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Update - HPRF Faraday Partnership and Accelerator Industry Club

David Wilcox

**Linear Collider UK Meeting
Birmingham 17th-18th April 2008**





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These slides are drawn from the SciTech08 presentations made yesterday in London by Doug Clunie and David Wilcox.





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Evolution of a Knowledge Network

Doug Clunie

Technical Director HPRF Faraday Partnership

Industrial Affiliate Cockcroft Institute





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Theme today

A brief history of transformation of how a group, established to support the development of microwave power for accelerator technology, has developed to support all aspect of the application of microwave power.





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The HPRF Faraday Partnership – Past

- HPRF Faraday initially sponsored by DTI and PPARC to support the Accelerator Community with 6 partners in 2001.
- Recognised from outset that it was necessary to broaden application base so remit broadened to include other application areas
- Defence
- Industrial processing
- And of course - Accelerator technology
- Strong managed links between clubs to ensure awareness of capability and potential applications
- Praised by DTI for its success
- Industrial partners have strongly supported its activities.- now over 60 members- from Internationals to SMEs





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The HPRF Faraday Partnership - Now

- DTI funding for Partnership ceased September 2007!
- Partnership now funded through self generated contacts.
- Since September supported by IET with more freedom of action
- Business continues but with substantial opportunities for growth
- Still provide a single, coordinating point of contact for RF systems
- Three special interest groups, with industrial, academic & government support- linked by small central staff to provide connectivity
- *Accelerators =Cockcroft Institute*
- *Industrial processing-Nottingham University*
- *Defence- Strathclyde University*





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The HPRF Faraday Partnership- Goals

- To establish the UK as the world leader in high power microwave technology and its applications, by stimulating industrially relevant research to generate and exploit knowledge and know-how to design, demonstrate, manufacture and maintain, sector-relevant, commercially viable, energy-efficient equipment.
- To be the primary provider of globally recognised training in high power microwave generation and use.
- To demonstrate a new model, through the IET for proactive Knowledge Exchange linking technology and application in both traditional and novel areas





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The Networks

- **Accelerators-** struggled as Government policy towards large science projects changed. Refocusing on broader application areas and formal links to Accelerator Institutes
- **Defence** – Prospered. Meets a need and aligns with MoD policy towards inclusivity in problem solving
- **Industrial processing** – Strong academic base, with world class capability but small industrial base- i.e. technology ahead of users
 - Considerable effort in outreach to inform industry of advantages –
 - Now growing academic centre with growing industrial support and capability
 - Application areas include mining, oil as well as industrial processing





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Defence Technologies and Applications Group

- Provides technical and technology advice and support to MoD, OGDs (and others)
- Brings together UK academia, government (e.g. Dstl), Industry (e.g. MBDA, e2v), SMEs etc. *Inclusivity is crucial.*
- Performs specific tasks for MoD and others as required
- Seeks solutions to wide variety of MoD's problems
- Significant guidance given to education and training programmes within UK academia
- Holds a comprehensive understanding of the UK HPRF capabilities.





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Industrial Processing Applications Network (IPAN)

- Multidisciplinary National Centre sited at Nottingham University for research, prototyping and exploitation
- Academic Network strongly supported by Industry

Aimed at-

- Pursuing specific applications, mining and industrial processing – **large potential growth- emphasis on energy efficiency**
- Growing a national and world class capability in Research Development and soon production
- Moving from laboratory demonstration to prototyping industrial size plants
- Overlap with Defence and Accelerator technology





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Accelerator Industry Club-Cockcroft Institute Knowledge Exchange Unit

- Scientific Research , Science, Security and Medical Applications
- Looking to widen application areas through-Proactive KE
- Based within Cockcroft Institute for Accelerator Science to promote Knowledge Exchange
- Work to ensure that the research within Institutes such as the CI is used for the widest common good
- Utilise CI expertise to support the defence and industrial processing networks in generation, distribution and application of microwave power





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Role of the IET

- Provides general support and access to all its members
- Provides the linkage between the networks to ensure that there is maximum use made of knowledge to solve problems
- Provides, through small central staff, active and knowledgeable connectivity
- Provides connectivity with a wide range of Government Departments, such as DIUD, BERR, DoH. MoD etc.
- Provides strong linkage to the Government's Innovation strategy
- Provides a major lobbying capability





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Advantages to the Cockcroft Institute

The links to the IET and the FPRF Faraday Partnership will:

- Strengthen links to the IET and its HPRF Faraday Industry Clubs
- Provide access to a wide range of relevant expertise as well as problems requiring innovative solutions
- Advise on the requirements of industry as the CI develops its R&D with a view to bringing products to market,
- Actively seek new ideas for incubation from all network members as well as IET members





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The future

- Producing a 5 year plan so long term future envisaged
- Establish other networks within the HPRF Faraday organisation
- Establish an IET Academy in HPRF Engineering to train graduates
- Hold at least one conference a year on HPRF Engineering
- Roll out the KE model to other areas





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Developing the KE activity at the Cockcroft Institute

David Wilcox

Chairman, Accelerator Industry Club
HPRF Faraday Partnership
Industrial Affiliate Cockcroft Institute

SciTech 08 April 17th 2008





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Extract from DIUS – “Innovation Nation”

We want to create an Innovation Nation because Britain can only prosper in a globalised economy if we unlock the talents of all of our people.

We want innovation to flourish across every area of the economy and, in particular, wherever high value added businesses can flourish and grow. We must innovate in our public services too. Innovation is as important to the delivery of healthcare and education as it is to industries such as manufacturing, retail and the creative economy.

Innovation will be the key to some of the biggest challenges facing our society, like global warming and sustainable development. We need to ensure that Britain contributes to the innovative solutions and that British business and the British people benefit from the new opportunities and prosperity they create.

In this White Paper, we set out our aim to make Britain the best country in the world to run an innovative business or public service. We can do this by investing in people and knowledge, unlocking talent at all levels, by investing in research and in the exploitation of knowledge and by using regulation, public procurement and public services to shape the market for innovative solutions.

In all this there is an exciting challenge for business, public services, third sector organisations, towns and cities, universities and colleges. Government can foster innovation but only people can create an Innovation Nation.

Rt Hon John Denham MP
Secretary of State for Innovation,
Universities and Skills





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KE at the Cockcroft Institute

- Each stakeholder has its own KE office so why another at the CI?
- Aim to complement not duplicate
- Emphasis placed on needs **external** to the accelerator community
- Greater opportunity to exploit all CI knowledge and skills





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Present status

The KE function is formally about to begin

- Presently preparing detailed plans that include targets, goals, timescales and measures of performance
- Contact with its potential constituency will begin soon to establish what is needed
- Valuable support from the IET
- Already have some good projects in prospect





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Resources

- At the heart lies the CI's staff
- Knowledge, skills and enthusiasm
- Small core team with substantial industrial experience
- Centred on but not confined to accelerator science and technology
- Supplemented by access to experimental facilities at Daresbury Laboratory and at the other stakeholder's premises
- Reinforced through extensive links with many establishments within and external to the UK





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Delivery mechanisms

- Engage with external partners to investigate, develop and incubate new ideas
- Prototype within the CI or associated facilities, including within Daresbury Innovation Centre
- Provide expert advice and consultancy
- Facilitate training and education
- Assist in preparing and submitting funding proposals
- Join in collaborations, partnerships and consortia where appropriate
- Support the generation and exploitation of IP





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BASROC – British Accelerator Science and Radio Oncology Consortium - a model

- Members from academia, the research laboratories, industry and the health care sector
- Aim is to build an affordable and versatile hadron therapy machine (protons or carbon ions)
- Advantage more precise targeting, less collateral damage
- Design based on cutting edge accelerator technology (Non-scaling Fixed Field Alternating Gradient accelerator). No machine yet anywhere in the world
- Technical risks are high but prize for success is great

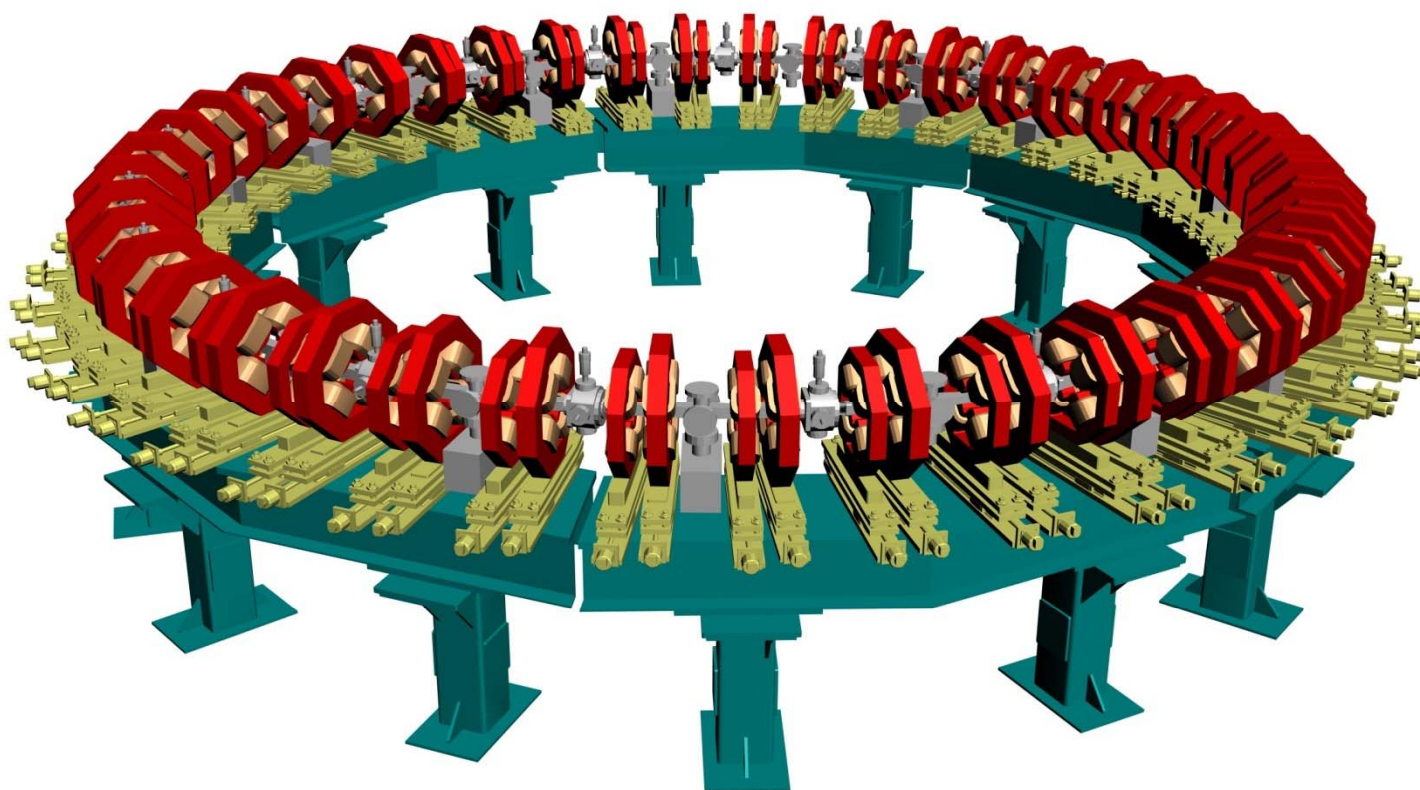




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EMMA – the experimental machine



The University of Manchester



Science & Technology
Facilities Council

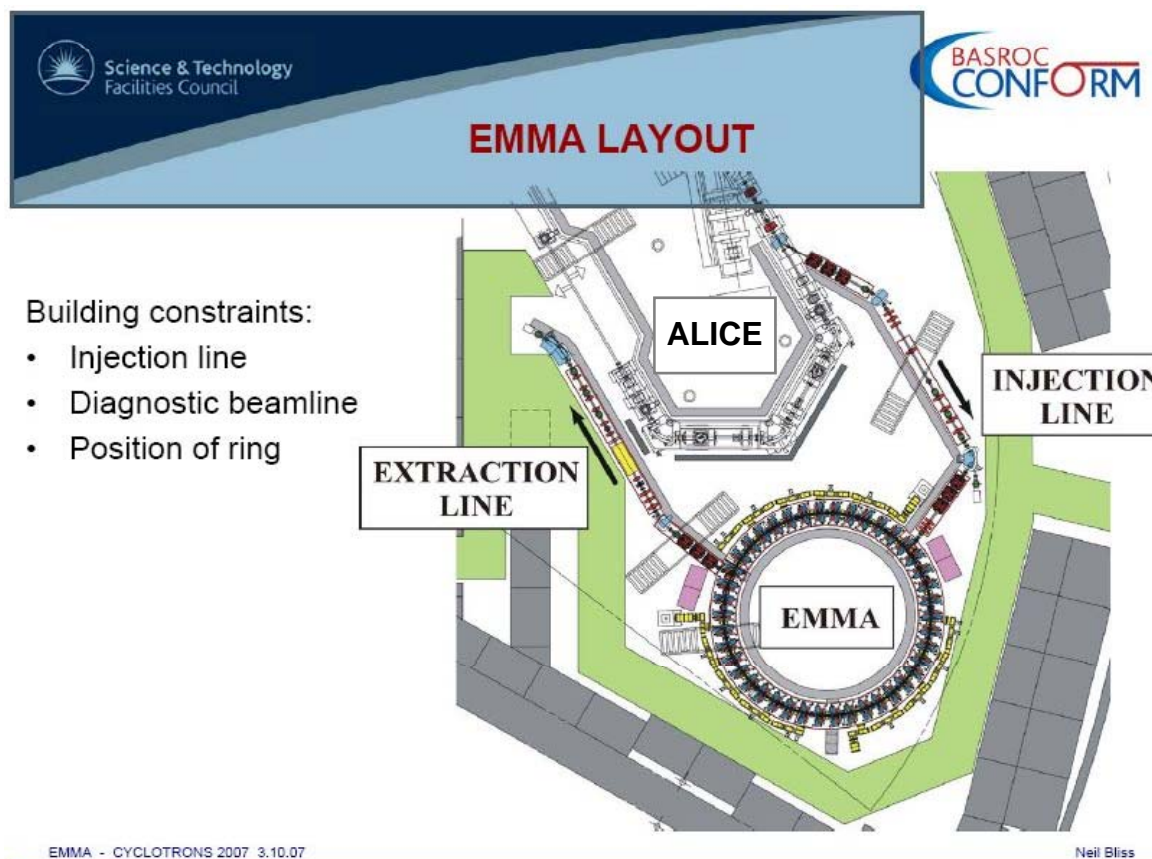




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Daresbury Laboratory - Where the action is

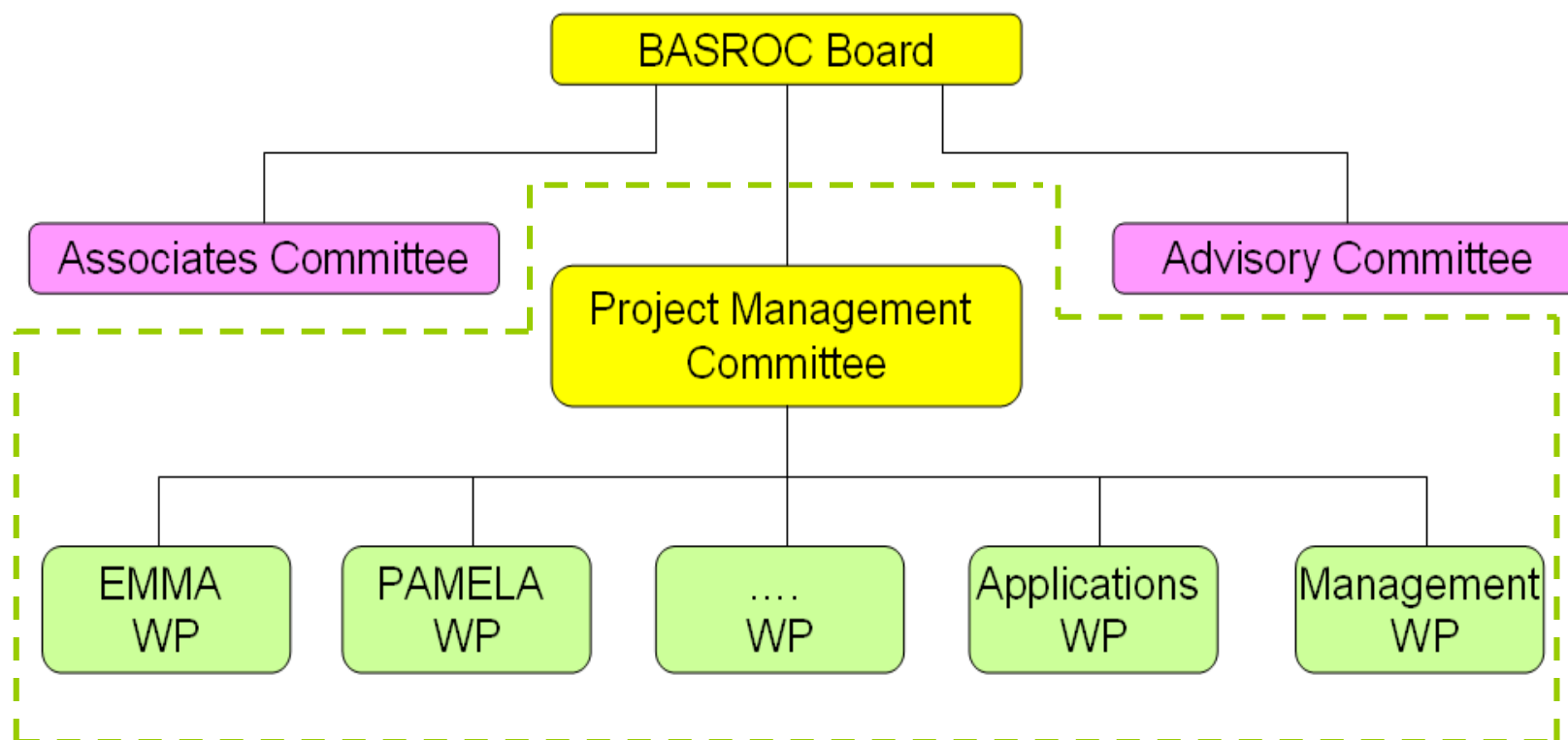




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Structure of BASROC





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Some important learning points

- Greatly benefited by involving industry and healthcare as well as other parties in preparing the proposal
- From the outset, sought support from the entire supply chain from design scientists through to machine users
- Adopted realistic targets and timescales
- Used genuine, uninflated, justifiable costing
- Took great care in writing and organising the proposal – it must be readable and comprehensible





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Summary

- The CI KE unit will become fully operational later this year
- Meanwhile potential users will be consulted
- Collaboration and problem-solving will be emphasised
- Encourage use of CI facilities for industrial or other prototyping
- Client R & D will be supplemented by an in-house, world leading, research and development programme
- First projects under negotiation
- It invites and welcomes contact from outside bodies or individuals who may need assistance or may have something to contribute
- Present an open door to the outside community
- Develop close and effective links the IET and with implementers of innovation including other government departments (OGDs)

