Review of the Balance of Competences – Research and Development

Call for Evidence

Response from the National Physical Laboratory

July 2013

Impact on the national interest

NPL is the UK's National Measurement Institute (NMI)- with the remit to advance and develop measurement and standards infrastructure in the field of measurement by carrying out research, disseminating the outcomes and ensuring the uptake of the outputs by industry, academia and other stakeholders. It provides direct technical support and services for industry and its outputs serve to enable trust and assurance in measurements for trade and consumer protection. NPL's research activities are designed to accelerate innovation across many sectors such as healthcare, advanced manufacturing, energy, and the environment using its capabilities in the physical sciences.

NPL represents the UK internationally and, in particular, where coordination of measurement science resources across national boundaries need to be pooled to address major challenges.

The global network of National Measurement Institutes is arguably the largest coordinated scientific ecosystem in the world and the UK benefits from being a developer and user of the infrastructure that supports this ecosystem. There is a clear need for research to develop the science and technology to advance the standards that underpin innovation, regulation and trade.

NPL undertakes research on a national and international level. It has been involved in 20 winning consortia during the period 2010 – 2013 for FP7. However, in our response to this consultation we will provide evidence based on our experiences within the European Metrology Research Programme (EMRP), a research and innovation partnership conducted jointly between the EU and Member States.

NPL was instrumental in the formation in 1990 of the European Association of National Measurement Institutes (EURAMET) an association of 37 European members that recognised the need to develop the measurement infrastructure on an international scale through scientific research, standardisation, providing scientific services, and international liaison.

The societal, technological and economic drivers to modernise the scientific metrology base, and enable it to have a much broader impact, was one of the main reasons for the European Metrology Research Programme (EMRP) that was conceived in 2007. It included three main actions:

- Pooling European excellence in metrology research,
- Opening the system to the best science, and
- Capacity building across the Metrology ERA especially in those NMIs with limited metrology research capacity

The relevant ministries in 22 countries collectively made a commitment to coordinate at least EUR 200 million of their dedicated NMI funding to the EMRP for a seven year period, matched by a EUR 200 million co-funding contribution from FP7. The EU Parliament and Council formally initiated the EMRP in summer 2009.

Since 2004, the government funding to NPL has declined in real terms by 30%, leading to a reduction in investment in science programmes. Since EMRP began, over half of this decline has been recovered through participation in EMRP, meaning that the targeted funding by the EU has played a major part in ensuring NPL can continue as a world leading measurement institute. This has been achieved without compromising the independence of the existing UK programme; a pre-requisite for participation in an EMRP project is that it must align with national priorities.

---

1. Where has EU action had a positive impact for the UK on research, technological development, innovation or space? What evidence is there for this? Has EU action encouraged national action in any areas?

The European NMIs, of which NPL is a leading player, have a long tradition of bilateral cooperation in scientific metrology and in 1987 they established EUROMET, the first pan European cooperation on measurement standards. The membership gradually expanded until it encompassed over 30 countries plus the Joint Research Centre.

During the 5th EU Framework Programme, EUROMET studied the options for closer cooperation between the NMIs in Europe. The introduction of the new ERA-NET Coordination Action instrument in FP6 offered the opportunity to implement the study conclusions and a three year ERA-NET involved 14 NMIs, the JRC and some national Ministries was launched. The overall aim was to prepare for an ongoing programme of metrology research to be undertaken from 2007 onwards under Article 169 of the EU Treaty (now Article 185 TFEU). The main outcomes were a single legal structure (EURAMET e.V.4) and an Outline for the EMRP Programme. (Article 185 encourages the joint implementation of national programmes in order to reduce fragmentation, ensure better use of scarce resources and promote exchange of information and good practices).

The EMRP was one of four initiatives identified in FP7. EURAMET, supported by 21 countries, the JRC and a €21 million co-funding contribution from the Community launched a single call under which 21 research projects were funded in 2008 at a total value of €64 million. Most of these are now completed and some case studies have been produced.

Adoption of EMRP as an Article 185 initiative was confirmed by the Commission in December 2008 and the Decision by Parliament and Council was published in the Official Journal in September 2009. This covers the period from May 2009 (start of the 1st Call for joint research projects) to the end of 2017 (completion of projects from the 5th Call). The UK has committed over 10% of its National measurement budget to support EMRP.

Within EMRP, the UK measurement community is now participating in 77 Joint Projects, of which the UK is leading 30, with a direct contribution from the EU of over £20m. At its peak, this equates to 28 scientific jobs at mid- career level, all of whose output is internationally competitive or better. Without the EU contribution through the EMRP, these jobs would be lost to the metrology community.

EMRP also provides for strengthened links between NPL and the academic community. Direct funding to researchers is possible through the Researcher Excellence Grants, of which the UK has been awarded 46. This equates to 20 senior academic roles, on average. A further scheme encouraging researchers to temporarily work at a different institute has attracted £5m of investment.

The remit of EMRP is entirely consistent with the strategy for the National Measurement System, as set by the National Measurement Office of BIS. The strategy broadly focusses on:

- Leadership in measurement – application of measurement to trade, healthcare, security and environmental legislation
- NMS infrastructure – standards and services to the private sector backed by high quality science and technical expertise
- Responding to National Challenges – new capability developed in partnership with business, universities and the world measurement community.

The National Measurement Office maintains a national programme reflecting national priorities. Whilst national priorities take precedence over those at a European level, as the EMRP programme matures, it is evident that there is a greater congruence between the national and European programmes than was hitherto recognised. For instance, whilst research into offshore renewables has only limited appeal across Europe, research into, for example, metrology to support improved radiotherapy, pan-European trade in Liquid Natural Gas or biofuels and meteorological measurements to support climate change modelling have a common requirement across Europe. Consequently, projects which would have been fully funded from the national programme can now be funded at a fraction of the cost through EMRP, the implication being that NPL can now meet a wider range of the UK's business requirements that otherwise could not have been supported through NMS funding alone.

The mid-term review of EMRP concludes that "The focus on the grand challenges (energy, environment, health, Industry, new technologies) and coordination and integration of metrology research programmes are widely regarded as key success factors of the EMRP" and "the EMRP's generally high quality of governance and management through transparent and effective process, the efficiency and effectiveness of coordination, the significant pooling of financial and human resources, the modernisation of the system also by focusing on new technologies and the increased profile of Europe as a global leader in the in metrological field".
(http://ec.europa.eu/research/evaluations/pdf/archive/other_reports_studies_and_documents/mtr_report_final.pdf)

In summary, EU support for this programme has had a positive impact for the UK. Research is producing a growing body of scientific knowledge and technical expertise which is being transferred

to UK businesses, many of whom recognise the importance of EMRP. This is evidenced by their participation in the programme as collaborators and stakeholders, which for the projects that are currently active, number over 150.

Without this support, NPL would only be able to conduct research into a fraction of its current activity; ultimately this would drive UK business to seek solutions offshore resulting in a knowledge gap between NPL and its European counterparts.

To conclude, the research and innovation partnership between the EU and member states, enabled by Article 185, we believe to be an outstanding example of a successful EU action.

2. Where has EU action had a negative impact for the UK in these fields? What evidence is there for this? Has EU action prevented potentially useful national action in any areas?

We have no evidence of negative impact for the UK in the field of metrology.

3. How and where has UK engagement with partner countries or international bodies, both within and outside the EU, been helped or hindered by EU involvement?

Within the EMRP projects, NPL is partnered with over 200 independent organisations in over 30 European countries. (The status of partner means that the organisation is a signatory to the contract, therefore it represents a serious commitment to the project). It is inconceivable that NPL could engage in collaborative research on this scale with such a large body of expertise within the funding provided by the National Metrology System.

4. What benefits or difficulties has the objective of a European research area (ERA)25 delivered for the UK?

As noted above, the EMRP programme falls within the scope of the ERA and the benefits noted in the answer to Q1 are largely as a result of the ERA.

5. How has the EU sought to coordinate the policy instruments at its disposal across different policy areas to create an enabling environment for researchers and innovators? How successful has this been?

EU policy instruments operate at a higher level than EMRP, although they have provided the environment in which the EMRP can operate. It is worth noting that one of the advantages of EMRP is that the EU has permitted the metrology providers themselves, through Euramet, (although still accountable to the Commission), to set the research agenda and provide Programme administration. The administration of the programme is conducted through an independent group based at NPL. Advice is taken from business stakeholders in the definition of potential projects and the selection of successful projects.

Future opportunities and challenges

6. What could the EU most helpfully do to promote scientific and technological progress and innovation (including in the space sector)?

- How could the EU use its existing competence differently to deliver more in your area?

- How might a greater or lesser degree of EU competence deliver more in your area?

- How could improvements to existing EU activities make them more effective and efficient?

On 10th July 2013 the EC confirmed their intentions to proposing EU funding for research and innovation partnerships with the private sector and Member States under Horizon 2020. See http://europa.eu/rapid/press-release_MEMO-13-669_en.htm?locale=en . As part of this announcement, the Commission proposes to establish four Joint Programmes with EU Member States to help member states to integrate and coordinate their own national research programmes to ensure better use of resources. One of the Joint Programmes is the European Metrology Programme for Research and Innovation (EMPIR) a follow on programme from EMRP. EMPIR will have a total value of €600m equally shared by the EU and participating Member States and will deliver projects within 7 call cycles during the period 2014 – 2023.

Improvements planned for EMPIR include a greater focus on capacity building for NMIs in developing economies, mechanisms to increase exploitation and innovation and wider participation through an increase in direct funding to academia.

7. Where might future EU level action be detrimental to your work in this area?

We have no evidence of future EU actions that would be detrimental to this area.

8. Where might action at national rather than EU level be more appropriate / effective?

There is currently an appropriate balance between national and EU action in the field of metrology. NPL does not undertake any work that is not in the national interest and there are mechanisms in place to ensure that. Where it is more beneficial (for reasons of value for money, resource utilisation etc.) NPL may submit a requirement for research to EMRP and compete in collaboration for funding. This ensures that NPL does not need to participate in a European research project that is not in the national interest.

9. How could EU and national policies and funding streams interact better?

We believe that the level of interaction between EU and national policies and funding streams is already an exemplar in what might be achieved. The improvements planned in the EMPIR programme (see Q6) will further strengthen the EU metrology community and its support to EU business.

10. What impact would any future enlargement of the EU have on this area of competence?

The EMRP programme has readily accommodated new entrants, as the EU has enlarged. From the original 21 members in 2007, Hungary and Poland joined in 2009. For the successor programme to EMRP, Bulgaria, Croatia, Greece , Ireland and Serbia will also participate.

11. Are there any other points you wish to make which are not captured above?