EM Community "Town Hall Meeting 9th April 2014

"Techwatch"

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The "Techwatch" Remit.

- To provide a technical structure for the field, both scientifically and organisationally

- To introduce mechanisms for Techwatch initiation, continuation and review **ensuring that all community members have the opportunity to contribute on a continuing basis** (first at MMC)

- To propose first generation target areas of interest with a mechanism for adding to them and continuing a review of initiatives at every stage

- To identify necessary enabling support actions including staffing development and other continuity needs

A Possible Future UK Ecosystem

- Tier 1. Major (National) facilities with multiple instruments, support infrastructure, operator and scientific staffing and an expectation of long term support

- Tier 2. Centres of excellence (Regional) with application specific capabilities and central contributions to support for external users, staffing and maintenance

- Tier 3. Widely distributed (Local) facilities

Only Tiers 1 and 2 considered within the current Techwatch but could be expanded.

Where we came from and what we were asked to do…

- **One part** of the working group focused on evaluating new (EM) technologies that would benefit the UK community

- An attempt to identify the specialised capabilities that we need as:
  (a) ones which we have and need to continue / develop / expand

  (b) clear gaps in UK EM that we should try to fill concentrating on equipment in Tiers 1 and 2

- Our ultimate aim is to produce a "priority list" [with some initial estimated costs] for capital spend **as part of a wider roadmap**

The AC Ecosystem Today – Tiers 1&2

- SuperSTEM – inc meV EELS – 2
- Double aberration corrected (TEM + STEM) – 3 (+ York In Situ)
- Probe corrected (STEM) – 6 (+2 at SuperSTEM, + 1 Glasgow Magnetic)
- In-Situ – 1 (AC ETEM + ESTEM)
- Magnetics – 1 (AC STEM)

- Significant limitation in specimen preparation for high quality analysis. New approaches and investment needed and solutions / equipment need to be defined

An Initial Priority List for Specific Instruments

- 2nd and 3rd generation in-situ microscopy Tier 1 or 2 [£5M with fast camera]
- Pulsed Sources Tier 1 [£10M+]
- Surface Microscopy Tier 1 or 2 [£2-4M]
- Chromatically Corrected Instruments Tier 1 [£10M+]§
- Low Voltage (and UHV?) TEM and SEM Tier 1 or 2. [SEM £1-2M, TEM £5M+]
- Specimen Preparation [distributed, £0.5-3M]

§ = *complementary to SuperSTEM 3 already funded*

More General Instrument Developments and Capabilities

- Anaerobic specimen preparation and transfer systems Tier 2*
- Development of standards with X-ray beam lines Tier 1
- Wet cells for living systems and organic / inorganic materials combinations Tier 2
- Vortex beams and spin polarised microscopy Tier 1 or 2
- Magnetic analyses Tier 2
- Fast electron detectors Tier 1* #
- Improved vacuum systems (UHV) Tier 1 or 2* #
- Quantitative diffraction based analysis Tier 2
- Application specific stage and control developments Tier 1 or 2 # and community wide

** = expected to be widely deployed once developed in the UK or by others*

 # = connected with in-situ EM