EUExNet December News 2011 Newsletter number 10

b 2012

Status report from United Kingdom

The EUExNet phase of the EUExcert Programme has been a driving force in the continuing development of vocational education and training for the UK explosives sector.

ACKNOWLEDGMENTS

As the Institute and EUExcert UK's representative on the EUExNet project, I would like to thank everyone involved in the project but in particular the following: Hans Wallin, Erik Nilsson and Hanne Randle for their patience and occasional 'prod'; Denise Clarke of HSQ for her long-term commitment to vocational education and training but especially her assistance to all partners as they tried to understand the complexities of the UK systems; Dave Winterborne and Paul Harris, co-chairmen of the SSB for EMSO, for their unwavering support as the National Node developed; Rob Parry, Geoff Hooper and Steve Murray for keeping my feet to the flames and their support in developing the SSSG and DOES.

EUEXCERT

KCEM (Competence Centre for Energetic Materials) in Sweden has a long-standing working relationship with Cranfield University and it was on the foundations of this mutual interest in education and training in explosives that the EUExcert programme was based. The EUExcert Association is now an independent European association with its HQ based in KCEM.

The aims of EUExcert are to establish a stable, firm basis and framework for the vocational education of people in the European explosives sector. The EUExcert programme has run in 3 phases to date: Phase 1 2003-Oct 2006, Phase 2 Oct 2006-Sep 2008 and Phase 3, the development of EUExNet, will be complete at the end of December 2011.

EUExNet is part funded by the EC's Leonardo da Vinci educational programme and aims to create a European association and a network with independent national nodes (bodies), which will be licensed to use the EUExcert logo for certificates of explosive competence and also to start a transnational European network and cluster for the explosives sector. The project continues the work to establish a transferable certificate of explosive competence recognised inside and outside the EU.

Benefits to partners include safer working in Europe and improved mobility of explosives workers. The additional commitment for a member of the SSB is expected to be minimal in terms of time and funding, depending on continued EU funding through the Leonardo da Vinci programme.

The network is now a web-based linking of National Nodes from each of the partner nations. IExpE agreed to be the UK National Node for this network and as such was expected to form a Consultative Group from all interested parties in the industry. In September 2010, the Institute recommended to the SSB,and it was agreed, that it should:

- recognise IExpE as the UK's National Node of EUExNet.
- take on additional responsibility as the basis of the UK's contribution to EUExNet.
- form the UK's Consultative Group within EUExNet.
- That SSB Members formally partner themselves with EUExcert and EUExNet

The Institute of Explosives Engineers accepted the role of EUExNet National Node for UK at the beginning of this project and, through collaboration with HSQ and the SSB as a whole built up the interorganisational links and media required to enable the members of what has become EUExcert UK to remain informed of developments in the EUExcert Programme. EUExcert UK has continued to grow and the following organisations have now added weight to the EUExcert Association by signing the Articles of Association:

Allen Vanguard Threat Solutions
Explosive Risk Management
Hinton Associates
Homeland Security Qualifications Ltd
Institute of Explosives Engineers
International School for Security and Explosives Education
Qinetiq
Ramora UK
SSB for EMSO

As a partner in the EUExNet project, IExpE provided the group with an outline Accreditation Process that could be suggested to governing bodies and amended to suit local circumstances yet remain recognisable to all partners. The UK, Ireland and Germany all employ variations on the following processes and it is suggested that this model should be adopted and adapted for EUExcert:

A government body sets criteria for accreditation in regulations and awards licences for certain bodies to award qualifications in a particular subject.

Industry sets the occupational standards for employees in the various disciplines within the industrial sector and a government, government sponsored or government accredited body

is made the custodian of those standards with some responsibility, along with industry for the maintenance of the standards, ensuring they are reviewed regularly.

The government body may also accredit External Verifiers with responsibility for ensuring that the quality of awarding bodies and the work of Internal Verifiers is normalised across different sectors.

A candidate awarding body applies to the government body for accreditation as an awarding organisation, licensed and/or accredited to accredit training providers as such.

The awarding organisation will accredit individuals as External Verifiers (or auditors) as having the necessary competence to be able to provide assurance that training providers' training meets the requirements of the awarding organisation when measured against the qualification standards and occupational standards.

Awarding organisations are responsible for accrediting assessors.

A candidate training provider applies to the awarding organisation to be registered with the awarding organisation to deliver the qualifications. The training provider will also arrange for its assessors to be accredited by a awarding organisation.

Assessors provide assurance that candidate trainees under assessment for a qualification meet the accepted quality of knowledge and skills against the various standards in the qualification.

The awarding organisation awards the qualification to the candidate trainee.

Membership of the EUExNet multi-national, multi-organisational partnership has been of benefit to the UK members of the EUExcert Association in many ways, principally in seeing and understanding that the issues of a declining industry and ageing workforce are having an impact on the whole of Europe and the rest of the world. All partners have recognised that the fragmentation of the industry has the potential to lead to increased accident rates as the experience and knowledge of the existing workforce retires and the limited numbers of new personnel, into niche areas of working, without broad understanding of the reasons for existing and new explosives safety legislation and control measures, can then lead to them taking shortcuts in the name of increased efficiency.

Within the project, it has been very useful to see and understand other partners' ways of working: their legislative processes, licensing and training regimes and the solutions they have proposed and implemented to overcome issues. As well as the formal, legislative and regulatory views, we have seen, and where appropriate, taken into our own use, practical use of tools for internet working which may otherwise not have been obvious as a sensible solution for the creation of the network.

THE FUTURE

It is intended that the members of EUExcert UK will continue the work of the EUExNet project and overall EUExcert Programme in the following ways:

- Contribute regularly to the EUExcert website.
- Invite other explosives-related bodies, organisations, individuals and companies to become members of EUExcert UK.
- Issue 'Articles of Association' to new members of the SSB and any other company that wishes to associate itself with the vision and aims of EUExcert. The UK set up its SSB some ten years ago and this partnership of members from different elements of the UK Explosives sector has proven to be very useful in disseminating the concepts of EUExcert and will be utilized to expand the EUExcert UK association to other potential partners, strengthening the wider EUExcert Association. Since the creation of EUExcert UK, other companies have joined and it is anticipated that the national association will continue to develop over the next few years, sustaining a basis for the European association.
- Encourage UK Explosives Sector to recognise the need for a EUExcert certificate. EUExcert certificates will be issued to individuals in the explosives sector, based on a procedure of accreditation of individual competencies – no matter how the experiences, skills or competencies have been acquired – according to the occupational standards that have been chosen as best practice by the previous EUExcert projects.
- Contribute to any further trials being conducted and the rollout of the final EUExcert
- Use the EUExcert logo and trademark.
- Exploit the EUExcert logo in UK.
- Recommend new nation members to the EUExcert Europe.
- Develop methods to recruit and associate new members in order to develop and maintain the European and world wide EUExcert network.
- Manage and update the glossary on terminology for the Explosives sector as and when requested to do so.
- Disseminate information about project activities using the EUExcert logo.

BACKGROUND TO UK INVOLVEMENT

The history of this development goes back to the 1990s when the MOD recognised it required assurance that people working with Ordnance, Munitions and Explosives (OME) were competent and should be given generic OME training and education. To that end, a Head of Profession (HOP) was nominated in Sept 2001 and a competence framework was constructed, however it became clear that there were weaknesses within a bespoke MoD model and that there was a need for wider industry involvement. The problems with bespoke competences were identified as:

- No recognition outside the MOD and therefore of little use to staff moving from the MOD to the civil sector or vice versa. They were unsuitable for recruitment as they could only be gained from within the MOD, not beforehand.
- Unable to bench mark against industry or national standards as these did not exist at the time. There was a need for standards across the whole explosives community

While MoD were developing their initial competence framework, National Occupational Standards (NOS) were being created for Munitions Clearance and Search Occupations funded by a Royal Engineers Trust and this organisation began to consider widening their remit to include other

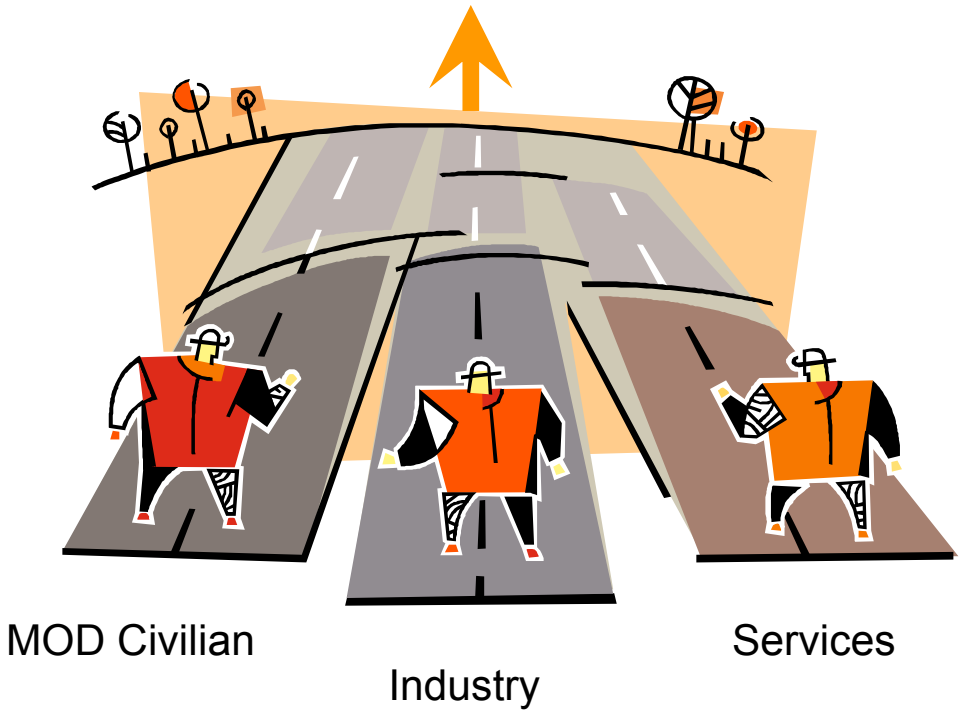
explosives and munitions occupations. The MoD and industry joined with the Explosives and Search Competence team and together they formed the Standard Setting Body for National Occupational Standards in Explosives, Munitions and Search Occupations (SSB for EMSO).

The SSB members represented 7 MoD organisations and 8 civilian organisations and the IExpE. Apart from small financial contributions from DOSG, AWE and DSTL most effort and cost was borne by the organisations releasing staff – approximately £1M effort.

MOD Munitions Strategy

By 2005 - HOP was working on two separate work streams:

- National competence standards. The aim was to identify a n effective & efficient solution – 'National' standards by which competence can be described & qualifications designed. Common Competences, Qualifications in Explosives



  - Standards Setting Body formed
  - Creation of National Occupational Standards (NOS) & NVQ's
  - NOS launched 2006
  - MOD met with selected defence industry representatives, who recognised the need for the NOS
  - 2009 MOD mandate demonstration of competence against the NOS to meet MSER i.e using best practices
  - NOS taken up to underpin future European qualifications

- Munitions Strategy, helping the sector to sustain OME skills. The Munitions Strategy being the long-term strategy for the through-life support of munitions in Defence, which informed

the Defence Industrial and Technology Strategies. The Munitions Strategy had a number of themes of which one was people. A key conclusion was:

- There is a growing concern throughout the munitions community over the reduction in numbers and competence of those employed in the munitions business. These concerns were:
  - Over the last 20 years (as at 2007) a serious decline in the breadth & depth of expertise & competence
    - Pyrotechnic companies: Was 7 now 4
    - RO staff: Was 19000 now 5000
    - Closure of 2 government research establishments: PERME and RARDE(Woolwich)
    - Intake 1960's and 1970's: Retiring or retired
    - UK explosives workers: 1990 (441,000); 1997 (300,000);

NB It is estimated that in 2011 this figure may now be >50,000.

- Decline in Skills Base
  - Shrinking explosives community
  - Stovepiping through privatisation
  - Age profile
  - Lack of investment in skills development
  - Few explosives qualifications
  - Qualifications must be based on skills and knowledge requirements

- And that there is:
  - No systematic approach to identify deficiencies
  - No systematic approach to devise a corrective solution

The MOD's aspiration was that these workstreams should be brought together under a single management regime that would be owned by the sector. It was led by the HOP and concluded that an entity was needed to assist Industry sustain the skills needed for the future. One of the options was for MOD to provide the service but this was considered to be expensive and also constrained to a few companies.

The NOS and associated NVQs were launched in 2006 after accreditation by the government Regulator, at that time SEMTA but now COGENT is the custodian of the NOS for Explosive Substances and Articles (NOS for ESA).

Key Roles for the Standards

Key Role	Description
1	Research and develop explosive substances and articles
2	Develop and manage explosives safety

3	Test and evaluate explosive substances and articles in field trials
4	Manufacture explosive substances and articles
5	Maintain and repair explosive substances and articles
6	Procure explosive substances and articles
7	Store and move explosive substances and articles
8	Transport explosive substances and articles
9	Manage explosives facilities
10	Prepare and use explosive substances and articles for engineering and entertainment purposes
11	Dispose of explosive substances and articles
12	Enable the pubic and armed services to continue their regular activities in peace and war by controlling and removing munitions threats
13	Support the explosive substances and articles function

In 2006 MOD commissioned the Tisley Report; it was to consider how an independent Entity may support the Explosives Substances and Articles (ESA) community to sustain competence, noting that **The community includes the whole of the explosives sector that is covered by the ESA National Occupational Standards.** The 'entity' was to be an organisation to support the ESA community and assist in sustaining the competence necessary to underpin the requirements identified in the Defence Munitions Strategy .

Organisations Consulted

Atomic Weapons Establishment	Leafield Engineering
BAE Systems	MBDA Missile Systems UK
Chemring Countermeasures	Nobel Enterprises Ltd
Defence Manufacturers Association	Primetake Ltd
Exchem Organics	P.R.Lee Consulting

Explosives Industries Group	QinetiQ
Halliburton Logging Services	ROXEL plc
Health & Safety Executive	Royal Gunpowder Mills
Health & Safety Laboratory	SEMTA
Institute of Explosives Engineers	Standards Setting Body (N Capel)
KCEM (Swedish 'equivalent')	Thales Missile Electronics

*"..***Only two groups, the EIG and IExpE, represent the interests of the ESA both inside and outside the Defence Industry. The DMA is oriented specifically towards the defence industry and the EIF is closely associated with the HSE, a Government body against which the Entity may conceivably wish to lobby..."**

THE ESA TRADE ENTITIES

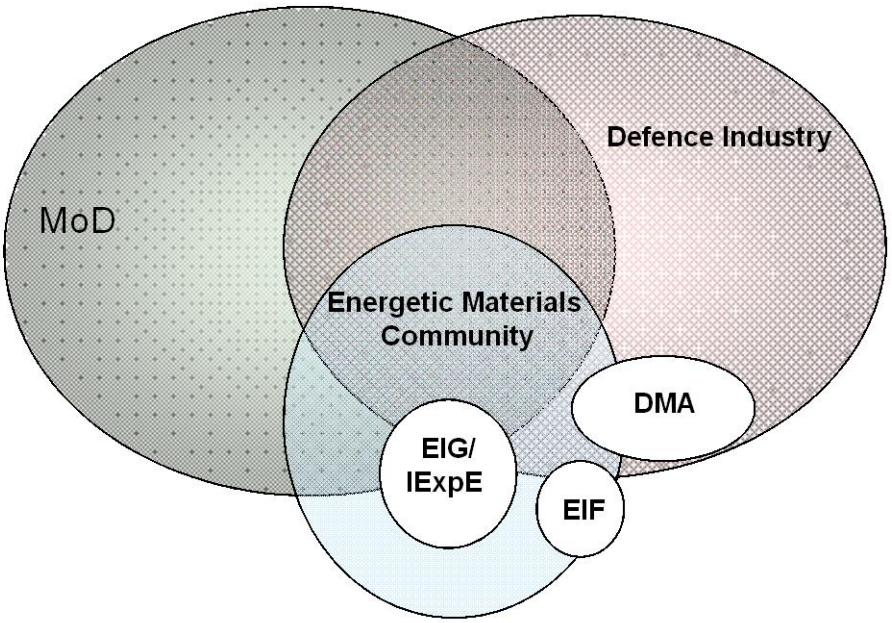


FIGURE 2

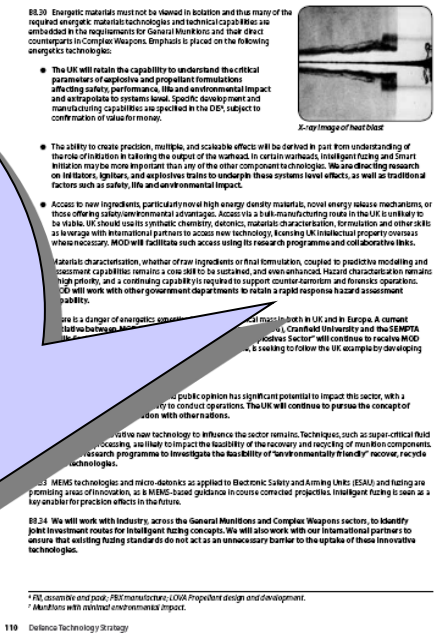
The conclusions of The Tisley Report were that:

- General concern over decline in competence within the Explosives Substances and Articles (ESA) community
  - Government, particularly MoD seen as having a reducing level of expertise

  - Industry has managed contractorisation and consolidation, and is in a reasonably robust position (although this was not agreed by all!)
- Generation of Standards and NVQs generally applauded
  - Seen as a step forward rather than a complete solution to competence decline
- Little enthusiasm for a completely new Entity to represent all aspects of the ESA community needs
- Most favoured format for the Entity is that of an extension to an existing group - The Explosives Industry Group (EIG), a body representing civil companies and predominantly the professional fireworks and pyrotechnics companies, or IExpE.

EIG considered the role to be more suited to that of the IExpE and with little enthusiasm for new entities it was suggested that the SSB could take strategic direction from the sector via the 'Entity'. On the 6th March 2007 the SSB endorsed the proposal for formation of an 'Entity' to bring together the Munitions Strategy and the National Occupational Standards

"There is a danger of energetics expertise falling below critical mass in both UK and Europe. **A current initiative between MOD Defence Ordnance Safety Group (DOSG), Cranfield University and SEMTA Skills Sector Council on "Training and Education in the Explosives Sector" will continue to receive MOD support.** The EU, through a Leonardo da Vinci programme, is seeking to follow the UK example by developing European standards and qualifications."



88.30 Energetic materials must not be viewed in isolation and thus many of the required energetic materials technologies and technical capabilities are embedded in the requirements for General Munitions and their direct counterparts in Complex Weapons. Emphasis is placed on the following energetics technologies:

- **The UK will retain the capability to understand the critical parameters of explosive and propellant formulations affecting safety, performance, life and environmental impact and extrapolate to systems level. Specific development and manufacturing capabilities are specified in the DEP, subject to confirmation of value for money.**

X-ray image of heat blast

- The ability to create precision, multiple, and scalable effects will be derived in part from understanding of the role of initiation in tailoring the output of the warhead. In certain warheads, Intelligent fuzing and Smart Initiation may be more important than any of the other component technologies. We are directing research on initiators, igniters, and explosives trains to underpin these systems level effects, as well as traditional factors such as safety, life and environmental impact.
- Access to new ingredients, particularly novel high energy density materials, novel energy release mechanisms, or those offering safety/environmental advantages. Access via a bulk-manufacturing route in the UK is unlikely to be viable. UK should use its synthetic chemistry, detonics, materials characterisation, formulation and other skills as leverage with international partners to access new technology, licensing UK intellectual property overseas where necessary. MOD will facilitate such access using its research programme and collaborative links.

Materials characterisation, whether of raw ingredients or final formulation, coupled to predictive modelling and assessment capabilities remains a core skill to be sustained, and even enhanced. Hazard characterisation remains high priority, and a continuing capability is required to support counter-terrorism and forensics operations. MOD will work with other government departments to retain a rapid response hazard assessment capability.

re is a danger of energetics expertise [illegible] critical mass in both UK and in Europe. A current [illegible], Cranfield University and the SEMTA [illegible] Sector" will continue to receive MOD [illegible], is seeking to follow the UK example by developing

[illegible] public opinion has significant potential to impact this sector, with a [illegible] to conduct operations. The UK will continue to pursue the concept of [illegible] with other nations.

[illegible] new technology to influence the sector remains. Techniques, such as super-critical fluid [illegible] processing, are likely to impact the feasibility of the recovery and recycling of munition components. [illegible] research programme to investigate the feasibility of "environmentally friendly" recover, recycle [illegible] technologies.

88.33 MEMS technologies and micro-detonics as applied to Electronic Safety and Arming Units (ESAU) and fuzing are promising areas of innovation, as is MEMS-based guidance in course corrected projectiles. Intelligent fuzing is seen as a key enabler for precision effects in the future.

88.34 **We will work with industry, across the General Munitions and Complex Weapons sectors, to identify joint investment routes for Intelligent fuzing concepts. We will also work with our international partners to ensure that existing fuzing standards do not act as an unnecessary barrier to the uptake of these innovative technologies.**

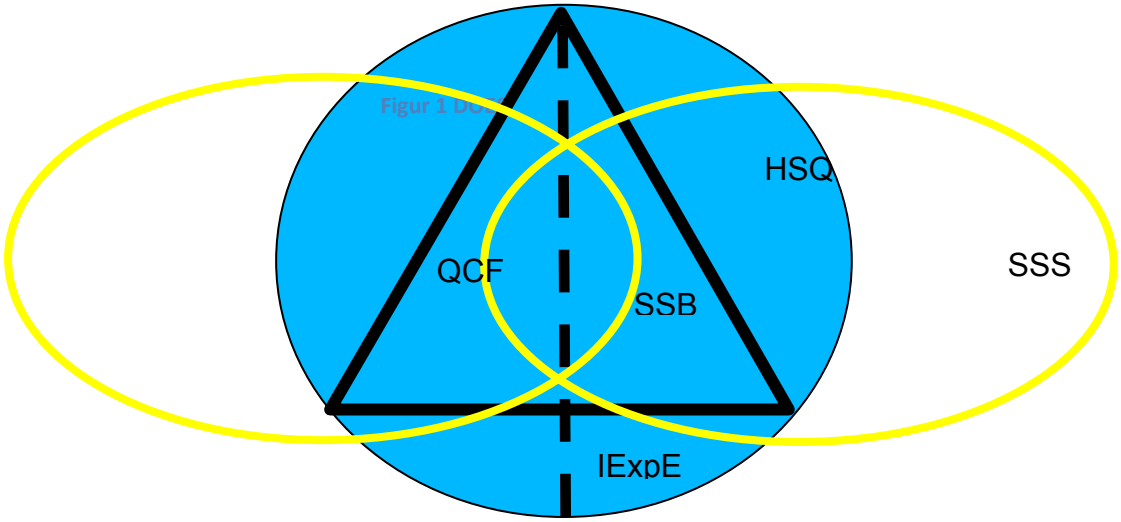
[illegible] PAL assembly and pack; PBX manufacture; LOVA Propellant design and development.
[illegible] Munitions with minimal environmental impact.

110 Defence Technology Strategy

MOD took further action in 2009 to mandate the NOS as best practice.

The Mission of the Institute of Explosives Engineers is "to promote the occupational competency, education and professional standing of those who work with explosives and provide consultative facilities for organisations and government departments within the explosives field" and it was absolutely clear to the Institute's Council that this important role had to be taken up along with the long-standing aspiration to become a truly professional body within the Engineering Council of the UK.

This entity came into being as a partnership between IExpE and what is now Homeland Security Qualifications Ltd. Initially the IExpE funded one of their Council Members to explore establishing a permanent entity – to be known as the **D**evelopment **O**ffice for **E**xplosives **S**kills (**DOES**) – yet it was not until 2010 that the creation of the Sector Skills Strategy Group (SSSG) enabled the Institute to recruit a DOES Programme Manager to work permanently with all parties with a vested interest in taking the NOS for ESA into greater use.



"There is a danger of energetics expertise falling below critical mass in both UK and Europe. **A current initiative between MOD Defence Ordnance Safety Group (DOSG), Cranfield University and SEMTA Skills Sector Council on "Training and Education in the Explosives Sector" will continue to receive MOD support.** The EU, through a Leonardo da Vinci programme, is seeking to follow the UK example by developing European standards and qualifications."

K A CROSS MBE CEng FIExpE
Chairman
EUExcert UK

Education and Culture DG
Lifelong Learning Programme

This project has been funded with support from the European Commission. This publication reflects the views only of the author, and the Commission cannot be held responsible for any use which may be made of the information contained therein