



Science Board

24th and 25th October 2013

Minutes of the Fortieth Meeting

Jury's Inn, Swindon

- Present: Professor Matt Griffin (**Chair**) – Cardiff University
 Dr Alison Davenport (**Deputy Chair**) – University of Birmingham
 Professor Sean Freeman – University of Manchester (25th Only)
 Professor Alan Heavens – Imperial College London
 Professor Anthony Lasenby – University of Cambridge
 Professor Ken Long – Imperial College London and STFC, RAL
 Professor Malcolm McMahon – University of Edinburgh
 Professor Bob Nichol – University of Portsmouth, ICG
 Professor Simon Redfern – University of Cambridge
 Professor Pam Thomas – University of Warwick
 Professor Dan Tovey – University of Sheffield
 Professor Justin Wark – University of Oxford
 Professor Alfons Weber – University of Oxford and STFC, RAL
 Professor Chick Wilson – University of Bath
- Apologies: Dr Olwyn Byron – University of Glasgow
 Dr Victoria Wright – Head, Science Strategy
- In Attendance: Dr Paula Chadwick – Deputy Chair, PPRP (item 7)
 Professor Andy Lawrence – Chair, Astronomy Grants Panel (item 16)
 Professor Peter Jones (item 13)
 Professor Mark Thompson – Chair, PPRP and Chair, Spectrographs Review Sub-Group (items 5, 6, 7, 8)
 Mr Tim Stevenson – Panel Member, PPRP (item 5)
- STFC: Professor Grahame Blair – Executive Director, Programmes
 Dr Simon Berry – Astronomy Programme Manager (items 16,18,19)
 Malcolm Booy – STFC Programme Support Group
 Kim Burchell – Astronomy Programme Manager (item 16)
 Dr Sharmila Banerjee – Secretary, PPRP (items 5, 6, 7, 8)
 Dr Catherine Ewart – Head, Futures (item 10)
 Ms Lisa Kehoe – Secretary, Science Board
 Mr Tony Medland – Head, Particle & Nuclear Physics (items 8, 9,13, 14, 15)
 Dr Janet Seed – Associate Director, Programmes
 Dr Jennifer Scratcher – Programme Manager, Light Sources and Neutrons (Item 17)
 Dr Colin Vincent – Head, Astronomy (items 5, 6, 7, 16)

Mrs Penny Woodman – Head, Global Challenge & External
Innovation (item 10)

1. Item 1 – Welcome and Introductions

- 1.1. The Chair welcomed everyone to the meeting. All members introduced themselves for the benefit of the new members.
- 1.2. Apologies were noted for Professor Sean Freeman (absent on 24/10/13), Dr Olwyn Byron, Dr Catherine Ewart and Dr Victoria Wright. Professor Bob Nichol had been delayed and would join the meeting at item 4.
- 1.3. The approach for handling conflicts was agreed to be:
 - Institutional: Science Board members should be aware of their institutional conflicts and avoid any influence over their comments.
 - Departmental: For items for which several members had a Departmental conflict, members could remain in the room but should not contribute to the discussion.
 - Project: Science Board members with a project conflict should leave the room for the relevant part of the meeting.
- 1.4. The Chair clarified that where members were involved in a project against which the project under discussion would be tensioned it would not be necessary for members to leave the room.
- 1.5. The Chair proposed that the presenters of the Projects Peer Review Panel reports remain in the room for the Closed Sessions on the agenda since there were no procedural issues with the PPRP reports which would necessitate a Closed Session.

2. Item 2 – Minutes and actions (SB.13.39 minutes and SB.13.40 Action list)

- 2.1. The minutes of the July 2013 meeting were approved with no amendments.
- 2.2. Actions from previous Science Board meetings were reviewed, and a summary is attached to these minutes.

3. Item 3 - Update from Council **SOME REFERENCES IN THIS SECTION HAVE BEEN REDACTED AS PROTECT: MANAGEMENT**

- 3.1. The Chair gave an overview of the 24th September meeting of Council.
- 3.2. Science Board had not met between the Council meetings so no significant updates were provided to Council on SB activities. The Chair requested that members provide Science Highlights ahead of the next meeting and noted that any scientifically interesting topics would be considered provided they were relevant to STFC.
- 3.3. Professor Womersley had provided an update on the BIS efficiency review, 'Eating the Elephant'. There had been particular concern at Council regarding the potential impact of a continued squeeze on Peer Review administration. The Deputy Chair, Science Board, had noted that Peer Review was itself a good mechanism for making savings given that it frequently identified efficiencies.

- 3.4. There was a large financial shortfall for facilities funding. A proposal had been presented to address this but was not strongly welcomed by STFC Council.
- 3.5. Updates on the Triennial Review and Spending Review were provided.

4. Item 4 - Director's Report (SB.13.40.01) SOME REFERENCES IN THIS SECTION HAVE BEEN REDACTED AS PROTECT: MANAGEMENT

- 4.1. The Executive Director, Programmes, presented the Director's report.
- 4.2. Funding for the facilities for 15/16 was under negotiation.
- 4.3. Science Board discussed the Sandpit for cross-facility and cross-council working at the Harwell Campus and requested that it be involved in the discussions and the sandpit.
- 4.4. Science Board noted that an international panel was undertaking a review of ISIS and that Professor Freeman was providing cross membership with Science Board.
- 4.5. Science Board noted that the STFC Chief Executive in his role as Chair of ESFRI would be commissioning a review of neutron strategy. The Executive would collate input to this review for consideration at Science Board's December meeting.
- 4.6. Science Board noted that the Education and Training team were reviewing the Studentships algorithm. Detailed modelling would be performed at the next meeting of the Education and Training and Careers Committee (ETCC). The current allocation would be rolled over to next year rather than applying the old algorithm to the new data.
- 4.7. Science Board expressed its concern regarding the rollover of the allocation. The executive clarified that the process being followed was intended to ensure the balance between Science Areas was maintained. Running the algorithm again would result in very large fluctuations and was not a desirable outcome. Science Board noted the strong request from the community to resolve the issue.
- 4.8. Science Board noted that STFC was the only Council awarding studentships via an algorithm but there was no pressure to harmonise the process.
- 4.9. Science Board noted the successful Astronomy event, 'Seeing the Universe in all its light', at the houses of Parliament, which had been held to coincide with the Higgs Nobel Prize.

5. Item 5 - PPRP Report – WEAVE (SB.13.40.02) SOME REFERENCES IN THIS SECTION HAVE BEEN REDACTED AS PROTECT: PEER REVIEW

- 5.1. The Chair, PPRP visiting panel for WEAVE, presented the PPRP report. Science Board noted that the standard PPRP process had been followed.

- 5.2. The William Herschel Telescope Enhanced Area Velocity Explorer (WEAVE) was a proposed wide-field spectroscopy instrument for the prime focus of the 4.2-metre William Herschel Telescope (WHT) on La Palma.
- 5.3. Science Board had previously conducted a review of the Island sites (Hawaii and La Palma) which concluded that STFC should continue to have an interest in the WHT if a new high strategic priority instrument was built for it.
- 5.4. The PPRP recommended that WEAVE be funded in full with the award being contingent on an international project funding status review.
- 5.5. Having considered the implications of the de-scope options and cost reductions requested from the applicants, the PPRP had recommended what it judged to be the optimal level of resources to give the best return to the UK
- 5.6. Science Board reviewed and endorsed the conclusions of the PPRP, and made corresponding recommendations regarding funding to the STFC Executive for approval.
- 5.7. Science Board agreed to re-visit the recommendation for WEAVE after the review of the Spectrographs proposals later in the meeting.

**6. Item 6 - Science Board Spectrographs Review Sub-Group (SB.13.40.03)
SOME REFERENCES IN THIS SECTION HAVE BEEN REDACTED AS
PROTECT: PEER REVIEW**

- 6.1. The Chair of the Spectrographs Review Sub-Group presented the report from the Sub-Group, which had been established to provide strategic advice on which, if any, of three spectroscopic instrumentation proposals should be invited to submit a full proposal to the PPRP.
- 6.2. The UK Astronomy Community wished to contribute to a range of spectroscopic instrument opportunities proposed for ESO and non-ESO facilities. Three concepts with significant UK roles were proposed:
 - MOONS – a multi-object optical/near IR spectrograph for deployment on ESO's VLT facility;
 - DESI – a spectrograph instrument for the Mayall telescope in the USA;
 - 4MOST – a multi-object spectrograph instrument for ESO's VISTA facility.
- 6.3. The Sub-Group Chair described the review process which had been undertaken and summarised the four main goals of the review:
 1. to consider the science cases and UK impact of involvement;
 2. to evaluate how each proposal fits with STFC science strategy;
 3. to evaluate timeliness, value for money and risk;
 4. to recommend a ranked order for involvement in one or more instrument.

- 6.4. The Sub-Group noted that there were partially overlapping science cases focusing on Galactic astronomy including Gaia follow-up and extra-galactic astronomy focusing on cosmology/dark energy.
- 6.5. The sub-group recommended that MOONS and DESI submit full proposals to PPRP in all funding scenarios.
- 6.6. The Sub-Group had considered the relationship to WEAVE and stated that although they had expressed a clear preference for MOONS over 4MOST they highlighted the importance of the science case for Gaia follow up.
- 6.7. The Chair thanked the Sub-Group for their report.
- 6.8. Science Board noted that wide-field spectroscopic surveys were considered to be a high priority by the Astronomy Advisory Panel (AAP) in its 2012 report and that the objectives of DESI were a strong fit with the STFC science priorities and the challenges identified in the STFC science roadmap. The importance of Multi-Object Spectrometer (MOS) instruments had also been highlighted as a high priority for STFC funding by a number of reviews, including those of the Astronomy Advisory Panel (AAP), the earlier astronomy Ground-Based Facilities Review (GBFR) and various international processes, such as the consideration of future European instrument needs by ASTRONET.
- 6.9. Science Board noted the scientific capabilities of 4MOST, particularly in following up the ESA Gaia mission. There was some, but limited, potential for UK leadership in 4MOST, and the ESO review had also identified significant levels of technical and managerial risk.
- 6.10. Science Board noted the intention to maximise the return on UK investment in ESO but in this instance given the strengths of other spectrograph proposals and the scientific capabilities that they would offer, together with the proposed WEAVE instrument, 4MOST was considered to be lower strategic priority and Science Board did not invite submission of a full proposal.
- 6.11. Science Board noted that the strong UK leadership in MOONS through the UK Principal Investigator would result in UK access to a very broad science programme and would maximise the return on UK investment in ESO. Science Board invited submission of a full proposal for consideration by the PPRP.
- 6.12. Science Board recognised that the opportunity to obtain leadership in the Dark Matter elements of the DESI proposal was strengthened by the applicants' excellent track record. A full proposal was invited for consideration by the PPRP.

7. Item 7 - PPRP Report – Gaia (SB.13.40.04) SOME REFERENCES IN THIS SECTION HAVE BEEN REDACTED AS PROTECT: PEER REVIEW

- 7.1. The Deputy Chair, PPRP, presented the PPRP report for Gaia Coordination Unit (CU)9.

- 7.2. As a result of the time pressures and the fact that the programme had already been reviewed by the Gaia Data Processing and Analysis Consortium (DPAC), the proposal was fast-tracked through the PPRP and a visiting panel was not convened.
- 7.3. The PPRP had been strongly convinced by the science case for the additional work.
- 7.4. Science Board noted that there would be an ongoing requirement for project handoff between the UKSA and STFC. If the Gaia handoff was successful it could be used to inform future activities.
- 7.5. Science Board noted that there was a strong case for the data access, data analysis tools, data visualisation and clear documentation for the Gaia mission. The UK had a major role within Gaia already, supported by the UKSA, and this proposal would enhance the opportunity for the UK community to exploit fully Gaia's scientific potential.
- 7.6. Science Board noted that in preparing the detailed peer review recommendations, PPRP had taken into account the strategic guidance given by Science Board. Having considered the implications of the de-scope options and cost reductions requested from the applicants, the PPRP had recommended what it judged to be the optimal level of resources to give the best return to the UK.
- 7.7. Science Board reviewed and endorsed the conclusions of the PPRP, and made corresponding recommendations regarding funding to the STFC Executive for approval.

8. Item 8 - PPRP Reports – COMET and g-2 (SB.13.40.05) SOME REFERENCES IN THIS SECTION HAVE BEEN REDACTED AS PROTECT: PEER REVIEW

- 8.1. The chair of the PPRP introduced the PPRP reports for Comet and g-2.
- 8.2. Professor Ken Long remained in the meeting for the discussion but left the room whilst Science Board made its recommendation.
- 8.3. Science Board had requested that both projects be submitted to PPRP and reviewed separately and in competition with each other.
- 8.4. The Chair, PPRP, presented the process undertaken for review of the two projects and noted that the only connection between the projects was that they both concerned muons.
- 8.5. Science Board noted that in preparing the detailed peer review recommendations, PPRP had taken into account the strategic guidance given by Science Board.
- 8.6. Science Board recommended the minimum viable level of support for g-2 to enable the UK to maintain a strong role in the scientific exploitation of the experiment.

- 8.7. The COMET experiment was split into two phases. The proposal addressed participation in phase I of the experiment.
- 8.8. Science Board recognised the scientific case for the COMET experiment and the strength of the UK team. Bearing in mind the cost of the current phase and that a further phase of the experiment was planned which would require ongoing commitment from STFC, Science Board regrettably concluded that COMET was unaffordable within the current, constrained funding scenario and did not recommend funding be provided.
- 8.9. Science Board noted that supporting one proposal would still increase diversity in the programme although it was regrettable that the current funding landscape would not allow excellent science to be supported.

**9. Item 9 - Accelerator R&D Review (SB.13.40.06, SB.13.40.07, SB.13.40.08)
SOME REFERENCES IN THIS SECTION HAVE BEEN REDACTED AS
PROTECT: MANAGEMENT**

- 9.1. This item was taken after the Futures Annual Report but the agenda order has been maintained in these minutes.
- 9.2. The Executive Director, Programmes, introduced the planned review of Accelerator Research and Development.
- 9.3. The Accelerator Strategy Board (ASB) had proposed a 3-yearly cycle of accelerator reviews and having carried out a preliminary review of STFC's entire programme in 2011/12 the second review was planned for 2014.
- 9.4. A plan for an accelerator review was presented, with the goal of evaluating and prioritising STFC's entire accelerator programme to inform strategic and financial planning for the next 10 years. The review would include:
 - the quality of the research undertaken and the proposed future plans;
 - the skills, expertise and training developed and supported by these activities;
 - the societal and economic impact of these activities and routes to commercialisation.
- 9.5. The review aimed to allow the STFC to ensure that the UK funded the breadth of accelerator activity to support what were seen to be the high priority areas, promote technology transfer and public engagement. As a result of the review, the intention was to develop a prioritised strategy for STFC investment in accelerator research for the next 10 years. The purpose of the review was not to peer-review existing projects, departments and institutes; instead it would develop a plan to move toward a balanced, prioritised programme allowing peer-review to take place in the normal way when existing funding commitments end from 2015 onwards.
- 9.6. Science Board noted that there was a need to have a strategy and set of guiding principles but that there was also a need to have peer review of the science. The importance of science input in determining the priority of the

accelerator projects was highlighted. Science Board noted that the accelerator strategy would need to emerge partly from the future strategic reviews of neutron and photon provision. The requirement for these reviews had been noted previously although the timing had not yet been agreed.

- 9.7. The accelerator roadmap was presented. The projects had been self-ranked by the ASB and would need to be mapped onto an accelerator strategy. Science Board noted that this paper would form an input to the review.
- 9.8. Science Board recommended that the review committee comprise closer to 8 rather than 12 members, but noted that it may be challenging to obtain the necessary breadth and expertise with fewer members.
- 9.9. Although it would be desirable to have the reviews of photons and neutrons prior to conducting the review of accelerator strategy, due to the need for the accelerator review to fit in with the funding cycle this would not be possible and the accelerator review would need to be conducted first. The iterative nature of the process was noted. There was information available which could be collated to inform the review in the absence of the photon and neutron strategies.
- 9.10. Science Board noted that when the neutron and photon strategies were developed it would be important to obtain significant community input.
- 9.11. Science Board was invited to:
 - endorse the strategic goals set out by ASB;
 - endorse the highest priorities as identified by ASB;
 - suggest additional areas for consideration;
 - review and endorse the goals and purpose of the review.
- 9.12. Science Board discussed the proposal in detail. It concluded that a review of the Accelerator Programme should be undertaken but did not endorse the review as presented. A Sub-Group of Science Board core and non-core members was proposed in order to fully understand the relationship with the neutron and photon strategy development, the science drivers for accelerator activities and the peer review of the projects.

10.Item 10 - Futures Annual Report to Science Board (SB.13.40.08) SOME REFERENCES IN THIS SECTION HAVE BEEN REDACTED AS PROTECT: MANAGEMENT

- 10.1. The Head, Futures, was unable to attend the meeting due to a last minute scheduling conflict. The Head, Global Challenge & External Innovation gave a brief update on the past 18 months and the future plans for the Global Challenge & External Innovation programme following the reorganisation.
- 10.2. The Futures and Innovations team had been working together over the past four years. The future oversight, management and advisory structure of the programmes was being considered. The Futures Programme had historically

had an advisory panel but no formal peer review mechanism; the Innovations Programmes had peer review but no advisory structure.

- 10.3. The final meeting of the Futures Advisory Panel would be used to formulate outputs and outcomes for the Global Challenge Programme.
- 10.4. Both the Futures and Innovations Programmes had made presentations to the Impact Sub-Group as part of the Programmatic Review.
- 10.5. The paper contained an annex listing the awards made in recent years. Science Board noted that the lack of projects awarded in the area of security was thought to reflect the absence of calls in this area owing to the availability of funding elsewhere. It was not clear whether a balanced programme across the theme areas was to be expected at this time.
- 10.6. The Global Challenge Concepts were proof-of-concept studies which needed to be multi-disciplinary and aim for further funding either from STFC or elsewhere. A review of the outcomes of the concepts would be undertaken at the end of the awards.
- 10.7. Science Board noted that within the more established Impact programme a series of visits with Universities which were not engaged with the impact programmes had been undertaken, and that this was proving to be very successful.
- 10.8. The Global Challenge Studentships had just been awarded (October). These awards were to take technologies developed by STFC to the Global challenges in other disciplines. The formation of a student network was being considered in order to encourage collaboration and information sharing and to make the most of the awards. A summer school was another option to encourage sharing of information. Science Board noted the suggestion that studentships may be awarded in clusters in particular research areas, but commented that this could reduce the number of institutions benefiting from the studentships programme. There was a possible advantage in having students spread out as it encouraged outreach activities within multiple departments. The possibility of using these students as ambassadors was suggested.
- 10.9. Science Board suggested that it would be useful to assess what fraction of the total number of studentships was awarded to new groups in novel areas compared with groups with existing links to STFC, and noted the positive steps being taken in order to implement metrics and define the benefits of the programmes.
- 10.10. Science Board noted that the high number of studentship applications could be a result of a general appetite for students; it would be important to ensure that the studentships were not being used to supplement reduced funding elsewhere.
- 10.11. The relationship of the studentships to the recent changes at the Large Facilities was discussed, as many of the students traditionally visiting the

facilities had been funded by EPSRC Project studentships, which were no longer being funded. There was a concern that with the move to Centres for Doctoral Training, fewer studentships involving research at the Large Facilities were being funded.

- 10.12. Science Board noted its interest in a report in the future on the use of the Healthcare and Environment reports in the Futures Theme, and in hearing about the Global Challenges, Innovations and strategic work being undertaken by the Futures Theme leaders. It was agreed that case studies would be presented at the next Annual update.

11. Item 11 - Science Board Future Work Programme (SB.13.40.10) SOME REFERENCES IN THIS SECTION HAVE BEEN REDACTED AS PROTECT: MANAGEMENT

- 11.1. The Associate Director, Programmes, introduced the paper on the Science Board Future Work Programme.
- 11.2. The need to balance the activity between review, monitoring and oversight activity and the development of long term strategy was recognised. The office would present a further paper to address the methods of working at the December meeting in order to work towards addressing the balance.
- 11.3. Science Board agreed that it would be preferable to do the technology reviews sequentially due to resource constraints and noted that they should be completed ahead of the next Programmatic Review.
- 11.4. The Healthcare and Environment action plans were discussed. Science Board reiterated its view that these plans were extremely valuable and should be fully exploited. An update on their implementation would be brought to the next meeting of Science Board.
- 11.5. The planning for the Energy Review was discussed. Science Board requested that the evidence for the use of the Healthcare and Environment action plans be presented before a commitment to another review could be made.
- 11.6. Science Board recommended that the review of photon provision be started at the earliest opportunity.
- 11.7. Science Board discussed the proposed review of neutron provision and agreed that its input to the ESFRI review should be in the form of a summary of existing documents including the Programmatic Review Report, the strategy proposed by the Director, ISIS, and other relevant documents previously considered by Science Board.
- 11.8. The proposed review of the Consolidated Grants Scheme was discussed. Science Board agreed that this could potentially be a light touch assessment. Terms of Reference would be provided to Science Board for review.
- 11.9. Future reporting by the Advisory Panel Chairs to Science Board was discussed. Science Board requested that a dialogue be initiated in order to maintain momentum and agree activities now that the Programmatic Review

had concluded. Three sessions were proposed for the Advisory Panels to present their annual reports to Science Board.

- 11.10. It would be important to address the balance between the Facilities and PPAN and ensure all relevant areas were being considered in the appropriate level of detail.
- 11.11. A more streamlined way of working would be considered at the December meeting including the potential for a standing PPAN sub-group.
- 11.12. Science Board discussed the need for an effective relationship with the Economic Impact Advisory Board (EIAB). The lack of a current EIAB Chair was noted.
- 11.13. Science Board discussed the need for a relationship with the Large Facilities Steering Group.
- 11.14. The issue of community input to the facility boards was raised. Science Board discussed and favoured the idea user groups with frequent and productive interaction with Facility Management. The Facility user meetings were a mechanism for this but it was not known how well these were functioning.

12. Item 12 - Programmatic Review Lessons Learned (SB.13.40.11) SOME REFERENCES IN THIS SECTION HAVE BEEN REDACTED AS PROTECT: MANAGEMENT

- 12.1. The Secretary, Science Board, introduced the paper on the Programmatic Review Lessons Learned.
- 12.2. To ensure that any future Programmatic Reviews were able to take full advantage of the experience gained during the 2012 – 2013 review, a lessons learned exercise had been initiated.
- 12.3. The lessons learned exercise would be conducted in two parts. The first part, which was on-going, was to solicit feedback on the process that had been followed to date. The second part would review the process for the publication of the final report and the implementation of the recommendations.
- 12.4. Science Board discussed the process undertaken by the Large Facilities Sub-Group and endorsed the comments regarding the difficulties associated with the dual remit of the LFS to provide input to the LFSG options analysis and to contribute to the Programmatic Review. The Executive agreed that this had not been an ideal situation but had been caused by the timing of the Review. It was expected that the same approach would not need to be taken in the future.
- 12.5. The fulfilment of the Terms of Reference of the Review and the usefulness of the report in providing strategic guidance was discussed. Science Board recommended that feedback from individuals representative of the target audience the review be sought. The new Science Board members were thought to be well placed for this and would be asked to provide their opinions to the exercise.

- 12.6. The difficulties in engaging with the facility users and others with a strong interest in the recommendations of the Programmatic Review was discussed. Facility users constituted a wide-ranging group with disparate interests and levels of engagement with the facilities, and future users were also very difficult to identify. The facilities advisory panels were formed immediately prior to the Programmatic Review and Science Board noted that it would be important to continue to engage with the Advisory Panels and to encourage them to work with the facility users and other Research Councils in their respective areas.
- 12.7. The need to maintain the Advisory Panels between Programmatic Reviews was noted. Each Advisory Panel would meet at least once a year. It was agreed that the Chair and Deputy Chair, Science Board would meet with the Advisory Panel Chairs via teleconference to discuss the future work programme.
- 12.8. The feedback indicated that there had been improved engagement of the Advisory Panels with Science Board and the community compared to the previous Programmatic Review but that there was still room for improvement.
- 12.9. Science Board noted that the Advisory Panels had provided their input and not received detailed feedback on the Programmatic Review outcome. The formality of the relationship had been maintained to preserve correct governance and process for the review in order to prevent inappropriate community lobbying via the panels.
- 12.10. The difficulty of evaluating future opportunities was discussed. Detailed information could not be presented in every case and Science Board noted that it was acceptable to consider future opportunities with less information than current projects. New opportunities could be defined and reviewed within a field for which there should be future planning for funding. Science Board noted the recommendation for a more interactive approach with the Advisory Panels in order to facilitate evaluation of future projects.
- 12.11. The title 'Programmatic Review' was considered to be backward looking and it was recommended that the message that the review was 'informing the future strategy' be delivered more strongly to support and encourage engagement.
- 12.12. Financial information should be presented in a way that makes it possible to evaluate "value for money" for any entity that is being reviewed, by relating the outputs to the total expenditure

13. Item 13 - SOI – Participation in a Future Long Baseline Neutrino Oscillation Experiment (LBNOE) (SB.13.40.12) SOME REFERENCES IN THIS SECTION HAVE BEEN REDACTED AS PROTECT: PEER REVIEW

- 13.1. Professor Peter Jones introduced the SOI for LBNOE.
- 13.2. Funding had been requested for a three year preparatory phase to support future participation in the Long Baseline Neutrino Experiment (LBNE) at

Fermilab, Tokai to Hyper-Kamiokande (T2HK) at J-PARC, and research and development for the UK-led water Cherenkov CHIPS project.

- 13.3. Science Board noted that participation in long-baseline neutrino oscillation experiments had been given high priority within the Particle Physics Advisory Panel's 2012 report and that contributing to an experiment in this area was one of the top priorities in the European Strategy for Particle Physics. The impact of the discovery of CP violation in the neutrino sector would be very high.
- 13.4. Science Board noted that the International Committee for Future Accelerators (ICFA) had created a neutrino panel of which Professor Ken Long was Chair. The committee had recognised the importance of both LBNE and T2HK.
- 13.5. The funding being requested for this R&D phase was significantly above the planning provision in the Flat Cash funding scenario from the PPARP-Sub-
- 13.6. Science Board invited submission of a full proposal to PPARP for the 3-year preparatory phase outlined in the SOI.

14. Item 14 - SOI LUX-ZEPLIN Dark Matter search (SB.13.40.13) SOME REFERENCES IN THIS SECTION HAVE BEEN REDACTED AS PROTECT: PEER REVIEW

- 14.1. Professor Anthony Lasenby introduced the SOI for the LUX-ZEPLIN Dark Matter Search.
- 14.2. The LUX-ZEPLIN SOI concerned participation in the construction of the tonne-scale liquid xenon detector for the LUX-ZEPLIN Dark Matter Search.
- 14.3. The Dark Matter strategy developed in 2012 and endorsed by Science Board had recommended that the UK dark matter community consolidate their activities in order to strengthen any future proposals. In April 2013, the DMUK collaboration selected LUX-ZEPLIN as the UK project to be put forward for construction support.
- 14.4. Technical activities to support and strengthen involvement in the next generation experiments EURECA and LUX-ZEPLIN had been funded. Publication of the results from LUX were expected during October. The current R&D programme was being re-focused to allow a managed withdrawal from EURECA activities and a concentration on LUX-ZEPLIN activities.
- 14.5. Science Board congratulated the UK dark matter community on the consolidation of the proposal for LUX-ZEPLIN, noting the significant progress made in the area.
- 14.6. Science Board invited submission of a full proposal for the LUX-ZEPLIN Dark Matter search to the PPARP.

15. Item 15 - SOI – PINGU (SB.13.40.14) SOME REFERENCES IN THIS SECTION HAVE BEEN REDACTED AS PROTECT: PEER REVIEW

- 15.1. Professor Alfons Weber introduced the SOI for PINGU.
- 15.2. Professor Weber had been asked to introduce the Sol since he has the most appropriate expertise. His participation in the competing T2K experiment was noted.
- 15.3. The SOI requested funding to participate in a preparatory phase for PINGU, an experiment to measure neutrino mass hierarchy using strings of photomultiplier tubes lowered into holes in the Antarctic ice sheet. The project would use the technology previously developed for the IceCube project.
- 15.4. Science Board did not invite submission of a full proposal for review by the PRRP.

16. Item 16 – Astronomy Grants Panel Report (SB.13.40.15, SB.13.40.15a) SOME REFERENCES IN THIS SECTION HAVE BEEN REDACTED AS PROTECT: PEER REVIEW

- 16.1. The Chair, Astronomy Grants Panel (AGP) presented the report from the recent grants round.
- 16.2. One complete cycle of the Consolidated Grants had now been completed. The Chair, AGP, considered the process of consolidation to have been relatively smooth. The community response had been very good and the degree of consolidation had been better than anticipated. The AGP believed that this was a result of the pragmatism of the community and their willingness to adapt to the requirements of the new scheme.
- 16.3. As previously noted by Science Board, there was an imbalance in the three year cycle of Astronomy grants. The AGP considered that the impact of this might have been mitigated by the overall contraction of the Programme.
- 16.4. The AGP had originally been hesitant to make changes to the funding in each year, however it had been agreed that 10% of the total funding would be moved into the most heavily subscribed year in order to help to correct the imbalance. There were two other options: to provide bridging or to have one single large round for all groups. Science Board noted that moving 10% would not go far enough to correct the balance as there would be 75% more applications in the biggest round.
- 16.5. The AGP did not consider there to be a significant relationship between group size and successful funding requests.
- 16.6. The AGP considered that there was geographical balance, good balance across science areas, and no particular bias observed over the three years. There was also a fairly consistent level of overbidding. The AGP had not detected any obvious imbalance between ground- and space-based science, and many proposals had some elements of both.

- 16.7. The scores for Knowledge Exchange were discussed. These had previously been assigned by the Panel but were now being provided by the Executive. This change meant that it was not possible to determine whether the relationship between Knowledge Exchange and Scientific Excellence had changed over the three years.
- 16.8. The fEC time awarded to academic investigators was discussed: the overall level of investigator time awarded had shown a greater decrease than the number of RA positions as the RA numbers had been deliberately protected by the Panel. The investigator time had been rigorously reviewed by the AGP, which considered that the overall level of investigator time (fEC) had been underfunded relative to the original intentions of government.
- 16.9. During the three-year cycle of the new scheme, overbidding had been a factor of ~2.5. This was greater than that seen under the previous rolling grant scheme.
- 16.10. It was noted that under the current scheme, there was no opportunity to put in a new standard grant in between rounds. This “three year freeze” for re-submission was unpopular amongst the community, and was proving to be a particular problem as a result of the lack of fEC investigator support.
- 16.11. The potential to amend the current peer review process to a light touch assessment was discussed. Science Board noted that any further reductions to the effort devoted to peer review could severely affect the quality and rigour of the process and would need to be carefully examined.
- 16.12. The New Applicant scheme was not working as intended. The scheme was designed to provide a mechanism to support new lecturers rather than to allow senior academics moving departments to make new bids. There had been more moves in this round (probably associated with the impending REF deadline).
- 16.13. The AGP requested that it be involved in the proposed review of the Consolidated Grants scheme implementation and that it be done sooner rather than later. The review would need to include the imbalance across the three years, the fEC investigator time allocated and the different cultures of the panels.
- 16.14. It was noted that the size of the panels and length of time for panel members to serve should be addressed separately from the review of Consolidated Grants.

Closed session:

- 16.15. Science Board considered that the grants round had been conducted appropriately and endorsed the outcome.
- 16.16. Science Board noted that due to financial limitations a significant amount of high quality research could not be supported, which was consistent with recent outcomes for other grants panels.

- 16.17. Science Board recommended reviewing the way fEC investigator time was allocated by the STFC panels compared with the other Research Councils. It was thought that it would be difficult to draw these comparisons as these were exploitation grants, rather than project grants, which were usually allocated by UKSA.
- 16.18. In assessing applications from large groups, the AGP currently took no account of the presence or absence of thematic or strategic coherence of the programmes, but simply divided them into individual projects with each project being assessed in isolation. This represented a change from the way in which large groups were assessed under the previous Rolling Grant system, when thematic coherence was considered to be an important factor. Consolidation had meant that groups with no common research now had to bid together within one department. This resulted in the grants appearing more like standard grants stapled together and increased overbidding with every faculty member having the ability to bid for one PDRA. There was a guideline provided to the groups to try to prevent overbidding but there was no penalty for doing so.
- 16.19. The duration of the Consolidated Grants and the fit with project students in terms of timing were noted.
- 16.20. There were few bids from consortia involving more than one University. Science Board noted that this was discouraged by the system since investigators were only allowed to be on one Consolidated Grant.

17. Item 17 – Update on HiPER (SB.13.40.16) SOME REFERENCES IN THIS SECTION HAVE BEEN REDACTED AS PROTECT: MANAGEMENT

- 17.1. The Executive Director, Programmes, introduced paper to provide an update to Science Board on the Executive's response to Science Board's recommendations on HiPER.
- 17.2. Science Board noted the on-going activity with respect to HiPER, including the Executive's response to the Programmatic Review recommendations.
- 17.3. Science Board noted that UK Inertial Confinement Fusion (ICF) research was being supported by two EPSRC research grants in addition to an ICF network grant.
- 17.4. The Fusion Advisory Board (FAB) membership was discussed. This was dominated by Magnetic Confinement Fusion (MCF) experts rather than ICF. This could be an issue when the National Ignition Facility (NIF) achieves ignition. A membership refresh would be undertaken following the strategy refresh to ensure the appropriate balance of expertise on the panel.
- 17.5. Science Board was requested to provide written input to be fed into the FAB review prior to Christmas. It was agreed that Professor Wark would draft a response for agreement by the Chair and Deputy Chair, Science Board.

18. Item 18 – Update on SKA (SB.13.40.17) SOME REFERENCES IN THIS SECTION HAVE BEEN REDACTED AS PROTECT: MANAGEMENT

- 18.1. Dr Simon Berry presented an update on the SKA project including the proposed international structure and governance.
- 18.2. SKA was moving into a critical detailed design phase; both the technical and policy aspects of the project were evolving quickly.
- 18.3. Science Board noted that the SKA science community in the UK was too small and that it was important both to build more community involvement and to review and refresh the science case as the project ramps up.
- 18.4. Science Board noted that the UK had secured a leading position in the project
- 18.5. Project planning was underway for the construction phase for SKA1, including understanding the approval process, future governance options and funding aspects. Proposals had already been reviewed by an international panel and would need to be agreed with BIS.

19. Item 19 – Update from UKSA (SB.13.40.18) SOME REFERENCES IN THIS SECTION HAVE BEEN REDACTED AS PROTECT: MANAGEMENT

- 19.1. The Acting Director for Technology Science and Exploration, UKSA, presented an update from the Agency.
- 19.2. Science Board noted that the science themes to be explored by ESA's next two Large (L-class) missions would be decided at the November Science Programme Committee (SPC) following recommendations made by the Senior Survey Committee in October.
- 19.3. The agency would be seeking guidance from STFC on the importance of the selected themes to STFC's programme. The next Medium class mission (M3) would be selected at the February SPC meeting from the five candidate missions (EChO, LOFT, Marco-Polo-R, STE-Quest, PLATO).
- 19.4. It had been agreed that the Agency would submit a bid for M3 funding to the BIS long term (to 2021) capital investment fund. Input from PPAN on these missions had been provided in February 2011, identifying EChO as the highest science priority for STFC and LOFT as good science which was well-aligned to STFC strategy. The Agency was now seeking reaffirmation of the importance of all the various M3 candidates to STFC, as a key input to be included in the capital bid together with information from the teams and the economic case. This input would be required ahead of the February SPC meeting
- 19.5. Science Board noted the report and the future business relating to the M3 candidates.

20. Item 20 - AOB SOME REFERENCES IN THIS SECTION HAVE BEEN REDACTED AS PROTECT: MANAGEMENT

- 20.1. Science Board members had recently requested a meeting at CERN in order to visit one of the underground detectors and to appreciate the nature and scope of the project. The visit could also be an opportunity to engage with staff at CERN e.g. the Director of Research, to better understand the vision and strategy.
- 20.2. When Science Board was initiated there had been a series of visits for members to facilities which were considered to be instructive and useful. STFC had supported this to ensure that members had a good understanding of the facilities that were being funded. Due to budget constraints there had not been any recent visits.
- 20.3. It was agreed that the Executive would discuss the funding for this ahead of the December meeting
- 20.4. There was a need to ensure that there was cross membership with the facility boards following the Science Board membership refresh. It was agreed that this would be discussed at the next meeting of the Science Board Executive.