



PPAP Statement of Intent Proforma for Preliminary Activity Bid to Infrastructure Fund 2022

Please ensure the maximum length of the submission does not exceed two pages.

1. Name of the project and contact name.

UK Strategic Detector R&D Programme – Dave Newbold (dave.newbold@stfc.ac.uk)

2. Give a short description of the new capability delivered by the Project

This proposal will support a new and sustained capability for mid-TRL detector systems R&D across UK particle physics / particle astrophysics institutes and laboratories.

3. Summary of preliminary activity

- Main objectives and deliverables
- Relevance to STFC roadmap
- Why is it a good fit for Infrastructure Fund including economic, social, environmental, health, cultural, public service or policy improvements?
- Which Full Infrastructure will this activity enable (aims and objectives, why needed, target user base,)

The objectives of this proposal are to:

- Develop and sustain a world-leading capability for advanced detector technology R&D in the STFC research community
- Facilitate continued UK leadership in the European R&D programme, and subsequent resulting leadership in next-generation experiments
- Construct and support specialised facilities at UK institutes, supporting international capability in detector development and construction
- Identify routes for rapid application of new detector technologies across national facilities, academic disciplines, and industry
- Support co-development of technologies with UK companies, leading to enhanced economic return from international investments
- Transform skills development, training and career prospects for technology-focussed early career researchers in STFC core science areas.

This will be achieved through the support of a few medium-scale R&D proposals, primarily in the context of UK participation in the European R&D programme. The programme will be focussed on R&D activities that are 'strategic' (i.e. in direct support of medium and long-term STFC science goals) but potentially generic across several options for future projects.

Strategic R&D is highlighted as a priority in the latest PPAP and PAAP roadmaps and is the subject of the PPTAP review which has recently reported to Science Board, TAAB and STFC Executive. The 2020 European Strategy for Particle Physics highlights this area as a target for new investment, and European Roadmaps for detector and accelerator R&D have been developed and approved by CERN Council, with UK support.

The capabilities supported by this proposal will support STFC's strategic objectives for its science programme and for wider economic and societal impact including national facilities and skills development. It has a range of subsequent routes to further objectives, including preliminary and full proposals to Infrastructure Fund for specific projects making use of R&D innovations.

Since this is not a traditional capital project, the fit to Infrastructure Fund should be scrutinised by STFC, and feedback in this area is welcome.

4. Please list the UK institutes and give numbers of researchers involved.

Birmingham (5), Imperial (3), Warwick (2), Oxford (16), QMUL (3), Glasgow (2), Sheffield (2), Liverpool (1*), STFC PPD (14), Manchester (4), Edinburgh (2), Lancaster (2), Cambridge (3), Bristol (1*), RHUL (1*), Sussex (1*), UCL (1*)

Where a single researcher is indicated, this is a designated contact person within the group as a placeholder for a wider involvement.

5. Please state to what extent the suggested activity has undergone scrutiny by the national or international community to judge its scientific, technical and project management aspects.

The scientific and technical aspects have been considered in depth by the European roadmap process, and by PPTAP and TAAB in the UK national context. The overall case for R&D has been prioritised by PPAP and PAAP in their respective roadmaps. Since this is an overall programme, the project management aspects of each R&D activity will be considered at the peer review stage of programme prioritisation.

6. Please outline the costings for the preliminary activity and the expected timeline.

The programme should begin in FY24/25, commensurate with the start-up of new DRD collaborations, and run initially for three years, at a cost of around £3M per annum, including:

- Direct support for UK participation in the DRD collaborations proposed by the European detector R&D roadmap, and any other relevant international activities.
- Follow-up of the current STFC blue-skies R&D call
- A cross-institute CDT in detector technology and data handling
- A centre for industrial engagement with particle physics

This should be followed by a subsequent ramp-up in funding levels commensurate with the ramp-down of current detector construction projects in particle physics.