

ASTRONOMY FORUM: NOTES FROM 15TH JANUARY 2010

1. In attendance: Andy Fabian (Cambridge, Chair), Michael Sterling (STFC), Keith Mason (STFC - KM), John Womersley (STFC - JW), Colin Vincent (STFC), Michael Merrifield (STFC), Paul Crowther (Sheffield), Mark Cropper (MSSL), Michael Smith (Kent), Trevor Ponman (Birmingham), Iain Steele (LivJMU), Bob Nichol (Portsmouth), Ofer Lahav (UCL), Coel Hellier (Keele), Jim Hough (Herts), Stephen Smartt (Queens Belfast), Gordon Bromage (UCLancs), Tom Hartquist (Leeds), Steve Schwartz (Imperial), Glenn White (Open), Rob Kennicutt (Cambridge), Martin Hendry (Glasgow), Tim Naylor (Exeter), Simon Garrington (Manchester), Paul Nandra (Imperial), Tom Marsh (Warwick), Steve Rawlings (Oxford), Valery Nakariakov (Warwick), Jim Dunlop (Edinburgh), Keith Horne (St Andrews), Walter Gear (Cardiff), Mark Lester (Leicester), David Burgess (Queen Mary), Ian McHardy (Southampton), , Roger Davies (Oxford), Robert Massey (RAS), David Elliott (RAS)
2. The Chair opened the meeting, explaining that the first half would consist of short presentations on the issues arising from the STFC prioritisation. The second part of the meeting was to focus on the tensions arising from fluctuating international subscriptions, the operating costs of large domestic facilities, and grants for university researchers that the Drayson review seeks to address.
3. Keith Mason gave an overview of the outlook for STFC funded astronomy and space science following the prioritisation exercise, explaining that this was an upsetting and difficult outcome but there was no alternative.

Spending commitments made in any specific year (including 09/10) apply over a much longer term (often 10 years) but Government funding is uncertain beyond a 3 year spending review period. Thus in making commitments at any juncture, STFC has to take a long-term view on the likely spending climate. Previously, the volume of the programme was maintained from the late 90s onwards, taking advantage of the growth in government investment in science. Thus while STFC formally has planned for flat cash, the reality up until CSR07 has been that the volume of research has at least been maintained, or indeed increased at each spending review, and this has set people's expectations.

In the event the final CSR07 settlement was flat cash plus 5% but Full Economic Costing (FEC) and increased funding for medical research absorbed the increase, with the result that the effective settlement for STFC (and other research councils) was flat cash. For STFC the difference between flat cash and an inflation-protected programme (assuming inflation at 2.5%) is roughly £60m integrated over 3 years. At the time of CSR07 it was a reasonable assumption that 2011 CSR (now likely to be in 2012) would restore inflation protection and constant volume funding. However, since then the full extent of the economic recession and the resulting Government deficit has become apparent. In such circumstances flat cash would be a good outcome in the next settlement. It is thus clear that the tighter fiscal environment is likely to be with us for more than the current spending review period, meaning that immediate aspirations and commitments have to be curtailed to be affordable.

To sum up, the Drayson review is an opportunity to further mitigate the impact of subscriptions and facility operations costs, but, in the increasingly constrained and competitive funding environment, the community still needs to make positive arguments for continuing investment in astronomy.

4. John Womersley presented specific issues relating to the implementation of the prioritisation exercise, stressing that there is no attempt to 'sugar coat' the impact of these savings:

The exercise shapes the astronomy programme from 2010-15. In ground-based astronomy, funding is planned to deliver KMOS, and the Dark Energy Survey Camera, exploit e-MERLIN, VISTA, and SuperWASP, and contribute to E-ELT and SKA R&D. Gemini is funded until the end of 2012. The Isaac Newton Group (ING) is supported until 2012 and no decision on its future has been made. JCMT is funded until 2012 and future funding will depend in part on the science results from the SCUBA-2 camera.

For the space-based programme funding is planned for Cosmic Vision R&D, completion of JWST-MIRI, GAIA and Bepi-Colombo, plus on-going post launch support for Herschel, Planck, Swift, Hinode, Stereo and Rosetta. Support was confirmed for Aurora ExoMars

STFC is to begin managed withdrawal from the ALMA Regional Centre, JIVE, Liverpool Telescope, UKIRT, plus Cassini-Huygens, Cluster, SOHO, Venus Express and XMM-Newton post launch projects. However, additional reductions will need to come from ongoing projects; £16m from ground-based astronomy and £28m from space-based astronomy.

In the grants line, there will be a 25% reduction in funding for the studentships / fellowships programme (not affecting existing award holders) but STFC wants to restore these funds if the economic situation improves. On advice from the Education & Training Panel, the 2010 postdoctoral fellowship round is cancelled so as to protect studentships as far as possible, but STFC will consult on the provision of these and studentships from 2011 onwards. The mid-term impact of the planned reductions in grants funding will be that the previous annual 80-90 new PDRAs (total 270) will reduce to roughly 60 (with a total of 180).

The proposals have been through the Astronomy Grants Panel (AGP) and are due for Particle Physics, Astronomy and Nuclear Physics (PPAN) Science Committee approval by late January.

Looking forward, STFC needs to ask some strategic questions about grant support. For example, should rolling grants continue to be awarded to groups with small numbers of PDRAs?

The Council is also looking at ways to continue low-level involvement in some projects like LOFAR. It recognises the issue of lack of future access to northern hemisphere optical and infrared observatories but PPAN concluded that buying 40 nights / year of 8-10m telescope time at £50k /night was not a viable model. STFC will therefore take advice on imaginative options, perhaps involving a future role for the WHT.

In conclusion, the overall STFC vision is to concentrate on instrumentation and operations on highest priority facilities (ESO, VLT, VISTA, ALMA), prepare for E-ELT and SKA, new space-based observatories and Mars science (part of the search for extraterrestrial life)

5. Bob Nichol (Portsmouth, chair of the Far Universe Advisory Panel - FUAP) gave an overview of the Panel's concerns.
 - FUAP work started May 2009, but remit ill-defined
 - Panel developed key science themes (First Light, Cosmology, Extreme Astrophysics, Galaxies), legacies and future potential

- Included hundreds of comments from community via town meeting and web forums
 - Rushed from August due to prioritisation
 - Final report submitted in October
 - No feedback on how it was used – but ‘public consultation’ used to claim cuts acceptable
 - Why does PPAN area have £28m reduction by 2014 whilst PALS sees £24m increase?
 - FUAP top priority was no further cuts to people but happened anyway
 - LOFAR, XMM-Newton, CMB research all hugely successful but support for them will go
 - And no northern hemisphere telescope access after 2012
 - Astronomy Panel chairs have written to THES and Lord Drayson, requesting Government assistance
6. Tom Hartquist (Leeds, member of the Near Universe Advisory Panel - NUAP) outlined the Panel members’ concerns.
- Panel identified 7 high priority questions and prioritised resources (including strong astrobiochemical component)
 - Consulted almost 100 experts, made 3 public calls for input, held a town meeting
 - 310 responses – in NUAP report
 - Major discrepancies in outcome
 - NUAP stated that grants and fellowships should be the highest priority; STFC is cutting them
 - NUAP argued that space plasma facilities were a high priority; STFC is cutting them
 - NUAP asked for Northern hemisphere telescope access to be a high priority; STFC is cutting this
 - NUAP concluded that Aurora / ExoMars is a lower priority; STFC is funding it
 - Why do these discrepancies exist – how did PPAN use the Panel reports and what is their strategy?
7. Jim Dunlop (Edinburgh)
- Call for properly managed and joined-up approach to withdrawal from facilities
 - Need to exploit recent investment in facilities (both by STFC and external bodies)
 - Maintain capacity i.e. scientific and technical expertise
 - Maintain / salvage international reputation (especially on shared facilities)
 - Must avoid driving young talent away from field and even UK
 - Example 1: UKIRT: could swap time for access to 8-m telescope in northern hemisphere if kept open until 2012 (rather than 2010) and could also complete the UKIDSS survey
 - Example 2: LOFAR: key step for SKA, have already raised £1.2m to purchase UK LOFAR station in Chilbolton – so why terminate funding now?
8. Rob Kennicutt (member of Ground-Based Facilities Review panel, Cambridge)
- Issues arise from rapid timetable for closure of facilities like UKIRT, JCMT, e-MERLIN and ING / WHT
 - UK astronomy needs access to northern hemisphere
 - No-one expects astronomy to be immune from economic downturn
 - GBFR contributed to STFC plan for future of ground-based astronomy programme
 - But STFC needs to embrace our positive vision and push this to BIS
9. Steve Schwartz (Imperial)

- Is it STFC strategy to cease UK involvement in space-based plasma science?
- Post-launch support for Venus Express, Cluster, Cassini-Huygens (UK scientists discovered atmosphere of Enceladus – BBC science highlight) all cut
- Only Rosetta involvement saved
- No other missions involving work on in-situ space plasmas will survive
- UK will lose national capability in magnetometry, thermal plasma detectors and high-energy particles
- Cuts will result in further serious damage to international reputation of UK science community

10. Mike Cruise (Birmingham, Astronomy Grants Panel - AGP) set out the change for the grants round as a consequence of the prioritisation.

- The AGP assumed a total allocation for this round of 90 PDRAs / Technicians
- Received 84 standard (SG) grant proposals and 20 rolling grant (RG) proposals which contained a total request for 151 PDRA's
- On the basis of the total target of 90 Panel proposed awarding 14 SG and 18 RG with 76 RG PDRAs
- The AGP's work was essentially complete by early December
- Post prioritisation, the AGP understood that the available funding might support 75 new PDRAs and could be as low as 56 per annum in later years
- At the level of 75 posts there could be 12 SGs and 14 RGs awarded, at 56 posts only 10 SGs and 7 RGs would be funded (out of 20)
- If future grants funding is limited to 56 PDRAs then about 70% of rolling grants would not be viable (the number of PDRAs awarded per group would be too small to warrant a rolling grant)
- UK astronomy (and STFC) would then see these groups failing at the levels proposed
- At this level, historically, these projects would not have happened: Stereo, SOHO-CDS, CIXS, D-CIXS, Hinode, SMEI, Liverpool Telescope, AMI, Fibre Spectroscopy, SPIRE, Planck HFI, Cassini magnetometer, Cluster instruments, Rosetta instruments, Bison, Locuss survey, Transition edge detectors, QUAD, FMOS, KMOS – in summary a huge fraction of the science output from STFC and international facilities.
- With the Rolling Grant model, UK has a coherent astronomy programme, enough of a critical mass for international leadership and enough stability to attract support from HEIs. With the likely future funding, we could move to a small number of independent academics who might typically receive two rolling grants over their whole career, no hope of international leadership, no stability, no technical base to support knowledge exchange and no incentive to engage in outreach activity.
- Astronomy and space science are one of the few areas where the UK is second in the world. To maintain this position there needs to be a review of the balance between exploitation and facilities funding in the STFC budget.

11. The Chair then opened up the Forum for questions and an extensive discussion followed, including the following points:

Why does the STFC CEO see there being too many postdocs for the facilities we have, in contrast to the views of most of the astronomy community?

KM: To maintain the long-term health of the community and protect our ability to make the case for continued investment in it, I stick by the need to maintain a healthy ratio between the numbers of people exploiting facilities, and the number engaged in developing, building

and operating new facilities and instruments. Currently the ratio of investment across the domestic (non-subscriptions) PPAN area is 2:1. We cannot have the UK just using other countries' facilities – otherwise the technical development that encourages investment will not take place.

The cuts in grants will amount to 55% by the end of 2010. These are crippling and will mean that bright young people will go elsewhere.

KM: We can run a healthy programme on 60 new PDRAs per year. Individuals should avoid arguing that the community is lame and just needs to be killed off.

There is a very non-linear impact when PDRAs are cut, given that a group reduced to just 1 PDRA doesn't have a critical mass of researchers. Even moving from 56 to 68 PDRAs would make a huge difference.

Where will the additional £44m of cuts fall?

JW: So far these have been managed through reductions in funding, delays in construction projects and slowing down ongoing builds. But we can't always do this as it depends on our international partners. STFC is working with the Principal Investigators (PIs) of affected projects on this issue.

The timescale for the cancellation of post-doctoral fellowship meant applications were halted. This left a very bad impression.

JW: The decision rested on whether to let the recruitment process run through with no funding provision, or whether to make realistic decisions as quickly as possible. We are trying to do that in all cases before the start of the next financial year.

The balance is shifting – can we use STFC funds to lever in European Research Council (ERC) money? It's very hard to get funds out of HEIs too given STFC uncertainty.

KM: The ERC money is top-sliced from national budgets. The UK contributes so our researchers should exploit it too and yes, leveraging those funds is absolutely part of our overall strategy.

What about funding for exploitation of existing data?

KM: If groups have data already or demonstrated means of acquiring them, then grant funding for this can be considered.

12. Michael Sterling (STFC Chair) and Keith Mason discussed the various structural options under consideration in the Drayson review. Andy Fabian explained that the RAS / Astronomy Forum submission to that review will be assembled on the basis of feedback from the members of the Forum and RAS Council.
13. Paul Crowther then set out his analysis of different structures for funding UK astronomy.
 - The CSR07 settlement and resulting STFC allocation led to a disproportionately large and detrimental impact on funding for research in astronomy and space science. In turn, this has

caused the press and public perception of UK involvement in fundamental science to be far more negative than in the past.

- As a consequence it is now essential to tweak or overhaul the STFC structure to avoid this happening again, most importantly to tackle the subscriptions and facilities / grants tension but also to set a clear strategy for the RC.
- A small scale 'tweak' for the Council is to have a clearer distinction between the Facilities and Science programmes. This would be in line with the recommendations of the 2008 RCUK Wakeham review, which suggested separate STFC Science and Facilities boards.
- Secondly, the Council could be better protected from exchange rate (and GDP) fluctuations by covering those at a higher level i.e. at RCUK or BIS. At the same time the ESA subscription will presumably shift to the new space agency, leaving STFC with ESO and CERN.
- Diamond, ISIS and CLF are multidisciplinary facilities of interest to all the other RCs (except for AHRC) and should therefore be shared across RCUK, with each RC paying according to its use. ATC, other laboratory areas and CCLRC would remain within a new Science and Technology Research Council (STRC).
- STRC would be similar to PPARC with the addition of Nuclear Physics. The advantage would be the facilities and related grants staying within the same organisation, but it might be too small to be viable and be vulnerable to further budget pressures (albeit on a more transparent basis than at present).
- An alternative is to move the non-space, non-laboratories components of STFC to EPSRC. The larger organisation would see exploitation grants tensioned against physical science and engineering, but would lack the STFC focus on PPAN areas. The STFC rolling grants would need to sit alongside the EPSRC preference for fixed-term responsive funding.
- A different approach is to only move the STFC exploitation grants to EPSRC (with volume costs at the 2007/8 level). This would remove the facilities / grants tension but again lack a focus on PPAN science and separate exploitation from experiments and instruments.

14. The Chair then indicated again that he was seeking views from across the astronomy community, in particular regarding the idea of transferring grants to EPSRC.

Members of the Forum then offered initial thoughts on these ideas.

Is there a high-level strategy in STFC? EPSRC certainly appears to handle this better.

HEIs prefer permanent posts in EPSRC area and this might help with their creation.

The arguments about structure miss the point to some extent. We really want a well-protected grant line, irrespective of where it is. We need to invest in operations and exploitation and somehow need an objective judgement of the balance between that and investment in facilities.

We should not be scared by having one large funding agency. In the US the NSF works well and is far better for interdisciplinary science.

Where do ELT and KMOS fit in?

In Canada it's easy to get funding for building things, but much harder to get funding for exploitation. This is driven by an impact policy similar to the one now operating in the UK.

Will EPSRC be happy if much of STFC moves across? They are a robust organisation and may not be receptive to taking on grants for 'lower impact' STFC research.

Taking the example of ISIS, you would apply for a grant for a postdoc from EPSRC and a grant for time on the facility from STFC. It isn't necessarily good to separate the grants and facilities.

I have real concern about doing this now. The costs of subscriptions and facilities are very high, leaving a smaller pot to be transferred across for grants.

Why is there a PPAN/ PALS shift? If the facilities issue were solved, would it help with this?

I advise against the exploitation / construction split. We need to get the other RCs to bear the brunt of the costs (e.g. redundancies) that flow from running down facilities.

Do we need more scientists on Council?

MS: We need scientists on council, but we also need more non-science (i.e. finance and commercial) expertise.

How will the (Drayson) review answer the space agency question?

Is there an STFC strategy to close down space plasma physics projects?

KM: No – there is no strategy to withdraw from space plasma physics. The individual projects in this area have all been subject to peer review. Peer review has driven our decisions in this prioritisation and is the best mechanism we have, even if it is not always perfect.

15. The Chair closed the meeting at 4 p.m., once again urging the Forum members to respond to the proposals.