Science & Technology Facilities Council

Science Board

22 and 23 October 2015

Minutes of the Fifty Second Meeting

Rutherford Appleton Laboratory

Present:
Professor Alison Davenport (**Chair**) – University of Birmingham
Professor Sean Freeman (**Deputy Chair**) – University of Manchester
Professor Marco Borghesi – Queen's University Belfast
Professor Peter Clarke – University of Edinburgh (until item 14)
Professor Jon Goff – Royal Holloway, University of London
Professor Richard Harrison – STFC, RAL
Professor Jayne Lawrence – King's College London
Professor Ken Long – Imperial College London and STFC, RAL (Day 2 only)
Professor Malcolm McMahon – University of Edinburgh
Professor Bob Nichol – University of Portsmouth (until item 14)
Professor Andy Parker - University of Cambridge (until item 14)
Professor Don Pollacco - University of Warwick
Professor Chick Wilson – University of Bath

Apologies:
Dr Joao Cabral - Imperial College London
Professor Christine Davies - University of Glasgow
Professor Rory Duncan - Heriot-Watt University

In attendance:
Dr Andy Boston - University of Liverpool (Chair, NPGP) (item 7)
Professor Andrew Harrison - CEO, Diamond Light Source (item 4)
Professor Chris Sachrajda - University of Southampton (item 5)
Professor Ian Smail - Durham University (item 2 by teleconference)

STFC:
Kim Burchall - Grants Programme Manager, Astronomy (items 2 - 3 by teleconference)

Dr Sharon Cosgrove - Executive Director, Strategy, Planning and Communications Directorate (Day 2)

Marcus French - Head, Detector and Electronics Division (items 3 & 13)

Professor Neil Geddes - Director, STFC Technology (item 3)

Jenny Hiscock - Programme Manager, Particle Astrophysics and Nuclear Physics (items 5 - 7)

Charlotte Jamieson - Head, Programmes Directorate Enabling Themes (item 11)

Dr John McLean - Head, Microelectronics Support Centre (items 3 & 13)

Tony Medland - Head, Particle Physics and Nuclear Physics (items 5 & 8)

Trish Mullins - Secretary, Science Board

Dr Anna Orlowska - Head, Applied Science Division (items 3 & 13)

Dr Janet Seed - Associate Director, Strategy, Planning and Communications

Dr Emily Swaine - Secretary, Skills and Engagement Advisory Board (observer)

Dr Colin Vincent - Head, Astronomy (items 1 - 2 by teleconference)

James Watson - Strategy Manager (item 14)

Dr Victoria Wright - Head, Research and Innovation Strategy (item 14)

[Secretary's note: due to timing issues, some items were not taken in order; the minutes reflect the agenda item order.]

1. Agenda Item 1 - Welcome

1.1. The Chair welcomed everyone to the meeting, particularly two new members of Science Board, Professor Parker, University of Cambridge, and Professor Pollacco, University of Warwick, who were attending their first meeting. Dr Swaine, who had recently joined STFC as secretary to the Skills and Engagement Advisory Board (SEAB) and Large Facilities Implementation Group (LFIG), was attending as an observer.

1.2. Apologies were noted from Dr Cabral and Professors Davies and Duncan, the three remaining new members of Science Board, who were unable to join due to prior commitments. Professor Long and Dr Cosgrove would join the meeting for Day Two.

1.3. For the benefit of new members, there was a round table of introductions.

1.4. The Chair reminded Science Board members that STFC shared sensitive information and, as a result, it was essential to maintain confidentiality at all times. It was also important that all conflicts of interest should be declared. Science Board noted that:

1.4.1. The expectation is that, where any committee member had a conflict of interest (either personal or institutional), they should withdraw for the specific discussion of that project or item;

1.4.2. Where the conflict is institutional and withdrawal would be detrimental to the quality of the discussion (in other words, in the interests of informed discussion), the individual may remain with the agreement of the Chair.

2. Agenda Item 2 - Astronomy Grants Panel (SB.15.52.01) SOME REFERENCES IN THIS SECTION HAVE BEEN REDACTED AS OFFICIAL

2.1. In discussion in advance of the teleconference, Science Board noted the 18% rise in applicants in the astronomy community seeking funding from STFC. It was noted that this trend was occurring across other STFC research communities and those of other Research Councils.

2.2. The Chair welcomed Dr Vincent and Mrs Burchall to the meeting (Professor Smail being delayed). Science Board noted the Astronomy Grant Panel (AGP) review process. The main changes from the previous grants round included the adoption of one of the recommendations from the review of

consolidated grants that the AGP call be split so that proposals in the Astronomy Observations and Theory (AO/AT) areas were separated from those in the Planetary and Solar Studies area (PL/SS). This allowed smaller, more coherent proposals to be considered. AGP considered the balance between the science areas to be robust. Other changes included AGP now receiving advice from the DiRAC[1] facility on requests for computing time, and Knowledge Exchange plans and Outreach plans no longer being reviewed separately by the STFC External Innovations and Public Engagement teams.

2.3. The level of full economic cost (fEC) awarded for each proposal reflected the contribution of individuals to the funded research. The level of fEC awarded had reduced since the equivalent grant round in 2012/3.

2.4. The Chair welcomed Professor Smail, the Chair of the AGP, to the teleconference and reminded all attendees of the requirement for confidentiality.

2.5. Science Board noted that this had been a large grants round with an increase in applications since the previous equivalent grant round in 2012/3. The increase in applications was approximately equally split between demand from existing groups and from new applicants (new members of staff or institutions/groups that have not previously held STFC consolidated grants).

2.6. Science Board had previously requested that AGP provide data and evidence relating to the excellent research that could not be funded at each grants round. Examples from the 8 projects just below the PDRA funding line had been provided in the AGP report. These projects were all highly rated (classified as “Proposal on a critical topic and likely to substantially advance the field” or “Competitive with projects being pursued by the best groups working in this area worldwide”). It was noted that a 10% increase in baseline funding for AGP would provide PDRA support for all of these projects.

2.7. It was noted that funding for ground-based facilities mapped with the community priorities for exploitation; equivalent data were available for space-based facilities, which mapped with UKSA priorities.

2.8. AGP analysis of the cohort had found no evidence of geographical bias and the proportion of funding by gender was felt to reflect the population of applicants. No evidence was found of varying success rates as a function of group size. It was noted that there were no figures available to evaluate whether there was a significant difference in success rates for senior and junior staff.

[1] Distributed Research utilising Advanced Computing

2.9. There had been a significant decline in the level of PDRA funding awarded by AGP, with the level halving since 2005. Some funding for astronomy groups had been secured from non-STFC sources, such as the European Research Council, (equivalent to approximately 50 RAs) but there was a significant risk that the UK would lose leadership in the exploitation of previously funded projects.

2.10. In general discussion, the following issues were raised:

2.10.1. The majority of astronomy applicants used more than one facility; it was rare for a project to require access solely to one;

2.10.2. Science Board requested clarification of the opportunity to share PDRAs across academics and projects (as was the practice in some other research areas). AGP felt that this would not be possible due to the nature and diversity of the astronomy community;

2.10.3. AGP expressed concern that the low level of fEC awarded might increase pressure within universities on future recruitment of astrophysicists. One solution might be to concentrate AGP funding in fewer universities. The AGP Chair confirmed that AGP would not wish to implement such a policy without clear future guidance relating to this from STFC and Science Board. At present, Science Board and STFC have no plans for such guidance;

2.10.4. Science Board asked whether it would be advantageous to award a consistent level of fEC across groups, but this did not appear to offer any benefit. It was noted that AGP had tried to mitigate some of the adverse effects of constrained funding by awarding fEC to some groups not gaining PDRAs. AGP's main concern was that nearly one third of the astronomy community received no fEC funding even though 90% were judged to be "research active";

2.10.5. AGP indicated that when considering requests to exploit observation facilities, the priority of construction projects in the Programmatic Review was taken into account. However, the Programmatic Review did not give sufficient granularity of prioritisation in all instances, leaving the AGP to undertake a detailed scientific prioritisation of the individual merits of projects.

2.11. The Chair thanked the AGP for the report and presentation and for conducting such a difficult process very effectively. Science Board welcomed the opportunity to discuss the issues raised by the grants panel.

3. Agenda Item 2a - Closed Session (AGP)

3.1. Science Board noted that the AGP report had recently been delivered to the UKSA's Space Programme Advisory Committee (SPAC). Science Board noted that SPAC had endorsed the outcome of the AGP round and had acknowledged the strong support for a range of UKSA missions. UKSA had asked that AGP provide more detail in future on the ratio of ground:space funding.

3.2. Science Board agreed that the AGP process was robust and thorough, particularly given the breadth and volume of applications, and that the panel had carefully considered the balance between supporting facilities while maintaining the breadth of the programme. Science Board endorsed the outcome of the AGP review.

4. Agenda Item 3: Overview of Technology

4.1. The Chair welcomed to the meeting, Professor Geddes, Director, STFC Technology Department and Mr French, Dr McLean and Dr Orlowska, Technology Department Heads.

4.2. Science Board received an overview of the STFC Technology Department (TD). TD had roughly 300 staff, based across STFC sites (RAL, Daresbury Laboratory (DL) and the UK Astronomy Technology Centre (UK ATC)). TD worked with all other departments within STFC, with other Research Councils, UKSA and external collaborators.

4.3. Science Board received an overview of TD finance and noted the complexity of funding staff across both internal and external projects. At any one time, approximately one third of TD staff worked with STFC's facilities, with the majority of the remainder working on STFC core programme projects. The balance between internally and externally-funded work was managed carefully to ensure that sufficient staff were available for STFC-funded projects.

4.4. There were 5 divisions within TD - Applied Science (including cryogenics and magnets; composites; materials testing; high power targets); Detectors and Electronics (detector development; electronic system and design); Microelectronics Support Centre; Technology @ DL (including nuclear physics and engineering support); UKATC (engineering and manufacturing support for the astronomy programme focussed on instrumentation). There were only limited overlaps between the groups and between sites.

4.5. TD's major roles included the Large Hadron Collider (LHC) detectors, magnet coils for CERN, the design and build of mechanical support for Advanced LIGO detectors and T2K beam target, ALMA, Planck and the Mid Infra-Red Instrument (MIRI) for the James Webb Space Telescope (JWST).

4.6. It was anticipated that TD would continue to bid competitively for direct funding for a full range of STFC projects; the work of the department was limited by staffing levels rather than demand.

4.7. Significant challenges included being involved in projects sufficiently early to ensure that appropriate TD staff were available, managing the skills portfolio against evolving demands, recruitment and management of staff to ensure these mapped against projects, and retention of expertise that could not be obtained from sources outside STFC.

4.8. There was anecdotal evidence that the cost of staff was higher in TD than in universities. TD felt that a simple cost comparison failed to take into account the unique range of technical services and expertise available within TD, which ensured value for money.

4.9. There was no mechanism within TD to allow the funding of strategic, speculative work, such as the development of detectors for light sources. For facility-related projects, limited funding was available through commercial projects. The greatest threat for TD was felt to relate to the pressure on staffing levels with public pay constraints leading to the loss of essential skilled staff.

4.10. The Chair thanked Professor Geddes and the TD Department Heads for the informative presentation.

5. Agenda Item 4 - Diamond Vision (SB.15.52.02) SOME REFERENCES IN THIS SECTION HAVE BEEN REDACTED AS OFFICIAL

5.1. The Chair welcomed Professor Andrew Harrison, CEO Diamond Light Source, to the meeting.

5.2. The CEO introduced the session by giving some background context on developments since his last visit to Science Board. Diamond had been operational for 8 years. The number of beamlines had increased from the initial 7 to 25, with 98% reliability. Demand for beamtime had increased, particularly for researchers wishing to use the facility remotely. The oversubscription factor for instruments was 2 or 3, although it was hoped that increased automation of sampling would improve this.

5.3. It was not easy to measure outcomes for Diamond effectively. While it was possible to obtain information on user publications, it was more challenging to assess the quality of such publications. Work on developing citations (such as use of mean normalised citation scores) was under development but would take time to refine. Diamond was also looking to understand why strong UK

research groups might chose to use an equivalent facility rather than Diamond.

5.4. A large number of industrial companies pay for beam time. 25% of projects have some form of industrial link or collaboration. Funding is in place for further beamlines with Phase III of Diamond to be completed by 2018.

5.5. The Diamond 10-year Vision explored areas where Diamond could make a difference and aimed to ensure that the facility had the technology to address these challenges. A number of facilities would have lower emittance than Diamond by 2020 and the facility was working with TD on the technology development required to retain Diamond's world leading position.

5.6. In developing the Vision, Diamond had consulted its users and Scientific Advisory Committee (SAC), and had held a public meeting to focus on key scientific challenges. The input arising from the Large Facilities science requirements exercise had also been taken into account.

5.7. The document focussed on key scientific areas and mapped each onto societal challenges. To complement this, the relevant enabling technology had been considered. This included the brightness lattice upgrade, emittance improvements, further enhancement of sample preparation, an increased range of sample environments (particularly in collaboration with universities and ISIS) and improvements in optics and data analysis.

5.8. Diamond beamlines had a competitive lifetime of 5 to 10 years and the prioritisation process for the closure and upgrade of beamlines was being established. The need to review operations had been recognised, including assessment of the best mechanisms for interacting with the community.

5.9. Diamond aimed to develop a stronger in-house science culture, including the recruitment and retention of the best staff. The core mission of Diamond had expanded to include a new national facility for electron microscopy and exploiting opportunities for working with others on the Harwell campus (particularly following the need for closer interactions flagged in the Triennial Review).

5.10. In discussion, a number of issues were raised:

5.10.1. In developing solutions for high performance computing applications, Diamond was seeking opportunities to find solutions across the Harwell campus.

5.11. Science Board was invited to provide further feedback on the Vision document, particularly on any issues that Science Board felt were not adequately covered or opportunities missed.

5.12. Science Board thanked the CEO for the overview of the Vision and welcomed the opportunity to work closely with the Diamond Light Source in its development.

6. Agenda Item 5 - Review of UK Phenomenology
SOME REFERENCES IN THIS SECTION HAVE BEEN REDACTED AS OFFICIAL

6.1. The Chair welcomed to the meeting Professor Sachrajda, Chair of the review panel, Ms Hiscock, Programme Manager, Particle Astrophysics, and Mr Medland, Head, Particle and Nuclear Physics.

6.2. The review panel had been asked by STFC to undertake a strategic review of UK particle physics phenomenology and to advise STFC on future support for the area. Phenomenology was currently funded by STFC through the Institute for Particle Physics Phenomenology (IPPP) and through the particle physics theory (PPT) consolidated grants.

6.3. The review panel had consulted widely with all UK particle physics theory groups and some experimental groups. It had found a number of areas of phenomenology in which the UK activity was world-leading, a number of other areas in which the UK has major strengths and some in which there were excellent individuals but a low critical mass.

6.4. Science Board supported in principle the recommendations of the review that support should continue for a national centre for phenomenology at a reduced funding level, contingent on a revised re-bidding process. In addition, a significant fraction of the IPPP programme, principally the research element, should be assessed in competition at the next PPT consolidated grants round. Science Board felt that the aims and objectives of the centre and the process for the bidding exercise required further refinement and this should be resolved urgently. Science Board noted the panel's view that there was a need for a review in the post-CSR period of the balance of funding for particle physics theory in comparison with other elements of the core programme.

6.5. The Chair thanked Professor Sachrajda and the review panel for the presentation and report.

7. Agenda Item 6: Interactions with the Nuclear Physics Advisory Panel

7.1. Science Board considered areas for discussion with the chair of the Nuclear Physics Advisory Panel (NPAP).

8. Agenda Item 7: Nuclear Physics Advisory Panel SOME REFERENCES IN THIS SECTION HAVE BEEN REDACTED AS OFFICIAL

8.1. The Chair welcomed to the meeting, Dr Andy Boston, chair of the NPAP. Dr Boston gave an update of the work of NPAP and progress on updating the NPAP roadmap.

8.2. Science Board noted the broad scope and scale of the nuclear physics programme. Broadly, the science areas were nuclear structure and nuclear astrophysics, hadron physics and strongly interacting matter, and nuclear theory. The programme sought to answer a number of STFC's key science challenges. The community consisted of approximately 50 academic staff (with this number having been stable over the last few years), roughly 60 research and professional support staff and 90 research students; over half of the latter were funded by STFC.

8.3. The UK nuclear physics community was small but continued to retain important roles in many international projects, with recognised leadership and expertise. Recent developments included those at FAIR[2] where, due to the delays, there had been a review and prioritisation of sub-projects. NuSTAR was a high priority for FAIR and the low energy beam will now be built. The R^3B[3] and DESPEC[4] experiments will be available for science in a phased start up from 2018.

8.4. STFC had funded upgrades for ISOL, JLab and ALICE and had agreed that the UK would maintain involvement in AGATA but would not contribute to the planned upgrade at this time.

8.5. Concerns identified by NPAP included the pressure experienced by the community in the continued constrained financial environment. NPAP highlighted the narrowness of the current nuclear physics programme. The nuclear physics community was identifying exciting new opportunities at a time when STFC funding was increasingly uncertain.

8.6. NPAP was also concerned that there had been unforeseen changes to the financial allocation during the last nuclear physics consolidated grants round and the timing of the grant round had not mapped well with that for the nuclear physics projects being reviewed. These issues meant that the expected distribution of cross-community post support was not ideal for future planning. STFC had recognised this.

[2] An International Facility for Antiproton and Ion Research
[3] Reactions with Relativistic Radioactive Beams
[4] Decay Spectroscopy

8.7. A new theory group chair had been established at York with STFC support to help establish a critical mass for UK nuclear theory. A key goal from STFC's perspective was to establish closer, stronger network links to other theory groups and experimentalists within the UK.

8.8. Science Board learned of the planning for community consultation to revise and update the current NPAP roadmap, including significant community consultation and community meetings. It was anticipated that the roadmap will be reported to Science Board in Spring 2016.

8.9. Funding for nuclear data, which was felt to underpin the safety and economic of industrial nuclear operations and processes, was discussed. It was agreed that STFC would explore what activities were taking place in the area of nuclear data, which would be reported back to Science Board.

8.10. There is now productive collaboration with industry in applied science, including transfer of technology from AGATA to medical imaging, a CLASP award linked to GANIL, and a mini IPS award for a hand held gamma-ray spectrometer.

8.11. The nuclear physics community supported strong professional development and training, including several masters training programmes, which were self-sustaining with funding from the nuclear industry.

8.12. It was confirmed that the nuclear theory community required computing resources from DiRAC with the community's requirements for data storage and archiving being adequately met locally within universities.

8.13. The Chair thanked the Chair of NPAP for updating Science Board on recent developments. Science Board looked forward to receiving a further update, particularly relating to nuclear physics community priorities, once the NPAP roadmap was completed.

9. Agenda Item 8: Update from STFC (SB.15.52.05; SB.15.52.06) SOME REFERENCES IN THIS SECTION HAVE BEEN REDACTED AS OFFICIAL

9.1. The Chair welcomed Professor Long, Dr Cosgrove and Mr Medland to the meeting.

9.2. This meeting paper was analogous to the former 'Director's Report'; STFC was working to ensure all advisory boards received a report to cover updates across the whole organisation. A number of issues had arisen too late to be included in the report:

9.2.1. ESRF had now renamed its upgrade programme to the Extremely Brilliant Source (EBS) project. A call for expressions of interest had been issued (deadline March 2016);

9.2.2. The number of CLASP proposals had seemed low although it was within the general range. It was recognised that application numbers differed depending on the topic targeted;

9.2.3. Discussions were ongoing with the facilities about how the advisory boards would be structured to be consistent with the LFIG structure.

9.2.4. Some concern was expressed that there would be a downselect of UK teams for LSST, although this situation was unclear. STFC agreed to update Science Board on the current position;

9.2.5. An extraordinary Council meeting had been held at FAIR. A proposal had been put forward for a staged start for FAIR with shareholders asked to contribute additional funding;

9.2.6. It was noted that there was to be a Global Challenge Review in Energy. Science Board had planned a similar review in the past and now welcomed the opportunity to add value to the Global Challenge review;

9.2.7. As part of STFC Light Touch Review, STFC was developing a framework to ensure the process for reviews was coherent and planned;

9.2.8. The name of the proposed UK Associate Director for ILL had been endorsed by STFC's Executive Board and would now be discussed by other ILL associates;

9.2.9. An impact study for the Daresbury Laboratory campus was being carried out, in part to inform Comprehensive Spending Review negotiations. This was a complex task.

9.3. Mr Medland introduced the proposal for supplementary funding for the existing R&D programme for DUNE (formerly called LBNE).

9.4. Science Board noted that the high scientific priority for this project had already been established and that the proposal would be considered by Science Board once it had been reviewed by PPRP. Science Board endorsed the process for consideration of ProtoDUNE by PPRP at its next meeting.

10. Agenda Item 9 - Updates from the Chair
SOME REFERENCES IN THIS SECTION HAVE BEEN REDACTED AS OFFICIAL

10.1. Professor Clarke updated Science Board on a meeting he had recently attended to consider computing challenges across STFC. There had been a clear positive recommendation that requests for computing resources should be as overarching as possible (that is, none should solely reflect the requirements of an individual community or facility). Science Board noted that the implementation of the STFC Computing Strategic Review would be considering the scope and priorities for computing resource. This would include encouraging larger projects, particularly in astronomy, to combine their requests for computing resources, such as data centres.

10.2. It was noted that the focus was initially on commodity type computing and storage. DiRAC was not central to this (although DiRAC representatives were involved in the meeting). At the current time, there had been limited involvement from the STFC national facilities although this would be remedied to ensure that common infrastructure was developed wherever possible.

10.3. STFC welcomed the involvement of this group in working with STFC towards the implementation of the computing strategy.

10.4. It was agreed that Science Board should receive an update on this development at a future meeting.

10.5. The Chair updated Science Board on her attendance at Council in July and September. The September meeting had included discussions on the Particle Physics (Experimental) Grants Panel and the Chair had confirmed that the grants process had been robust in a highly constrained landscape. Council had asked whether PPGP had sufficient information for prioritisation (given the elapsed time since the last Programmatic Review) and noted the difficulty of balancing funding for a broad programme with maintaining current flagship projects.

10.6. At a recent open meeting of the Particle Physics Advisory Panel (PPAP), it had been reconfirmed that the community wished to see the high priorities maintained while ensuring sufficient breadth of programme.

10.7. Science Board agreed that, if there was a difficult financial settlement post-CSR, it would be essential to have a robust strategic landscape to enable priorities to be agreed. It was noted that an ongoing series of reviews would be undertaken and that an update on plans for the successor to the Programmatic Review should be available for presentation to the December Science Board.

10.8. Council had discussed the ‘Drayson partitions’ and the Chair had reiterated Science Board’s support for their retention in order to reduce the effect on the core programmes of potential fluctuations in international subscription and facility costs.

10.9. Council had received an overview from the Chair of SEAB.

10.10. Professor Freeman gave an overview of the last SEAB teleconference. SEAB was working to develop a strategy. STFC had provided a paper setting out a number of options. Professor Freeman felt that he was able to represent Science Board’s views on issues such as CDTs, fellowships and studentships although, as the work programme evolved, it might be necessary for Science Board to discuss these in more detail to ensure its views were adequately captured.

11. Agenda Item 10 - Update on the Comprehensive Spending Review and Other Reviews

11.1. Science Board received an update on STFC activities relating to the Comprehensive Spending Review and a number of other reviews including the Nurse Review, McKinsey review and the RCUK Operational Cost Reduction Programme (OCRP).

12. Agenda Item 11 - Report from the Accelerator Strategy Board (SB.15.52.07a; SB.15.52.07; SB.15.52.08; SB.15.52.09)
SOME REFERENCES IN THIS SECTION HAVE BEEN REDACTED AS OFFICIAL

12.1. The Chair welcomed Mrs Jamieson and congratulated her on her recent promotion.

12.2. Professor Borghesi, as the cross-member between Science Board and the Accelerator Strategy Board (ASB), gave a report of the recent ASB meeting. ASB had considered three Statements of Interest (SOIs), two of which had been invited to submit full proposals. ASB had received an update on the strategy review of Free Electron Lasers (FEL).

12.3. Mrs Jamieson summarised the ASB consideration of the PPRP reports for AWAKE (a proton-driven plasma Wakefield acceleration experiment at CERN) and UK participation in HL-LHC (LHC high luminosity project).

12.4. In its consideration of both PPRP reports, ASB had considered the context of the overall accelerator programme and the available funding.

12.5. Science Board noted the PPRP and ASB review process and the assumptions underpinning the funding recommendations.

12.6. Science Board endorsed the funding levels recommended by ASB.

13. Agenda Item 12 - STFC Corporate Strategy Refresh (SB.15.52.10) SOME REFERENCES IN THIS SECTION HAVE BEEN REDACTED AS OFFICIAL

13.1. The Chair welcomed Mr Sharples, Head of Strategy, to the meeting.

13.2. Science Board noted that STFC had initiated a refresh of its current corporate strategy. The current strategy had been in place since 2010 and this would now be revisited to provide a strategy for the next 10 years. A working group had been established to provide narrative input and STFC had also sought input from its senior staff and advisory bodies.

13.3. A paper (SB.15.52.10) had been circulated to Science Board setting out the process and main framework. The three long-term goals (world class research, world class innovation and world class skills) would remain unchanged from the previous strategy, together with the three existing themes. Three new themes were being developed with the intention of ensuring that the themes were more STFC-specific. Science Board was invited to provide top level comments on the overall framework and specific comments on the 'world class research' narrative (Annex Two of the paper).

13.4. Science Board noted that the document would be revised further and that it would have an opportunity to comment on the revised version.

13.5. One of the information papers (INFO.SB.15.52.13), which was a report from the Innovations Advisory Board (IAB), included reference to IAB's consideration of a paper on campus clusters. It was noted that IAB had received an equivalent update on the STFC corporate strategy refresh and that this had included information on campus clusters.

14. Agenda Item 13 - Tour of STFC Technology

14.1. Science Board had a tour of Technology Department's Detector and Electronics division, MSC (Micro-electronics Support Centre) and Applied Science Division (Cryogenics Lab and Metrology Lab), hosted by Mr French, Dr McLean and Dr Orlowska.

14.2. Science Board expressed its appreciation of the insightful visit.

15. Agenda Item 14 - Update on the Free Electron Lasers (FELs) Strategy Review (SB.15.52.11)
SOME REFERENCES IN THIS SECTION HAVE BEEN REDACTED AS OFFICIAL

15.1. The Chair welcomed Dr Wright and Mr Watson to the meeting. Science Board received an update on the Free Electron Lasers (FELs) strategic review. Science Board had considered a draft report at its July meeting. Science Board was invited to discuss the amended report.

15.2. In considering the ASB report and the draft FELs report, Science Board asked that the two strategies should be linked together.

16. Agenda Item 16 - Minutes and Actions (SB.15.51)
SOME REFERENCES IN THIS SECTION HAVE BEEN REDACTED AS OFFICIAL

16.1. The minutes of the meeting held on 15 and 16 July were approved.

16.2. Actions from the meeting were reviewed. Actions that were incomplete were discussed and Science Board updated them, as appropriate.

17. Agenda Item 17 - Any Other Business
SOME REFERENCES IN THIS SECTION HAVE BEEN REDACTED AS OFFICIAL

17.1. Science Board noted the information papers. The Chair explained for the benefit of new members that Annex G to the 2013 STFC Programmatic Review report (the PPAN sub-group input) and the accompanying financial tables are standing information papers for Science Board.

17.2. A cross-member between Science Board and the UK Space Agency's Science Programmes Advisory Committee (SPAC) should be identified.

17.3. There was no other business.

18. Agenda Item 18 - Meeting Close

18.1. The Chair reminded Science Board of the importance of extending apologies for Science Board meetings with sufficient notice to allow the invitation to the meeting of non-core members or other expert attendees with the necessary core skills, should the need arise. At the end of each meeting, Science Board members should inform STFC if it is known they will be unable to attend the next meeting.

18.2. Science Board noted that its next meeting will be 15 and 16 December in Polaris House.

18.3. Meeting dates and venues for 2016 were:

11 - 12 February	Polaris House
27 - 28 April	Daresbury Laboratory, Cheshire
5 - 6 July	Polaris House
3 - 4 October	UK Astronomy Technology Centre, Edinburgh
12- 13 December	Polaris House

[Secretary's Note: the dates for the Science Board meeting in April 2016 were subsequently changed to be 28-29 April 2016 (venue unchanged)]