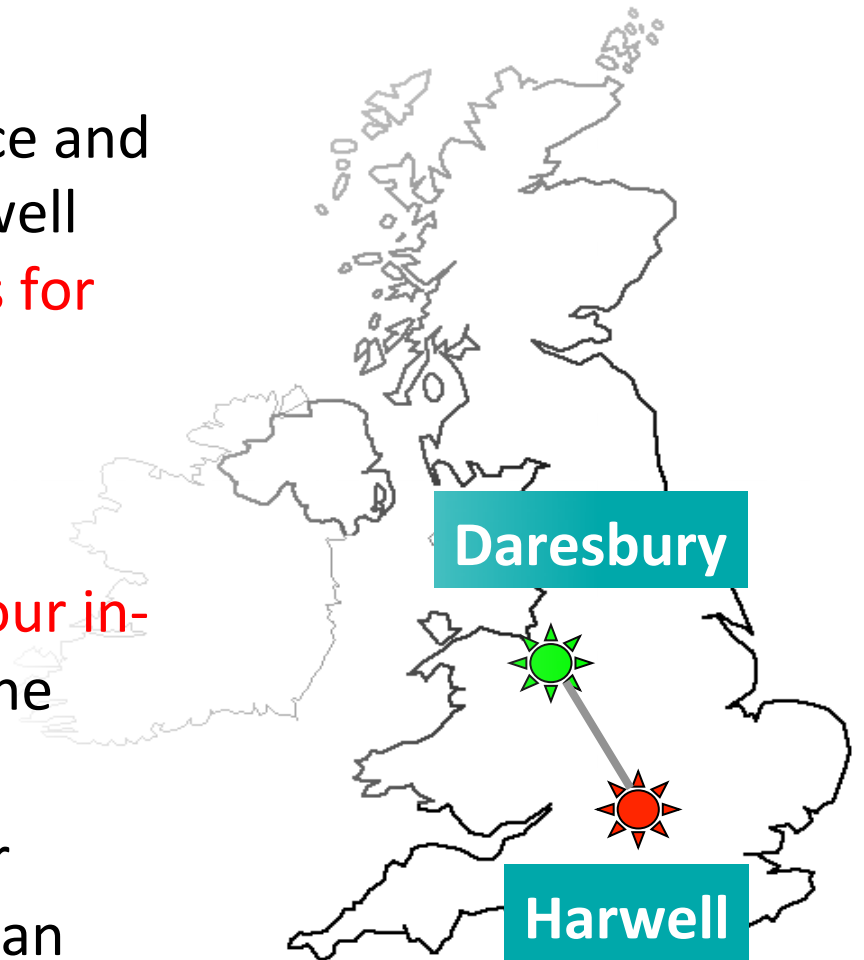
- Expanded Futures programme for global challenges
- Public engagement activities to inspire and enthuse young people & improve public understanding/support



- New funding for early stage applications of research
- Further development of Campuses in partnership with Goodman at Harwell and Langtree at Daresbury

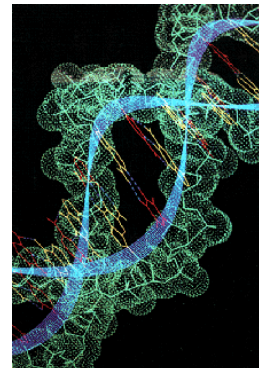
Science and Innovation Campuses

- We are developing the Science and Innovation Campuses at Harwell and Daresbury as **focal points for collaboration and knowledge exchange** with industry and academic researchers,
- Aim to become **gateways to our in-house expertise** and that of the communities we support
- We will increasingly focus our technology competencies on an **outward facing collaborative role**



Futures Programmes

- We have identified four areas of particular relevance to the challenges faced by society and the economy:
 - **Energy** e.g. new materials – 40% of ISIS research
 - **biomedical research** e.g. structures of biomolecules – Diamond
 - **climate and the environment** e.g. Earth observation
 - **Security** e.g. scanning and detector technologies





Campus Centres

- Outline business cases have been assessed for 12 proposed outward-facing Campus Centres
- Council approved funding in 2011-12 for the following:
 - Advanced Lasers Technology Centre
 - International Space Innovation Centre
 - Computational Science and Engineering
 - Micro/Nano Technology Centre



Conclusions

- Funding is clearly constrained in the UK for the next four years
- *But* the importance of science is growing – scientific and technical innovation is increasingly key to our future prosperity, security and wellbeing
- CSR outcome is a vote of confidence in what we do
- We must find ways to maintain our scientific position within flat funding levels while protecting our long term vision and prospects
- **We need scientifically excellent projects that are imaginative, affordable, and relevant**

Over to you!



New STFC Grants System and e-Val

Janet Seed

New STFC Grants System

The existing standard and rolling grant mechanisms will be replaced by a single consolidated grant scheme.

The main features will be

- a) one consolidated proposal per department (or equivalent) per grant panel area submitted every 3 years
- b) core elements could be funded up to 4 years, non core elements up to 3 years (but with flexibility to spend over 4 years).
- c) The part of the budget to be allocated to core elements to be determined by the Grant Panel and STFC. Core staff can support construction projects mainly funded by project grants.



- d) The consolidated grants may incorporate existing schemes for PATT, travel and visitor grants.
- e) An individual academic can only be supported for exploitation on one consolidated grant
- f) A certain level of public outreach activity could be specifically funded on consolidated grants, subject to a well justified, peer reviewed case
 - **Encouragement to smaller groups to join with other groups in same well defined research area to submit a consolidated grant.**
 - **Greater flexibility on consolidated grants to allow staff to be moved between projects over the course of the grant, particularly to start new activities before the next 3 year review.**



Grants Implementation

- Introduction of a new investigators scheme to allow newly appointed academics to apply for support before their department consolidated grant is next considered. Funding to come from the relevant grant line.
- Will be differences between subject areas – no ‘one size fits all’
- Taking into account natural schedule of grant reviews
- No plans to withdraw and reissue grants for this.

STFC e-Val

- On-line data collection system for all grants.
- Need to provide evidence of impact of our investment
 - For government
 - For case studies
 - For advisory and management boards
 - As input to peer review (track record)
- Builds on work commissioned and successfully used by MRC.
- Questions tailored to STFC-specific requirements.
- Pilot study in July 2010, roll-out to all grantholders in 2011.



Discussion

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