

# **INNOVATION, UNIVERSITIES, SCIENCE & SKILLS COMMITTEE**

## **Select Committee Press Release**

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27 March 2009

### **No clear strategy and a lack of expertise: MPs critical of Government engineering policy**

**The Government lacks sufficient in-house engineering expertise to exploit fully the UK's world-class engineering base, warns a report published today by the Innovation, Universities, Science and Skills Committee.**

**The report, *Engineering: turning ideas into reality*, also says the Government is failing to seek timely engineering advice and lacks detailed strategic planning for engineering policy.**

More trained and experienced engineers are needed at all levels of the civil service. The report says many officials do not have adequate knowledge of the sector to decide who to seek advice from and, crucially, when to ask for it.

The Committee was shocked to discover that engineering advice was absent, or barely featured, in the formulation of key Government policies, including eco-towns, renewable energy and large IT projects. Engineering advice should be sought early, before policy is agreed.

Each major engineering project should have a detailed roadmap as a matter of course. Wider use by departments of the Science and Engineering Fast Stream is also required, and training should be prioritised to ensure civil servants know when to seek engineering advice.

More efficient management of engineering policy across departments is needed. The Committee recommends a reorganisation of advisory structures, including the creation of a Government Chief Engineer.

The Committee says significant skills shortages could have a serious impact on the Government's plans to build new nuclear power stations within ten years. There is no clear and detailed plan for delivering the next generation of power stations. A master roadmap for delivery of nuclear new build is essential and it must address the issue of skills capacity.

The report says that, given the urgent need to tackle climate change, the Government would be negligent not to consider the potential of geo-engineering technologies as a 'plan B' to the 'plan A' of mitigation and adaptation. It calls on the Government to establish a clear view on the matter.

The Government should also revise its support structures for fledgling industries, such as plastic electronics, in order to exploit the potential for economic return.

Chairman of the Committee, Phil Willis MP, said: "Engineering is one of the UK's great strengths. While we've been critical about aspects of Government policy and called for significant changes to be made, we should not forget the positives. Our engineering research base is one of the best in the world and our engineers continue to be sought after to lead on prestigious global projects. The Government is making efforts to improve the recognition of the engineering community. And it has become clear to us just how vital the contribution of the engineering community is to tackling the global challenges we face."

End

**FURTHER INFORMATION:**

*For media inquiries please call Becky Jones on 020 7219 5693. For any other information please call Ana Ferreira, on 020 7219 2793. Previous press notices and publications are available on our website.*  
[www.parliament.uk/ius](http://www.parliament.uk/ius)

**Committee Membership is as follows:**

Mr Phil Willis (*Liberal Democrat, Harrogate and Knaresborough*)(Chairman)  
Dr Roberta Blackman-Woods (*Labour, City of Durham*)  
Mr Tim Boswell (*Conservative, Daventry*)  
Mr Ian Cawsey (*Labour, Brigg & Goole*)  
Mrs Nadine Dorries (*Conservative, Mid Bedfordshire*)  
Dr Ian Gibson (*Labour, Norwich North*)  
Dr Evan Harris (*Liberal Democrat, Oxford West & Abingdon*)  
Dr Brian Iddon (*Labour, Bolton South East*)  
Mr Gordon Marsden (*Labour, Blackpool South*)  
Dr Bob Spink (*UK Independence Party, Castle Point*)  
Ian Stewart (*Labour, Eccles*)  
Mr Graham Stringer (*Labour, Manchester, Blackley*)  
Dr Desmond Turner (*Labour, Brighton Kemptown*)  
Mr Rob Wilson (*Conservative, Reading East*)

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- Set and maintain professional standards, in association with ECuk.
- Define chartered status; provide a framework for Initial Professional Development (IPD) including defining the skills needed eg project management.

## 6.7 GOVERNMENT

In addition to the earlier recommendations, we:

- Applaud the Government's increased commitment to lifelong learning.
- Recommend a review of the way Government sets targets for the LSC to deliver the upskilling the UK requires.

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## Memorandum 22

### Submission from UK Naval Engineering, Science and Technology Forum (UKNEST)

This paper is offered in response to The House of Commons Innovation, Universities, Science and Skills Committee news releases Nos. 22 & 25 (07–08) dated 29 January and 6 February 2008—Inquiry into Engineering in the UK. It provides a position statement on behalf of the UK Naval Engineering, Science and Technology Forum (UKNEST) following the request for evidence by the IUSS committee and focuses specifically on the intellectual resource base that supports this industry.

#### INTRODUCTION

1. This submission is made by the UKNEST forum. UKNEST was formed in 2005 with the overall objective *to provide a forum for the UK's professional naval engineering, science and technology community for addressing issues of common concern, fostering specific professional development needs, and giving a focal point for interaction with, and influencing the wider Government and industrial community.*

2. UKNEST comprises 20 organisations<sup>63</sup> representing most of the principal contractors and major suppliers to the UK maritime defence engineering industry as well as MOD, the Royal Navy and professional bodies. UKNEST is independently chaired by Mr John Coles (former Chief Executive of the UK MoD Ships Support Agency and IPT Leader for the future aircraft carrier programme). In the last year UKNEST working groups have focused on skills development and sustainment, research and development (R&D) pull-through, and design processes. Further information is available here: <http://www.uknest.org/uknestflyer2.pdf>.

3. The vision of UKNEST is to *develop and sustain the vision and implementation of a world-class naval engineering, science and technology intellectual base in the UK.*

4. The views contained in this submission represent a collective view from UKNEST and do not represent the specific views of any one of the member organisations.

#### UK MARITIME DEFENCE ENGINEERING SKILLS

5. UKNEST member organisations employ the vast majority of people engaged in the UK surface ship and submarine engineering design, build and through life support communities, industry and government, white collar and blue collar. Hence UKNEST can be seen to represent the major elements of the UK maritime defence industry in addition to many of the members being engineering employers on a much broader scale, across a number of engineering sectors.

6. The maritime defence sector requires the application of a wide span of scientific, technological and engineering disciplines with practical domain experience. These include naval architecture, marine, mechanical and electrical engineering, systems engineering, electronics, acoustics, nuclear engineering, metallurgy, atmosphere chemistry and many others. Much of this technical expertise and associated domain experience in the UK is provided by UKNEST member companies.

7. In September 2006 UKNEST submitted written evidence to the House of Commons Defence Select Committee inquiry into the future of the strategic nuclear deterrent: the UK manufacturing and skills base.

<sup>63</sup> Aveva Solutions, Babcock Marine, BAE Systems Surface Fleet Solutions, BAE Systems Submarine Solutions, BMT Defence Services, Convertteam, Devonport Royal Dockyard, dstl, Institute of Marine Engineering Science and Technology, Lloyds Register, Ministry of Defence, QinetiQ, Rolls Royce, Royal Institution of Naval Architects, Royal Navy, Systems Engineering and Assessment, Thales, VT Shipbuilding, Weir Strachan and Henshaw, WS Atkins.

### THE ENGINEERING SKILLS BASE IN THE UK

8. UKNEST is concerned about the quality, quantity and demographic profile of engineers within both its own industry sector and engineering in the UK at large. A particular challenge for UK maritime defence is captured well by the Defence Industrial Strategy (DIS)<sup>64</sup>. Whilst some aspects of warship and submarine engineering utilise general fields of engineering and production, there remain a number of specialist skill sets only utilised fully in this sector. Examples include nuclear shielding (a problem not shared to anything like the same extent as civil nuclear), pressure hull technology, submarine hydrodynamics, survivability under enemy attack, atmosphere control engineering and life sciences, underwater communications, special acoustic and optical sensors etc. These skills can only be developed by working in the maritime defence sector and learning from others, experiencing at first hand the specialist applications needed. It is a fact that many of these niche skills reside in only a small population of engineers and that the average age of this population is worryingly high.

9. Equally important are the core warship skills to define, design, procure, build, accept, modify, update and support in-service naval vessels. These are essential to ensure sovereign capability is maintained and whilst not necessarily in short supply, require sustained business to maintain sufficient capability.

10. A study sponsored by UK MoD and undertaken by the RAND Corporation has quantified the numbers and skills of engineers in the UK maritime defence sector and also highlighted a small number of niche skills which are becoming critical or under threat. UKNEST has been a key contributor to this work.

### THE ROLE OF ENGINEERS IN INNOVATION AND THE IMPORTANCE OF R&D

11. UKNEST views engineering design, build and through-life support holistically as being part of all the lifetime activities from research through to disposal—this is the responsibility of the collective maritime defence enterprise. Recent work by the UK MOD Research Acquisition Organisation in developing the UK Defence Technology Strategy (DTS) has identified a strong link on how spending in R&D has a direct impact on delivered military capability, leading to a typical 10-year advantage over those nations which invest much less in R&D. This reinforces the holistic view and that product capability is a continuum from R&D through to the practical engineering for realising and sustaining deployed assets with a long service life. The need for sustained government spend on R&D is evident if the UK is not to lose any military or other wealth creation advantage.

12. UKNEST has established a R&D working group which has:

- Contributed to the development of the UK MoD DTS and prompted MoD to consider its emphasis for future R&D;
- Identified the importance of R&D to wealth creation and competitive advantage;
- Engaged with MoD in the development of its Defence Technology Plan;
- Organised and facilitated a one day seminar entitled “Maritime Grand Challenge 2007—Focussing Long Term Science and Technology”, the aim of which was to examine the question, “*Where should the UK invest in the long-term Research & Technology to ensure Maritime success for the future?*”.

13. Innovation to enhance capability arises from R&D, academia, professional engineers working in design and support, etc, in other words the intellectual capability within companies and Government. One must be careful to avoid missing the key innovative individuals and engineering experts who can realise an affordable product (measured in low hundreds of people in UKNEST organisations) when considering the whole enterprise (measured in high thousands).

14. Equally important are a number of domain specific niche technology areas, which are not shared easily internationally and with other industrial domains. For instance, it has been suggested that the total “intellectual” core capacity necessary to sustain the necessary UK submarine enterprise sovereign capability is in the region of 250 professional engineers and scientists. This represents a small proportion of UK defence enterprise resource but one which is strategically important in the context of its ability to provide greater wealth creation for the UK. UKNEST suspects that similar situations exist in other engineering sectors and believe that this is one area in which the committee’s inquiry should seek greater definition and clarification.

### PROMOTING ENGINEERING SKILLS AND DEVELOPING CAREERS

15. To retain the key skills necessary to ensure UK sovereign capability in maritime defence (as required by the DTS) requires investment to regularly exercise these skills, to fund innovation and experimentation, to recruit new blood and develop existing professionals. This is best achieved by engineers undertaking “real” work: doing their jobs and adding value to create a product or service which can be traded. Where such work is in short supply due to reduced Government spending, market decline etc then some of the essential skills have to be retained by company self-investment. There is no lack of willingness in UK industry to sustain the necessary skills, provided sustainable business opportunities are forthcoming. It is

<sup>64</sup> “It is a high priority for the UK to retain the suite of capabilities required to design complex ships and submarines, from concept to point of build; and the complementary skills to manage the build, integration, assurance, test, acceptance, support and upgrade of maritime platforms through life”

therefore essential for engineering businesses to be able to more accurately predict workload trends in order to provide worthwhile sustainability of skills. It is recognised by UKNEST that sustainability may be achieved better through improved integration and exchanges between the build, manufacture and through life support delivery teams in maritime defence, and perhaps this applies to other engineering sectors too.

16. UKNEST has recognised that the education, training and development of engineers at large and for the maritime defence community specifically, are essential to provide a sustainable enterprise. UKNEST includes in its membership two key professional engineering institutions and many companies are accredited providers of initial professional development for young engineers. This association ensures a consistent professional rigour is applied.

17. To support this, UKNEST has established a training, education and development working group which is currently focussed on establishing a UKNEST enterprise-wide recruitment and awareness campaign for undergraduates and graduates in all engineering disciplines. The campaign should be launched in late summer 2008. It is unique in the maritime defence sector in portraying the attractions of the entire enterprise to all engineering disciplines across all organisations. If successful, this scheme will probably be expanded to encompass non-graduate recruitment and to influence school children.

18. UKNEST is also proposing an enterprise-wide internship scheme for undergraduates aimed at producing a greater number of well-rounded (broad rather than narrow experienced) young engineers who have gained work experience and sector awareness prior to graduation.

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### Memorandum 23

#### Submission from the Wellcome Trust

1. The Wellcome Trust is pleased to respond to the Innovation, Universities, Science and Skills Committee inquiry into engineering. The Wellcome Trust is the largest charity in the UK. It funds innovative biomedical research, in the UK and internationally, spending around £600 million each year to support the brightest scientists with the best ideas. The Wellcome Trust supports public debate about biomedical research and its impact on health and wellbeing.

2. As a funder of biomedical research, the Trust would like to emphasise the importance of medical engineering and would urge the Committee to consider this discipline within its inquiry. Medical engineering integrates the UK's strengths in innovative engineering and medical research; it is a growing field which will continue to be important for improving health and strengthening the economy. Medical engineering has resulted in many innovative applications—such as life support systems, medical lasers, hip replacement, pacemakers, and medical imaging—and will continue to play a significant role in the UK's "innovation drive". For example, four of the world's top ten neuroscientists are based at the Wellcome Trust Centre for Neuroimaging at University College London.<sup>65</sup>

3. The Trust has provided over £46 million in funding for grants involving biomedical engineering research since 2003. Some examples are given below:

- Dr Morgan Alexander, Professor Martyn Davies and Professor Paul Williams at the University of Nottingham, in collaboration with Professor Robert Langer and Dr Daniel Anderson at MIT, to use novel polymer array technology to rationally design polymers for anti-biofilm properties that can be readily incorporated into standard medical devices.
- Professor Ijeoma Uchegbu of the School of Pharmacy at the University of London, to develop nanotechnology that significantly increases the potency of drugs in the brain and to demonstrate that this can result in significant anti-tumour activity while sparing the healthy brain and bone marrow.
- Matt McGrath of Aircraft Medical for the development of the world's first handheld video laryngoscope.
- Dr Andrew Gee at the University of Cambridge for the development of next generation imaging software for freehand, three dimensional ultrasound scanning—the project team involves both clinicians and engineers.
- Professor Paul Addison of CardioDigital Ltd develop the COP-AF← Prototype ECG-based system—a medical device for the selection of atrial fibrillation patients most likely to benefit from cardioversion therapy, developed by.

4. Special efforts are often needed to promote collaborative innovation between engineers and medical researchers. The Trust welcomes the opportunities offered by the biomedical engineering research institutes at the University of Oxford, Imperial College London, and the University of Dundee for collaboration between scientists, clinicians and engineers.

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<sup>65</sup> <http://www.fil.ion.ucl.ac.uk/>