



ERF Workshop

“The Socio-Economic Relevance of Research Infrastructures”

Views from the UK

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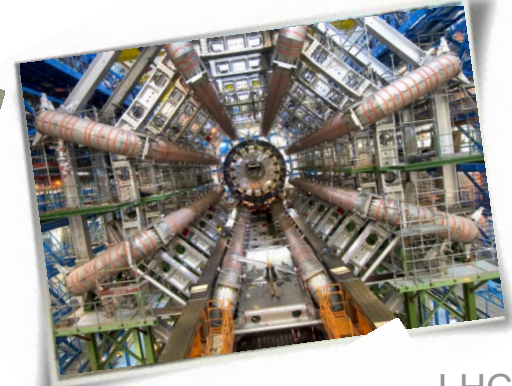
31 May 2012

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Research in UK universities,
RAL and DL



JCMT Telescope



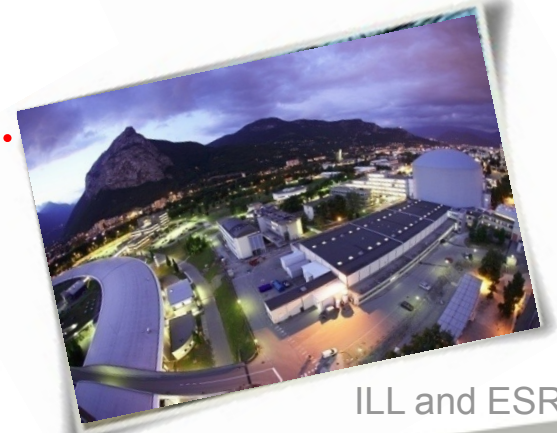
LHC



ESA: Top Sat



ESO: Alma Array

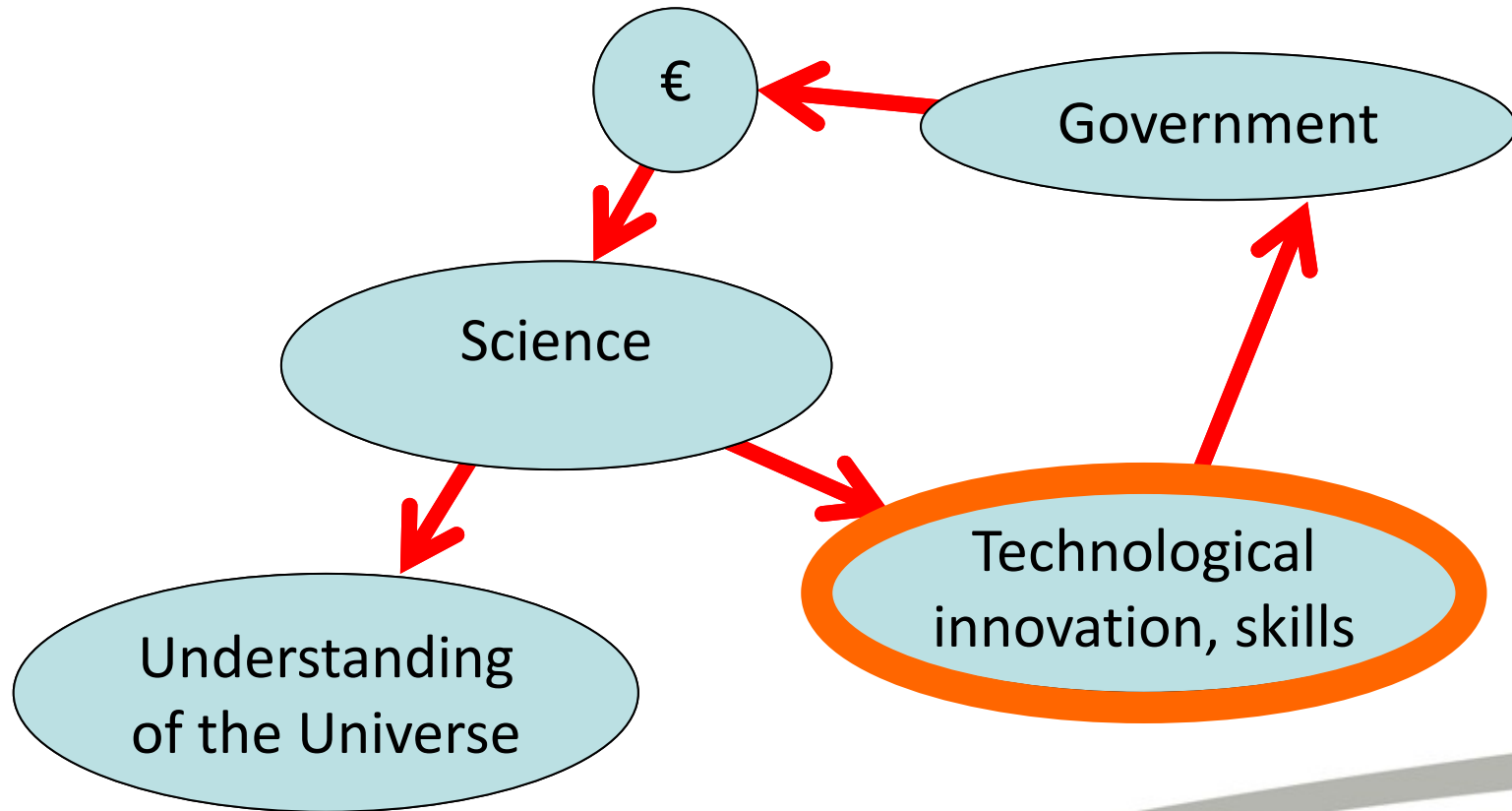


ILL and ESRF

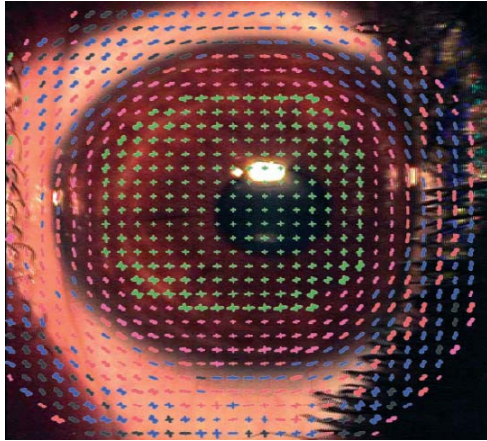


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Why does government support science?



Economic impact – a UK case study



Retinal research carried out on SRS



Bronze age helmet, examined on SRS

The Synchrotron Radiation Source (SRS)



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Synchrotron Radiation Source

- Owned and operated by STFC and its predecessors
- X-rays to examine detailed structure of matter
- Multiple science areas
- Academic & industrial users
- Closed in 2008 after 28 year operation
- ~ £300M total spend

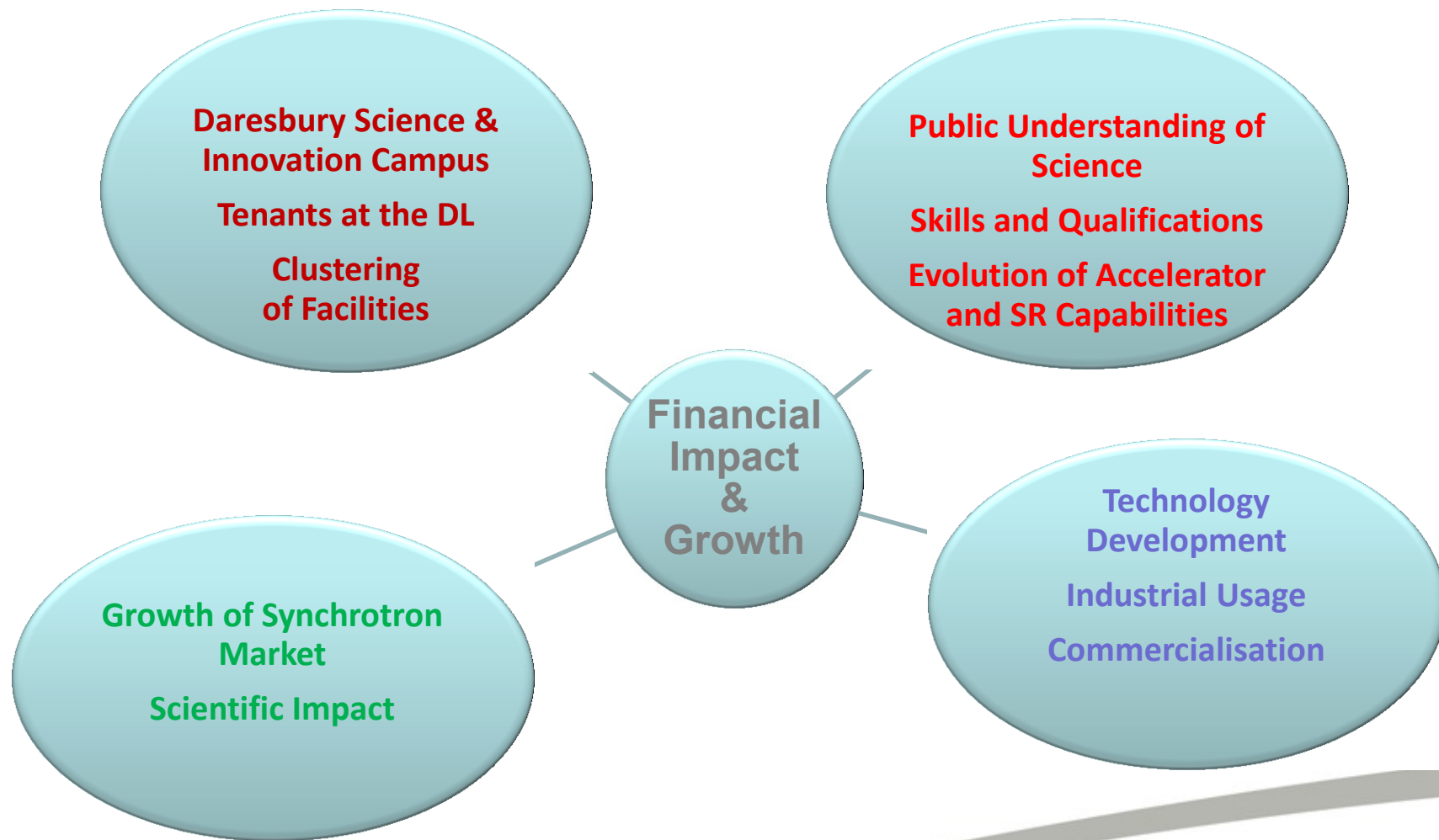


SRS Economic Impact Study

- Project to capture the considerable impact from a UK large science facility
- SRS closure in 2008, impact over the lifetime of the facility
- Methodology – desk research, interviews with key stakeholders, statistical data
- Why?
 - Reflection of UK Government's increased focus on EI
 - Methodology development
 - In house expertise
 - Highlight any issues with EI measurement
- Results - Quantitative and qualitative data and case studies



SRS Outputs



SRS Economic Impact

Bringing scientific influence & impact to daily lives

- 2,000,000 hours of science – diseases, global warming, new medicines, historical artefacts etc
- 5000 papers, 10 high impact factor/yr
- 1200 protein structures solved
- 70 synchrotrons operational worldwide in 2008
 - SRS staff have been involved in over half of them

Delivering skilled people to the labour market

- 11,000 users from over 25 countries - 4,000 PhD students & 2,000 post-docs
- ~500 work experience students & 110 apprentices
- 6000 public & schools visits per year
- Development of skills & technologies – vacuum, cryogenics, detectors
 - Ability to develop new facilities



Impact on the local economy

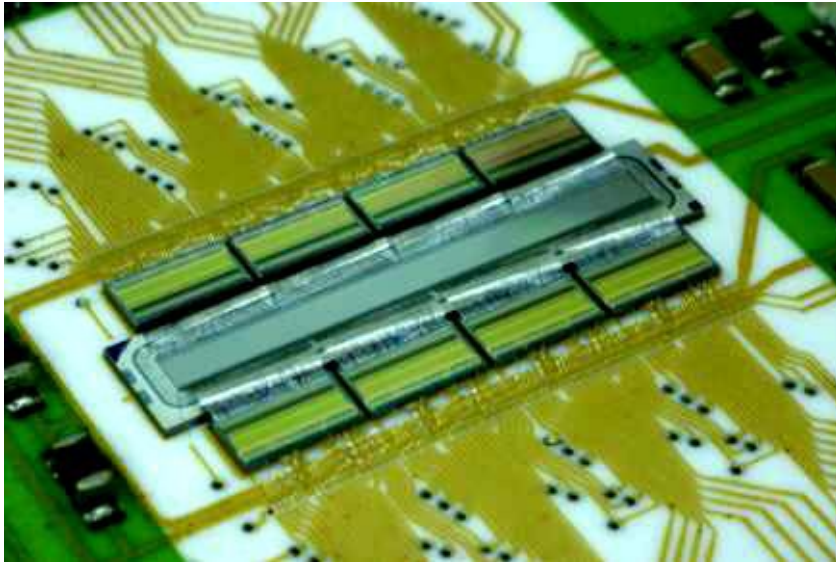
- £468M total spend, 90% locally
- Average 230 staff employed over lifetime
- 300 local businesses – goods & services
- Induced & indirect EI from spend & employment ~£357M (using ONS I/O multiplier for R&D sector of 1.84)
- Clustering of companies & facilities on site/area
- Critical mass of expertise – driver for creation of Daresbury Science & innovation Campus



Breakfast Meeting at Daresbury Innovation Centre



Creating new companies



XSTRIP detector, marketed by Quantum Detectors

- 6 direct spin-outs, 3 indirect spin-outs, 1 commercial service provider
- Scientific instrumentation, detectors, cholesterol monitoring, software, cryogenics & drug discovery
- 25 patents created
- 11 licenses, revenue ~£1million – UK sales



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Working with UK business

- 200 proprietary customers
- 11 out of the top 25 companies in the UK R&D Scoreboard (2008) including ICI, BP, Unilever, Shell, GSK, AstraZeneca and Pfizer
- Technology development projects with industry – KE
- Contracts of £300M won by UK industry as a direct result of working with the SRS



*Double-crystal monochromator
manufactured by Vacuum Generators in 1995 and
delivered to the new Advanced Photon source*



SRS Economic Impact Study

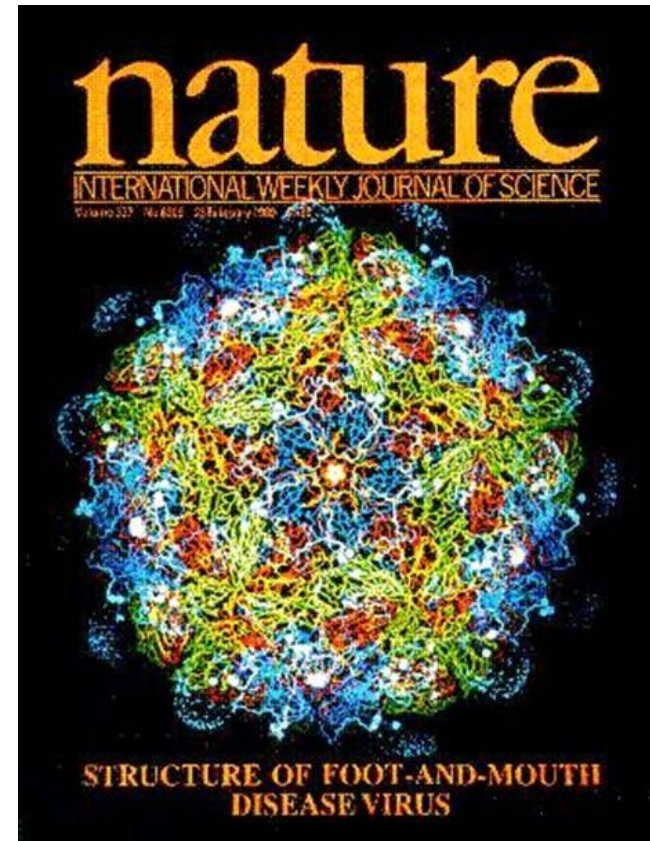
Some Specific Examples



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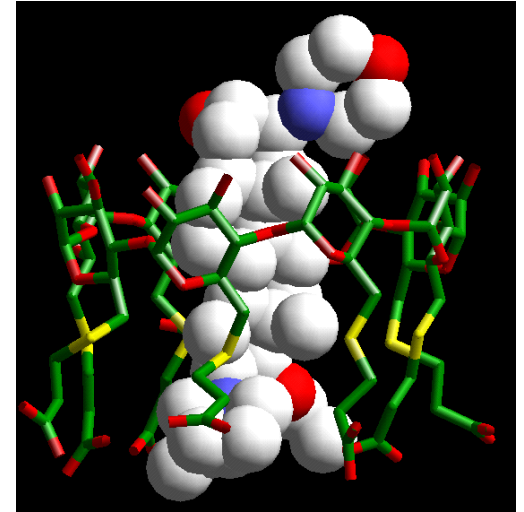
Foot and Mouth Disease Virus

- Research undertaken by Oxford University, Wellcome Biotech & Porton Down on SRS in 1980's
- FMDV structure determined
- Led to development of vaccines
- 2001 outbreak estimated at £8.4bn cost to UK
- If animals had been vaccinated outbreak could have been avoided



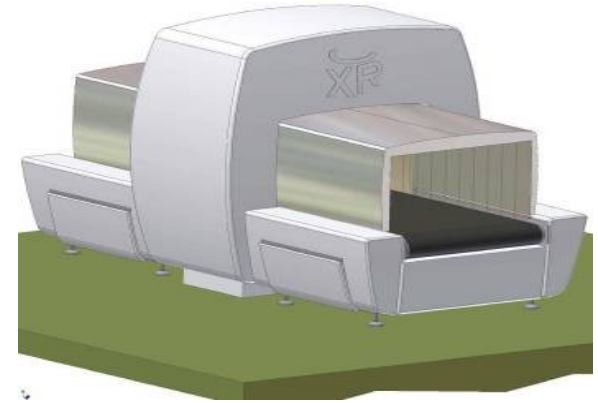
Drug development - Sugamadex

- Commercial usage of SRS by Organon
- Drug which reverses effects of drugs administered during anaesthesia
- Drug released & owned Shering-Plough
- Recovery times have been reduced to 1-2 minutes from 30-60 minutes - removing the need for all patients to be moved to an intensive care unit
- Cost to NHS of ICT beds £2K/day vs £200/day on wards



CXR Ltd – co-location for skills exploitation

- Multiple X-ray sources for 3D images of suitcases and baggage – detection of banned fluids
- Located at DL initially to exploit skills built up through supporting the SRS
- Company have benefited from expertise in vacuum, engineering design, project management, testing, high vac cleaning
- Recently installed a system at Manchester Airport



SRS & e2v – Technology Transfer

- Radio-frequency (RF) power equipment is critical to particle accelerators
- Staff at SRS built a long term & successful relationship with radio-frequency equipment manufacturer, e2v
- Transfer of technology from SRS to e2v led to the development of a coating that was critical to e2v business
- E2v then became the dominant player in this market for 30 years, gaining sales of £250M

e2v



Issues and Benefits of the study

- Methodological issues we had to deal with
 - Timescales
 - Attribution
 - Confidentiality
 - Industry contacts
 - Electronic records
 - Quantification of impacts
- Benefits of the study
 - Demonstration of impact from large scale facility
 - Develop In house expertise
 - Develop Methodology
 - Positive Publicity
 - Evidence of impact for UK Government



What are we doing now?

- Strengthen methodology
- Apply methodology to other studies
- Implement measurement systems for all STFC research
- Share best practise & work with other stakeholders
- Hear more about STFC's approach in Parallel Session I
 - *Katharine Robertson/Sharon Cosgrove*
- Read more about SRS Impact in the full report on our website
 - <http://www.stfc.ac.uk/About+STFC/19005.aspx>



Thank you!



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