First a tragedy, then farce

Brian Foster, European director of the global design effort for the International Linear Collider, says that the funding crisis at the UK's Science and Technology Facilities Council has damaged the country's international reputation as a scientific partner and that the council needs urgent reform

It is impossible to think about the problems in the UK over the last 10 months arising from the £80m shortfall in the budget of the Science and Technology Facilities Council (STFC) without recalling Marx's famous aphorism: "History repeats itself, first as tragedy, then as farce." Certainly the repetition of a funding crisis in UK particle physics and astronomy is hardly unexpected; they seem to occur every decade or so with unwelcome regularity. The consequent loss of morale, jobs and opportunities in the UK for the brightest young people to pursue their dreams in what is widely acknowledged to be world-class science is a tragedy. What perhaps marks the uniqueness of the funding crisis this time round is the level of farce. The sums that did not add up; the consultations without interlocutors; and the truculent and damaging statements about withdrawal from the Gemini telescopes based in Hawaii and Chile, and the International Linear Collider (ILC) – the next big particle-physics project after the Large Hadron Collider (LHC) at CERN.

A great deal has now been written about the reasons for this crisis. The bookkeeping issues are so arcane that it is possible for people of good will to disagree. I state a lowest common denominator with which I think most would concur. The creation of the STFC in April 2007 by merging the Council for the Central Laboratory of the Research Councils (CCLRC) with the Particle Physics and Astronomy Research Council (PPARC) was a thoroughly botched job by the Office of Science and Innovation, precipitated by the Treasury. The STFC management team was therefore presented with an impossible timescale to fashion a functional organization from a shotgun wedding of two disparate councils (see "A programme to be proud of" by Keith Mason pp16–17).

Christian Schmid/DESY

Counting the cost The UK's funding crisis has hit the country's work on the International Linear Collider.

With the best of intentions

Even though the STFC was given a 13.6% budget increase over three years in the 2007 Comprehensive Spending Review (CSR) – worth a total of £1.906bn – this increase was still lower than any other science-based council, and much of it was "non-cash". This term represents resource that must be set aside to cover the cost of depreciation of large capital facilities, such as the DIAMOND light source in Oxfordshire. It cannot be used to fund science. However, if insufficient "non-cash" is available, then real science programmes must be cut to compensate for it.

In the present CSR, which runs until 2010, "non-cash" accounted for 5.6% of the STFC budget increase, leaving a rise of only 8% in its funding for science. Once inflation is taken into account, this equates to a real-terms cut. Despite ministerial assurances to the contrary, some "legacy" issues from the merger of the two councils do exist. These include higher than expected running costs of large UK-based facilities, as well as VAT (value added tax) that the STFC unexpectedly incurred. So the financial situation of the old PPARC programme was materially worse after the merger.

The subsequent reaction of the STFC's management to this settlement in November last year was to cut programmes, such as the UK's involvement in the ILC and the Gemini telescopes, with a minimum of consultation. The communication of the STFC with the community both inside the UK and internationally was parlous. These are not simply my conclusions, but can be found in the blistering report on the STFC debacle issued in June by the House of Commons select committee on innovation, universities, science and skills (see *Physics World* June p15).

Take the Gemini telescopes. Initial dialogue from the STFC with the seven-member Gemini board was non-existent and even some of the STFC's UK delegation were not informed of the proposed "withdrawal". Indeed, it later transpired that there was to be no withdrawal – the STFC has now decided to try to sell 50% of the UK's observing time to other countries that are members of the project.

The saddest and most farcical aspect of the whole sorry tale is that the UK government had nothing but the best intentions; its funding of science over the last decade has been exemplary. There is no indication that ministers had any intention of precipitating a crisis at the STFC. Indeed, they must have been rather bemused that their hard-fought victory in getting a good overall settlement for science resulted not in plaudits but brickbats.

A direct consequence of the outcry from the community was the government's decision to set up a review of the health of physics in the UK under the chairmanship of Bill Wakeham, vice-chancellor of Southampton University, which is due to report this month. Another likely consequence is that recommendations from the Department for Innovation, Universities and Skills (DIUS) for the division of the science budget could be subjected to increased scrutiny from ministers in the next CSR.

Problems in particle physics

Whatever the outcome of the Wakeham review of physics, the measures that the STFC will take are clear and will involve the cancellation and reissuing of university grants. Indeed, principal investigators on those projects to be axed or scaled back, such as research into the ILC as well as the LHCb detector – which will search for matter–antimatter asymmetry at the LHC – are already talking to the STFC about how much, and what, to cut.

The Particle Physics Action Group, consisting of me and five colleagues, was set up by our community last November to co-ordinate our response to the crisis. It estimates that about £8m will be lost from current particle-physics activity, with the threat of further cuts at the next grants review due early next year. Perhaps the most damaging aspect is the breach in the covenant between research council and university. Never before

have grants that have been already issued been recalled and cut. Significant effort will now be required from the STFC to rebuild its relationship with university vice-chancellors.

The situation is particularly difficult with the ILC. Nevertheless, it was reassuring to contrast the intemperate earlier statements from the STFC, which called into question the viability of the entire ILC project, with the measured words of the government's official response to the DIUS select committee report. "Although, [sic] it is true STFC has chosen not to ramp-up investment in the current International Linear Collider project," the government stated, "STFC will continue to participate in developing global strategies for future Linear Colliders and continues to honour its commitments to the common development fund."

Nevertheless, the accelerator research and development programme will now be reduced to 25% of its current level. As a result, there have already been redundancies in some UK institutions and several of the most promising researchers have left the field. Despite these very difficult circumstances, the Linear Collider Collaboration in the UK has remained determined to rescue the UK's participation in future planning for international particle physics.

I am delighted that, despite these traumatic times, a much smaller, but still vibrant and world-leading UK linear-collider activity can survive. This owes much to the constructive attitude of the STFC's chief operating officer, Richard Wade, and its director of science programmes, John Womersley. By building on this and other activities such as the PAMELA (Particle Accelerators for Medical Applications) project, and by applying new accelerator technology to cancer treatment, we believe that particle physics has much to offer not only in elucidating the mysteries of the universe, but also to the government's knowledge-exchange agenda.

The way forward

Much exciting science and several new opportunities will be funded by the STFC and we are all committed to ensuring that this good news is widely broadcast. The STFC must continue to be the steward of UK particle physics, nuclear physics and astronomy, but to enhance it we must ensure appropriate, reformed structures. These reforms should include making the structure of the STFC much more like that of the other research councils so that it can really oversee the executive. Currently, and uniquely, almost a third of the places on the STFC council are taken by members of the executive.

Other essential reforms include a radical overhaul of communications. Some organizations forget that communication is a two-way process; the STFC remarkably could not even manage one-way communication. Another major issue that looms ever larger on the horizon is that of international subscriptions such as those for CERN and the European Space Agency. The cost to the UK is set by international treaty and generally at least compensates for inflation and often increases beyond this. Over many years the increases in subscriptions have far outstripped the increases in the budget of the research council paying them, thereby progressively eating into the funds available to use the facilities to which we subscribe. As has often been said, we risk being a member of a golf club but being unable to afford a set of clubs with which to play. An additional retrograde change hidden inside the confusion of the creation of the STFC was the transfer of responsibility for currency fluctuations from DIUS to the STFC.

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The UK is unique among the major European nations in not finding a rational way to pay international subscriptions without squeezing the organizations seeking to use them. Other European nations do things differently, but the Treasury simply refuses to consider alternative models. I was, however, pleased to be able to bring this problem to the attention of Wakeham during his committee's oral evidence-gathering session in June. I believe that structurally it is the most important problem that we need to solve in UK physics and it will become critical within a decade or so.

If we can address the above problems and establish increased openness and a renewal of leadership within the STFC, then the tribulations and pain of the last 10 months may not have been entirely negative. With a more secure foundation, we can ensure that the communities supported by the STFC can make the best case for the increased funding that the promise of the science undoubtedly deserves.

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