

High-End Electron Microscopy as a Distributed Facility in the UK

Objectives and Terms of Reference for a Working Group

Drafted by Peter Nellist, University of Oxford, Jan 2013 in consultation with the SuperSTEM Management and International Steering Committees, the Electron Microscopy and Analysis Group of the Institute of Physics, The Royal Microscopical Society and the EPSRC (Dr Susan Morrell).

Background

Prompted by the EPSRC review of mid-range facilities, the Electron Microscopy and Analysis Group of the Institute of Physics organised an open community meeting of UK electron microscopists in November 2009. In brief, the purpose of this meeting was to explore the level of community support for a distributed facility model. In such a model, a coordinated funding bid is made for high-end electron microscopes in the UK, with the individual instruments required to fulfil UK requirements for high-end electron microscopy (EM) being distributed across sites with relevant and specific expertise, but together acting as a coordinated facility. The report from the community meeting is attached. It recommended that a working group be established to develop a specific model or small number of model for further consideration by a community meeting and presentation to research councils. The formation of such a group was suspended during the bidding process for the EPSRC National Facility for Aberration Corrected STEM, but it is now timely to move this initiative forward. This document provides the objectives and terms of reference for such a group.

The expenses of the working group will be funded by the EPSRC, and will focus initially on EM activities within the physical sciences, while also considering whether a distributed facility model can cater for both physical and life science applications. The purpose of the report made to EPSRC is to provide advice and a perspective from the UK EM community, and no immediate commitment to funding the proposals is expected from the EPSRC.

Overarching aims of the working group:

- To determine, based on the evidence available, whether a distributed facility model based on the “layer cake” proposed at the 2009 EM Community Meeting can deliver enhanced value for money.
- To propose a specific model (or small number of possible models) for presentation at a further community meeting and subsequently for discussion with the UK funding authorities.
- To define a “roadmap” by which the activities of the EM community can evolve towards the proposed model.

The specific objectives of the working group are:

1. To define a number of notional boundaries to the layers in terms of EM capabilities. The horizontal (layer) boundaries can be based on the international competitiveness of the capability, the capital expense associated with the capability to ensure and the level of expertise required to operate the instrument to deliver the capability. Vertical boundaries may also be considered within layers, for example whether a distributed facility can cater for both physical and life science applications.
2. To quantify the demand for the capabilities at each level and to estimate the capacity required to satisfy research demand.
3. To identify any gaps in the current provision of EM capabilities.
4. To populate the layers with specific instruments with specified capabilities, and propose mechanism for distributing capabilities across sites. In particular, the need for “neutral” sites (eg Daresbury or Harwell) to maintain community cohesion should be evaluated.
5. To define a roadmap by which by which the activities of the EM community can evolve towards the proposed model. In particular, any intermediate steps should be proposed, for example whether an expanded version of the current SuperSTEM “hub” model to allow users to access existing capabilities is desirable.
6. To determine how the distributed facility could evolve with time. For example, should there be a defined facility lifetime after which a new negotiation with funding bodies occurs, or should the facility continuously evolve using a shorter funding cycle. How are new host sites identified?
7. To estimate the capital investment required during the length of the funding cycle, and the running costs.
8. To propose an access scheme that provides fair access to all users but rewards the host institutions based on their actual and in-kind contribution.
9. To ensure that the model contains vertical communication that allows science to feed up or down through the layers as appropriate
10. To define how training, particularly of young researchers, can be accommodated in such a model.
11. To gauge whether the model proposed leaves room for technique development work.

Work plan:

Work group meeting 1 will start by reviewing the report from the 2009 community meeting. Objective 1 should be addressed to enable data gathering for objective 2 and objective 3. Methods for gathering the data will be identified and responsibilities for specific data gathering tasks distributed amongst the WG.

Work group meeting 2 (approximately 3 months later) will review the data and develop a model(s) in consideration of the remaining objectives listed above. A report will be drafted that (i) evaluates the current level of instrument provision and the demand for such capabilities; (ii) identifies any immediate capability gaps and (iii) defines a roadmap by which which the activities of the EM community can evolve towards the proposed model. The report from the WG to then be circulated to the community (via EMAG and RMS) and to funding agencies.

EM Community meeting (approximately 2 months later) to present the model and evaluate community support. This meeting to include representatives from funding agencies.

Final report and proposal produced to enable detailed discussions with funding agencies.

Selection of working group members:

It is proposed that the working group comprise 9 members. They would be selected by the SuperSTEM (EPSRC National Facility for Aberration-Corrected STEM) Management Committee (3 members), the Royal Microscopical Society (3 members) and the Electron Microscopy and Analysis Group of the Institute of Physics (3 members). SuperSTEM are included given their existing experience in acting as a hub for a distributed facility.

Budget required:

Assuming £200 expenses per WG member per meeting = £3600

Catering and room hire for community meeting = £2400 (attendees cover their own travel).

Total = £6000.