Science & Technology
Facilities Council

The Science and Technology Facilities Council

John Womersley

Chief Executive

Science & Technology Facilities Council

HM Government &

HM TREASURY

RESEARCH COUNCILS UK

Arts & Humanities Research Council

BBSRC bioscience for the future

E·S·R·C ECONOMIC & SOCIAL RESEARCH COUNCIL

EPSRC Pioneering research and skills

MRC Medical Research Council

NATURAL ENVIRONMENT RESEARCH COUNCIL

Science & Technology Facilities Council

Science & Technology Facilities Council

- Grant-funded programmes in astronomy, particle physics and nuclear physics

  Working with universities

- Access to world leading, large scientific facilities for UK researchers and UK industry

  Working with the other research councils, universities, business and industry, international organisations

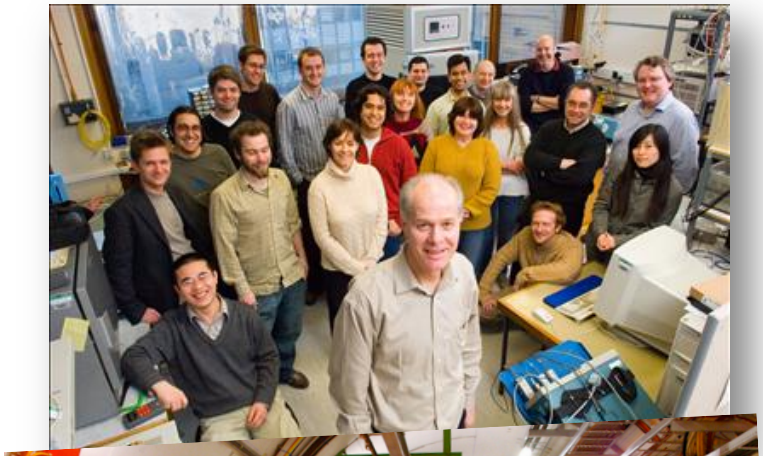
- Promote academic and industry collaboration at our Harwell Oxford and Sci-Tech Daresbury Science & Innovation Campuses

  Working with Business and industry, Innovate UK, UKSA, UKAEA, etc

Grant Funded Programmes

Grant funded programmes

- UK steward for fundamental physics (astronomy, particle physics and nuclear physics)
- Fund university research projects and postgraduate training
  - 1,700 researchers, engineers and technicians in UK universities
  - Rolling cohort of ~ 900 PhDs
- UK is world leader in astronomy and particle physics and 2nd in nuclear physics
- £1 billion annual UK tax contribution by graduates & postgraduates attracted & funded by STFC research



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Particle Physics, Astronomy and Nuclear Physics

- 90% of physics students say they were attracted to the subject by these areas
  - Undergraduate numbers up 8%
- Large Hadron Collider at CERN
  - Higgs boson discovery in 2012
  - reached 26 million people in the UK

Access to world leading facilities

Access to world leading facilities

- Providing access for our astronomy, particle physics and nuclear physics community to the best facilities around the globe
  - Large Hadron Collider at CERN
  - Atacama Large Millimetre Array
  - ESO Very Large Telescope
  - Herschel/Planck/GAIA/James Webb Space Telescope
- Technology
  - Grants for university groups to develop instrumentation
  - Ensuring return for UK business
  - CERN and ESA Business incubators
- Developing the facilities of tomorrow
  - Square Kilometre Array
  - Facility for Anti-proton and Ion Research
  - European Extremely Large Telescope

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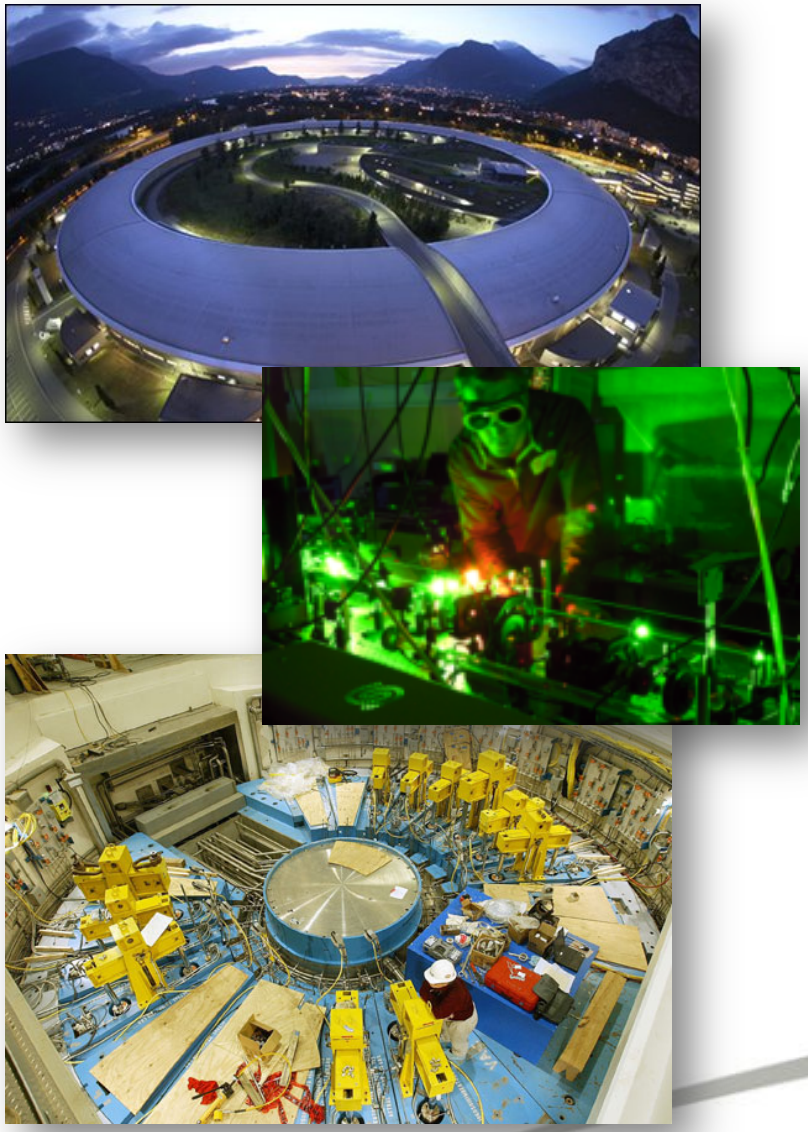
Access to world leading facilities



- Providing access to world-leading multi-disciplinary facilities
  - ISIS neutron source
  - Diamond light source
  - Central Laser Facility
  - European Facilities ESRF and ILL in Grenoble
- These facilities deliver advances in
  - biomedical research, material sciences, chemistry, pharmaceuticals, fundamental biochemistry, cell biology, energy and engineering
- Access for around 4,000 researchers to UK facilities
- Access for around 1,300 UK researchers to overseas facilities

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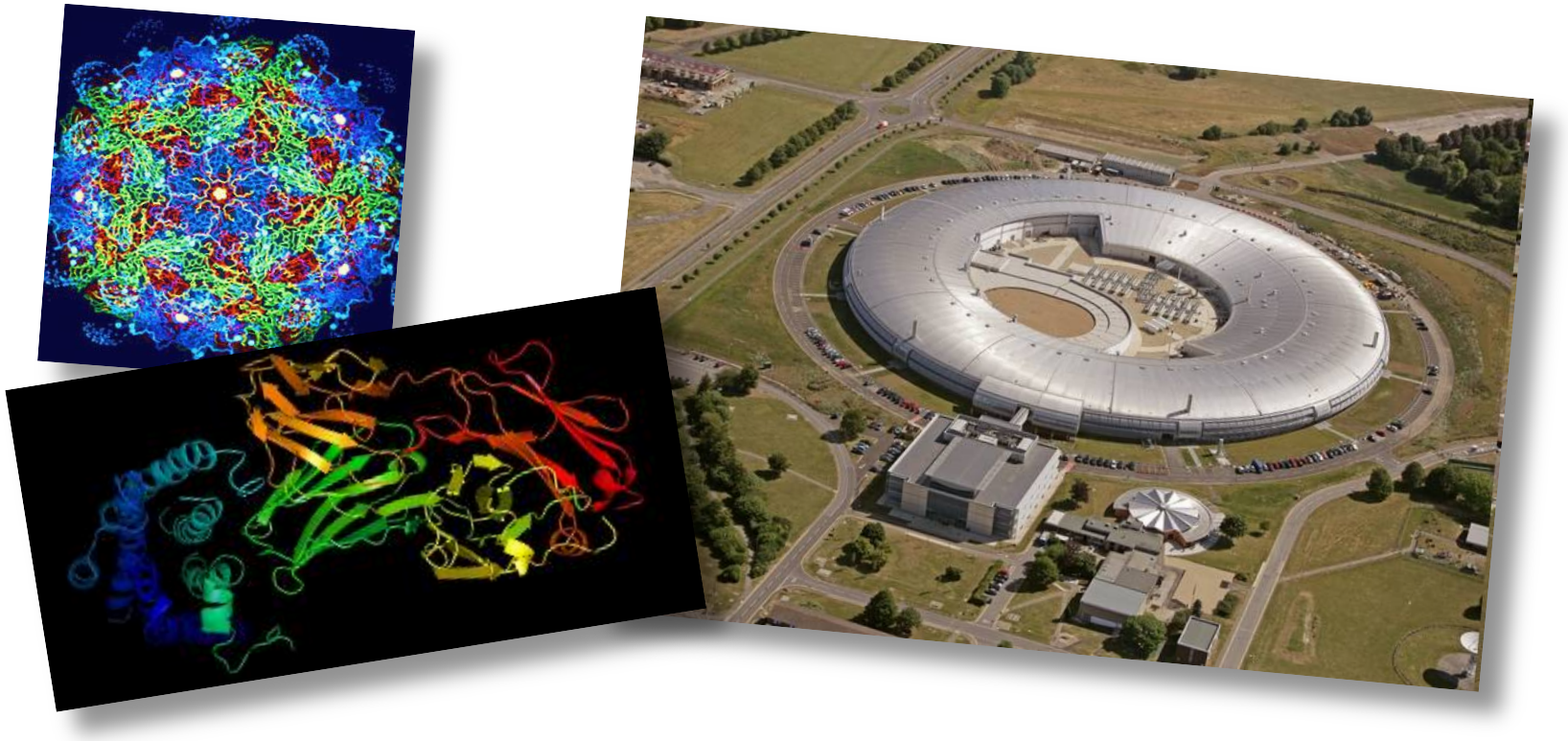
Diamond Light Source

- The largest scientific instrument built in the UK in > 40 years.
- Phase III beamlines under construction
- Aims to be the best medium energy x-ray source in the world.



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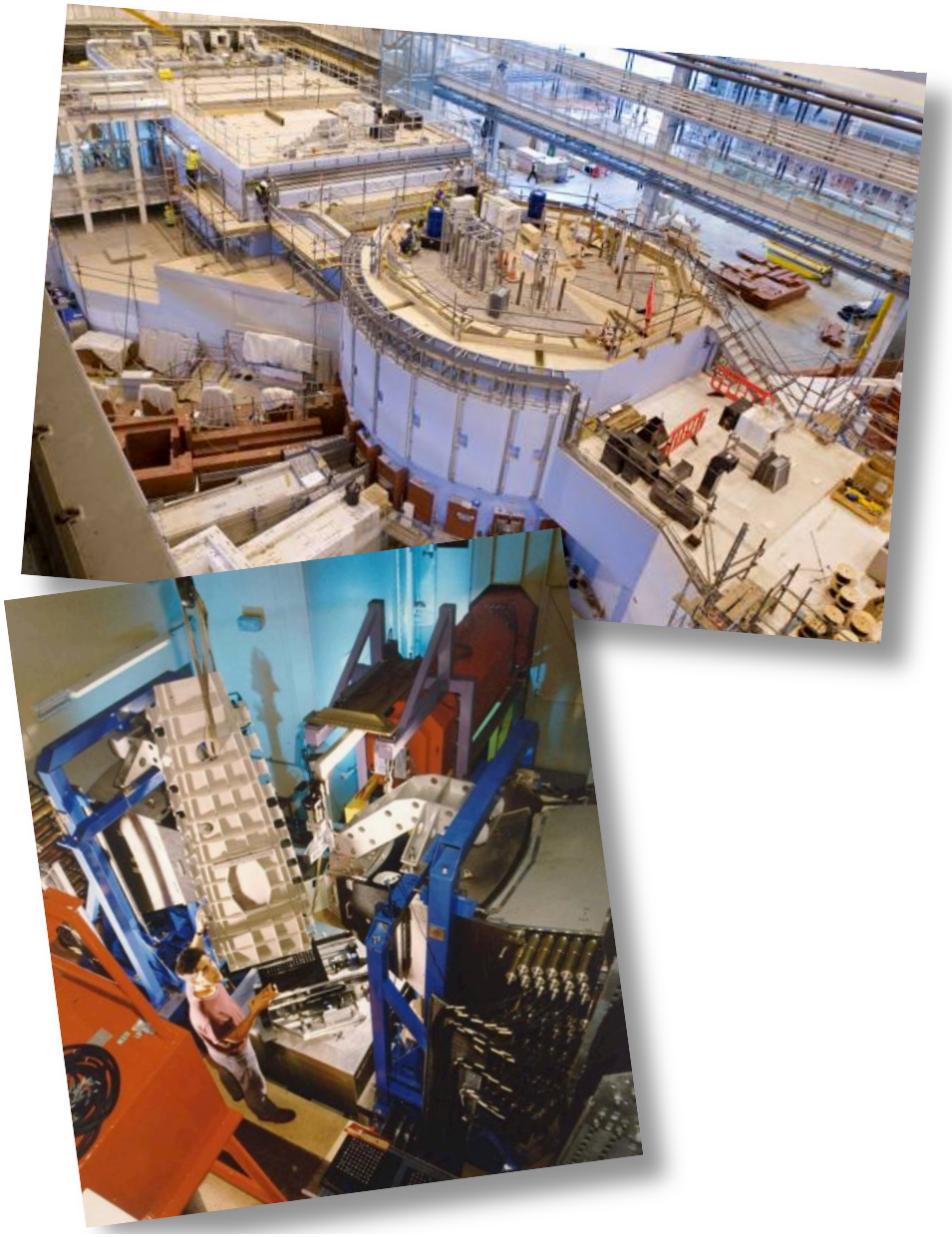
ISIS neutron source

- 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 coming online
- Collaboration with Italy, Sweden, ESS



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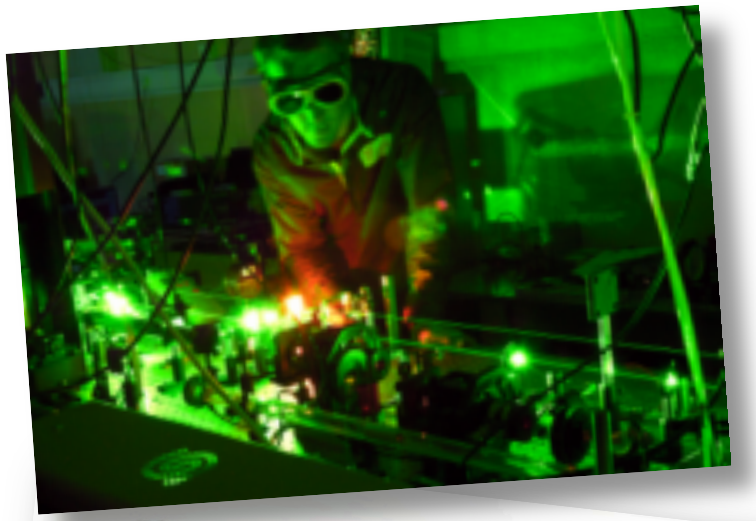
High Power Lasers

- The Central Laser Facility (CLF) provides an internationally leading capability in the provision and application of high intensity lasers
- Centre for Advanced Laser Technology and Applications
  - Cobalt Light Systems
  - Collaboration with European projects (ELI, HiLASE)



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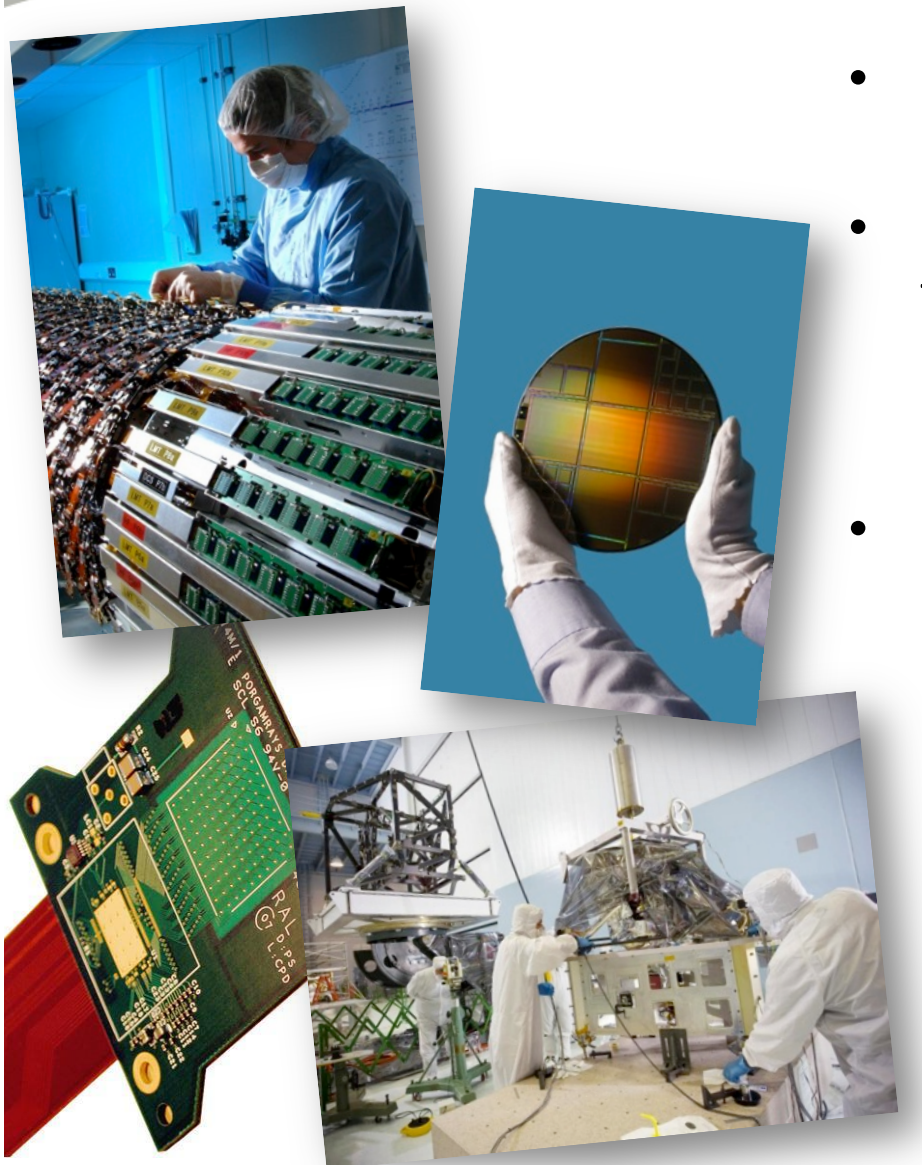
Technology



- Engineering technology centres at our Harwell, Daresbury Edinburgh sites
- Develop and deliver innovative technologies to develop new facilities and optimise their capabilities
  - work with universities
- Particular capabilities in
  - Accelerator technologies
  - Instrumentation, Detectors and Sensors
  - Data Acquisition and Processing
  - Microelectronics design
  - High Performance Computing


ess
EUROPEAN
SPALLATION
SOURCE


SKA
SQUARE KILOMETRE ARRAY

Science and Innovation Campuses

Promote economic growth by leveraging our world leading capabilities: change the level of academic and business collaboration

Our two Campuses now host 230 enterprises and 5,500 jobs

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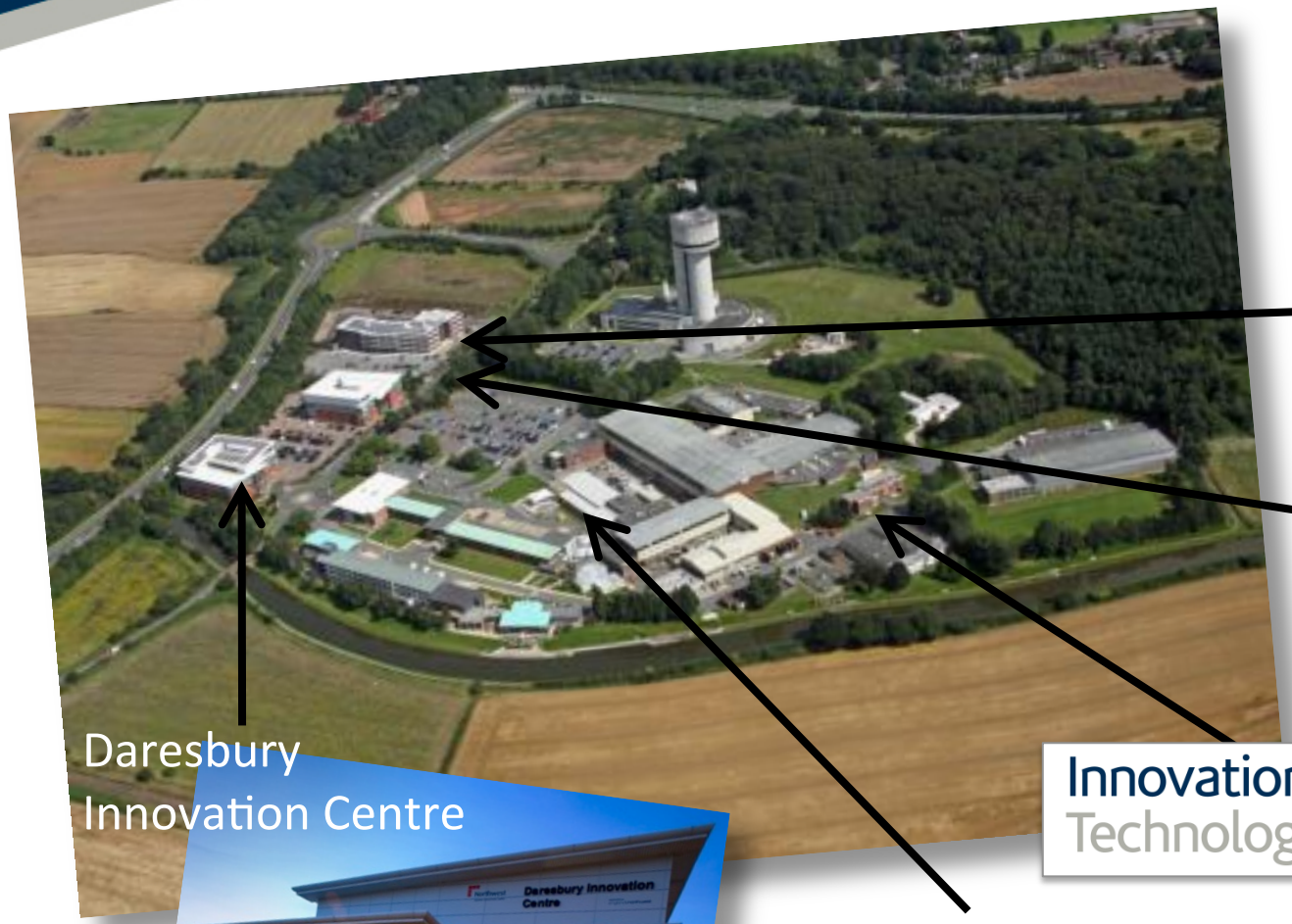
Sci-Tech Daresbury Campus



Daresbury Innovation Centre

The Cockcroft Institute of Accelerator Science and Technology

CERN

Innovations Technology Access Centre

IBM

Unilever

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Hartree Centre

A centre of Excellence in Computational Science and Engineering

- Supports government's e-Infrastructure Programme
- ~~£30M~~ £50M investment in high performance computing platforms
  - UK's fastest computer
    IBM BlueGene/Q (1.2 Pflops)
- Co-laboratory with IBM
- Focus on algorithm development in partnership with hardware providers and end-users (Unilever, Astra-Zeneca, Met Office…)

The SKA1 in Big Data Terms

Inspired by Torre Wenaus (2013) and Wired's Infographic on Big Data (2012)

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Astronomical Data Deluge

Megadata

In excess of 1 Exabyte of raw data in a single day - more than the entire daily internet traffic

Square Kilometre Array

€1.5b

+ A €1.5 billion global science project

+ Astronomers and engineers from more than 70 institutes in 20 countries

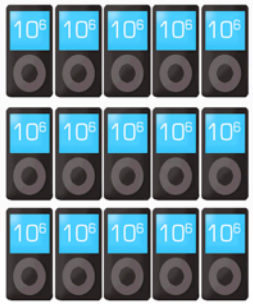
3000

+ 3000 dishes, each 15m wide

+ Using enough optical fibre to wrap twice around the Earth

1,000,000 m²

+ A combined collecting area of about one square kilometre



Enough raw data to fill over 15 million 64GB iPods every day

+ Automated data classification = faster with fewer errors
+ Guided search = easier access for scientists and non-scientists alike
+ Frees researchers to be more productive and creative

IBM Information Intensive Framework

A prototype software architecture to manage the megadata generated by SKA

IBM®

Top image: SPDO/Swinburne Astronomy Productions

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Harwell Oxford Campus

elementsix™

CATAPULT Satellite Applications

Innovations Technology Access Centre

cobalt LIGHT SYSTEMS INSIGHT FROM LIGHT

esa technology transfer programme European Space Agency

SIEMENS

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Space Cluster

- Growing space cluster at Harwell
  - Satellite Applications Catapult Centre (TSB)
  - RAL Space (STFC)
  - European Space Agency (major expansion)
  - ESA Business Innovation Centre
- Supports government's Space innovation and Growth Strategy
- Brings together upstream hardware providers and downstream users of satellite data

CATAPULT Satellite Applications

esa

RAL Space

UK SPACE AGENCY

STFC Impact Report 2013

- Two million people reached face-to-face last year including 346,000 school children and 17,500 teachers
- How CERN technology benefits the UK economy
- New vaccine for foot and mouth disease
- New method for breast cancer biopsies
- Supporting UK space industry (worth £40 billion by 2030)
- Tenant companies at Sci-Tech Daresbury, delivered £35 million sales, £63 million of investment and 147 new products

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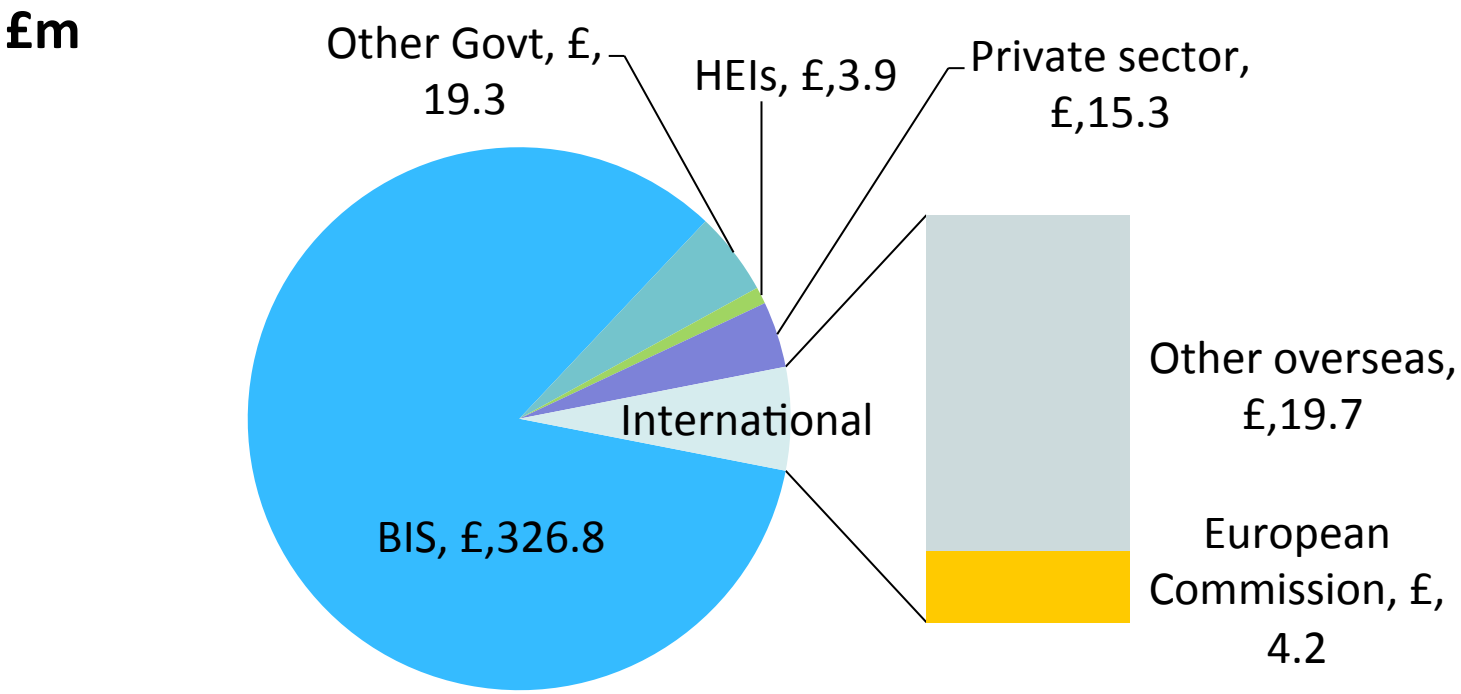
Where our funding comes from



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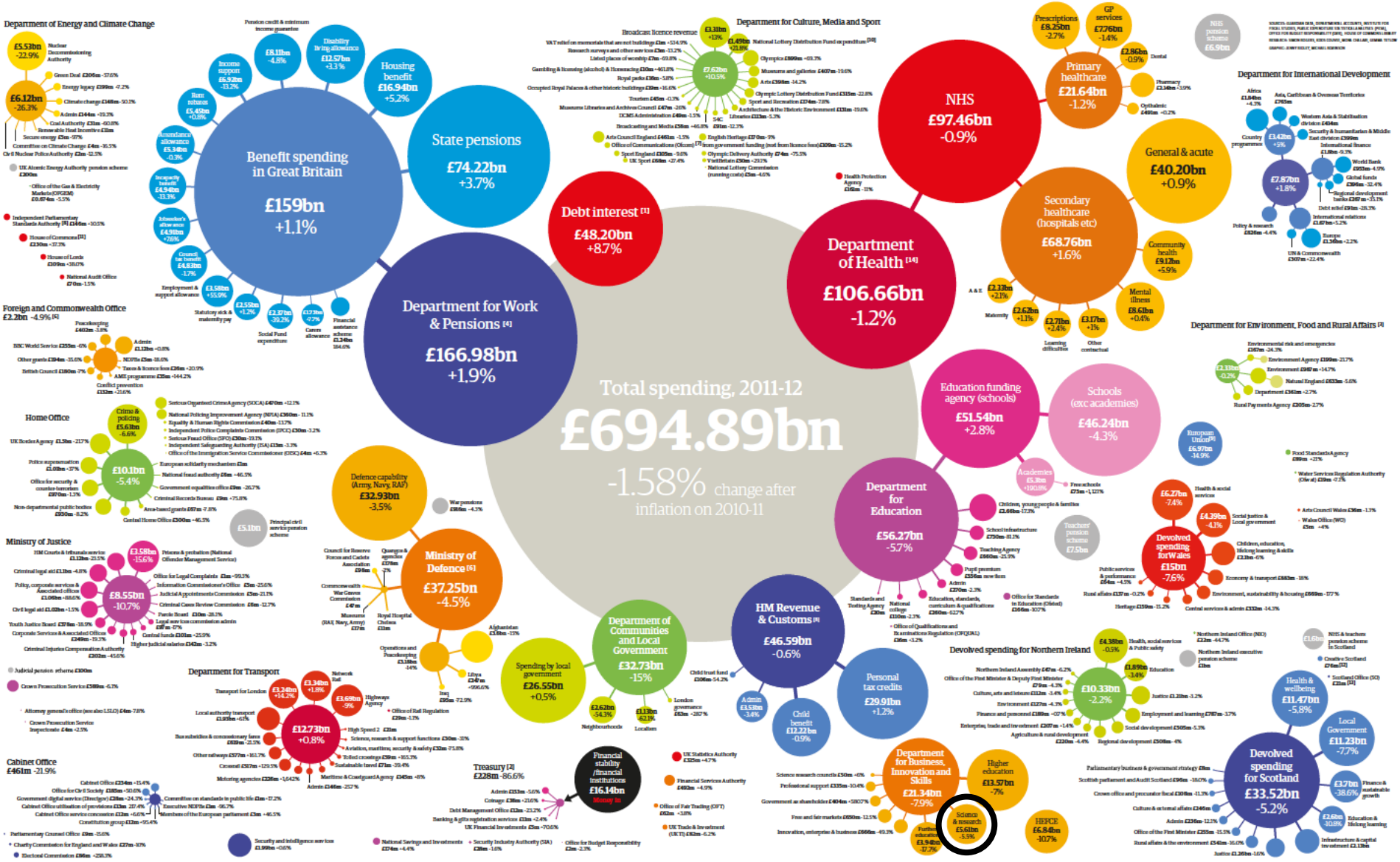
Where your taxes went this year – and where the cuts were made Public spending by the UK's central government departments, 2011-12

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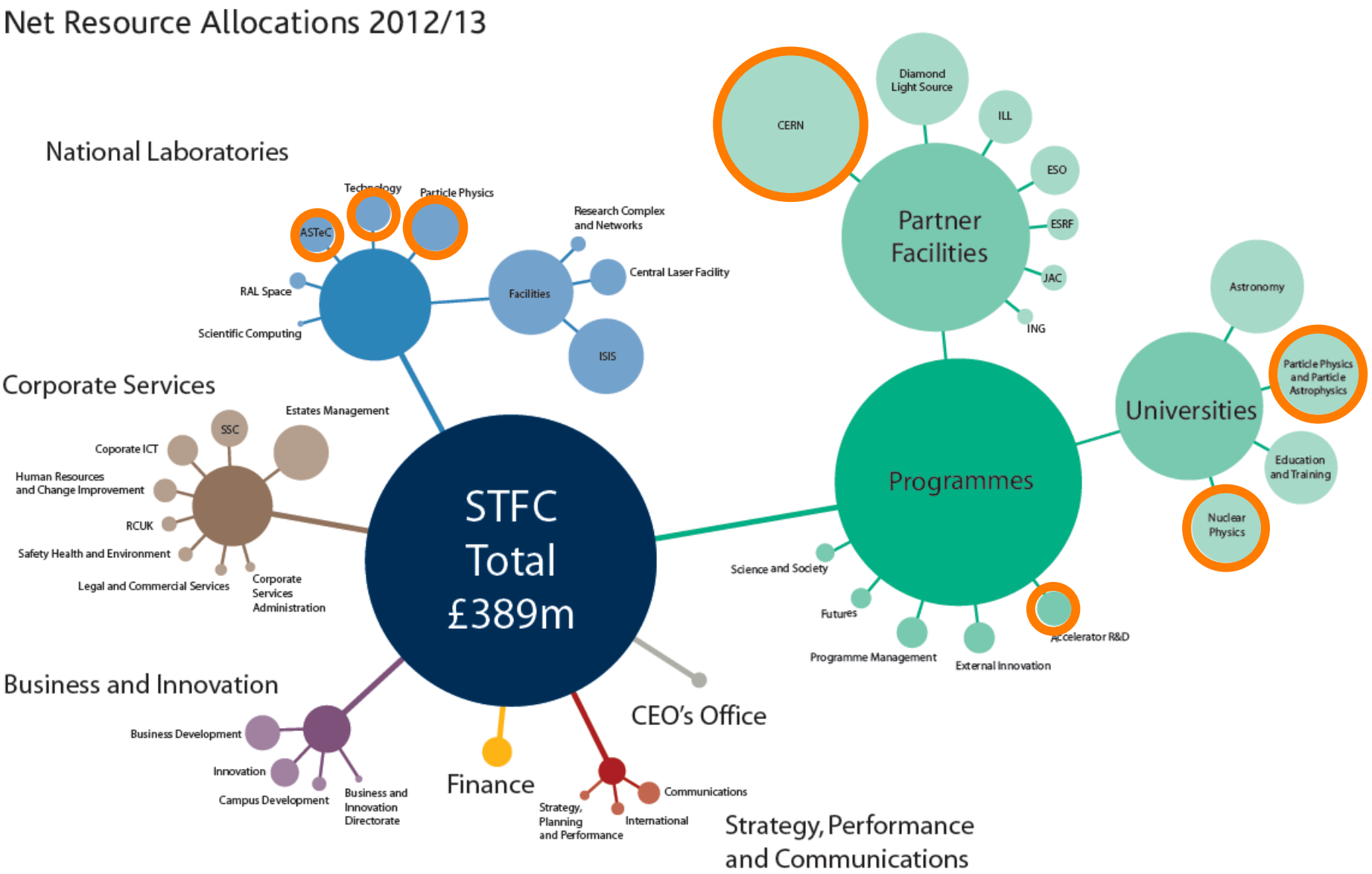
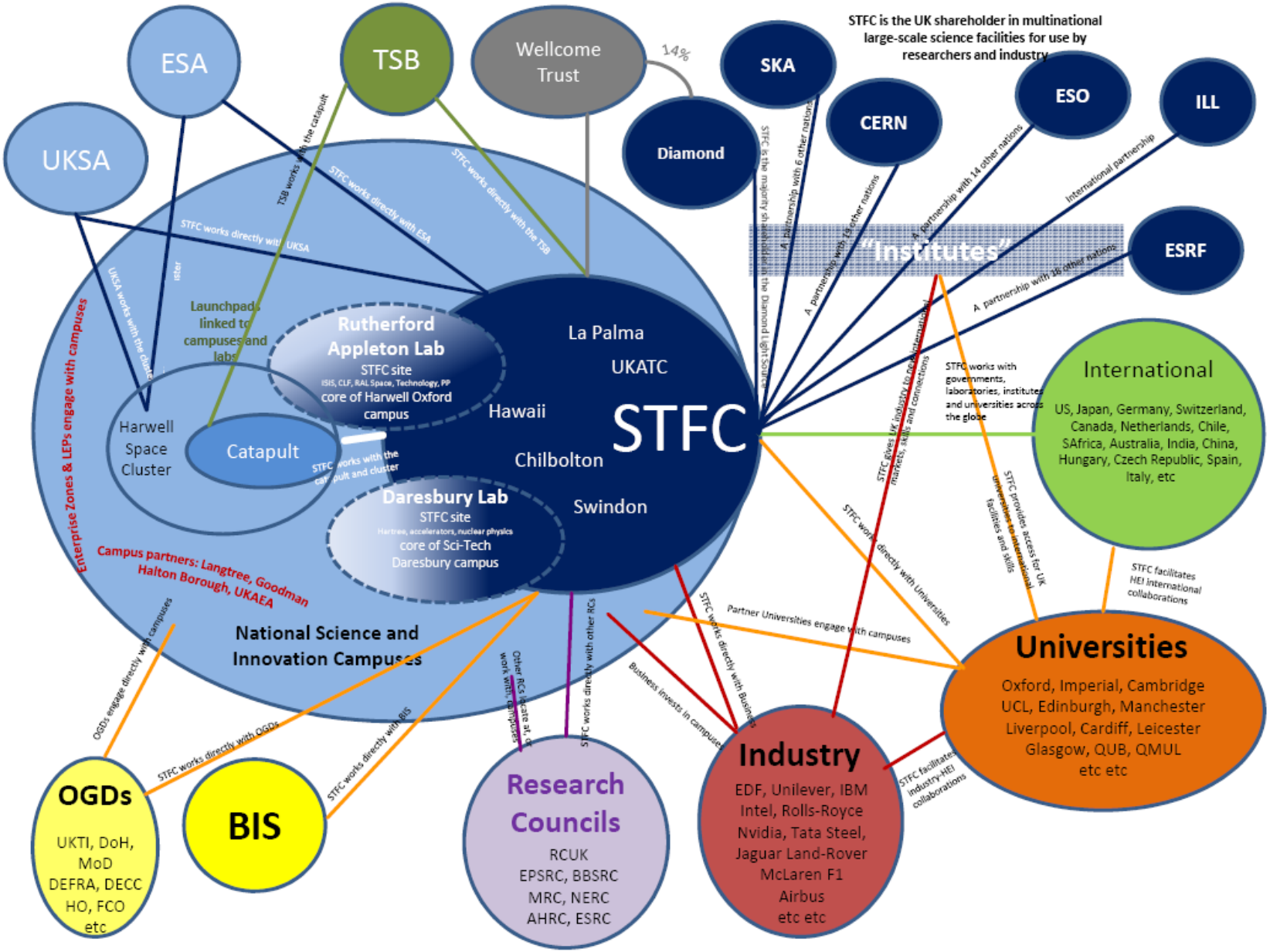
What we spend our funding on



Who we work with



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Summary

STFC's role is to

- Provide grant funding for fundamental science
- Provide and operate large science infrastructures for the UK
  - requires long term planning and investment
- Promote academic and industry collaboration at our Science and Innovation Campuses

We want to ensure

- the UK's continued scientific excellence
- that the technologies, facilities and people we support go on to have an impact on the economy
- that the UK has the education, training and skills it needs to compete

Thank you!

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