IOP Institute of Physics

The European and UK Space Agencies

Institute of Physics submission to a House of Commons Science and Technology Committee inquiry

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19 April 2013

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The Clerk
Science and Technology Committee
House of Commons
7 Millbank
London SW1P 3JA

IOP Institute of Physics

Dear Dr McGinness,

The European and UK Space Agencies

The Institute of Physics is a leading scientific society. We are a charitable organisation with a worldwide membership of around 50 000 working together to advance physics education, research and application.

We engage with policymakers and the general public to develop awareness and understanding of the value of physics and, through IOP Publishing, we are world leaders in professional scientific communications.

The Institute welcomes the opportunity to respond to the House of Commons Science and Technology Committee inquiry into the European and UK Space Agencies

If you need any further information on the points raised, please do not hesitate to contact us.

Yours sincerely,

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Vice-president, Business and Innovation

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Director, Membership and Business

IOP Institute of Physics

The European and UK Space Agencies

1. What are the strengths and weaknesses of the funding, organisation, and work of the European Space Agency ?

1. The European Space Agency (ESA) operates with a clear mission-led focus and a structure that ensures buy-in from nation states and other space-related organisations. As a technical, rather than political, organisation, the ESA is able to concentrate on the issues which are essential to achieving its objectives.

2. Its key strengths are its leadership and mode of governance. Through a member-based structure, the ESA is able to bring together different aspects to create a stronger whole. For example, the UK's strength in small satellite production and space science enables it to contribute to these programmes within the ESA at a high level, and to benefit at a similar level. Within this arrangement, stability and commitment in funding through multi-year plans agreed with member states results in well-defined projects and measurable outcomes of projects and programmes. The dependence of the ESA on the funding decisions of member states could be seen as perhaps a weakness as well as a strength. But this in many ways is mitigated by strong technical leadership within the organisation and the high-level agreement of long-term arrangements.

3. The ESA's ability to leverage the strengths of its member agencies allows it to deal as an equal with larger and perhaps better equipped space agencies such as a NASA and the Russian Space Agency. These relationships, along with the ESA arrangements with other national spaces agencies, such as the Canadian, Swiss and Norwegian agencies, also means that ESA is well-placed to offer contract services to other nations.

4. One of the drivers of the ESA's success is its geo-return policy (*juste retour*) which enables the nation states to retain a focus on their chosen areas – for example, stronger domestic industries, government priorities or academic strengths – confident that the ESA will reward them with equivalent value in contracts. The ESA also enables member states access to expertise and experience not necessarily available domestically. For example, Belgium has no distinct 'space agency', but instead funds the ESA directly and allocates its share of *juste retour* monies to companies and sectors it feels are beneficial to its national economy. This method of allocating funding does increase the overall cost of ESA missions but has shown success in connecting with different priorities of national governments over many years.

2. In light of the European Commission's recent Communication on relations between ESA and the EU (COM 2012 671), what relationship between ESA, the EU and the UK would provide the most effective governance regime ? Why ?

5. The relationship between the ESA and the European Commission is complex and it should be noted that the ESA, and European space science and technology in general, is succeeding under the current governance arrangements. For example, programmes such as the Galileo Navigation System have been successfully developed and deployed though a partnership between the ESA and a number of other European and national agencies. Indeed, it may be that some of the current tensions could be avoided with a clearer statement on the future management arrangements for Galileo and the roles of the European GNSS Agency (GSA).

6. The ESA is a technical operation that operates within a narrow scope. The focus that can result from what is essentially a single-mission agency should not be lost within an understandable enthusiasm to centralise the European science landscape. While closer collaboration with other European science programmes, particularly the Horizon 2020 programmes, will undoubtedly generate some advantages and efficiencies, this may well also have a cost.

7. Under the current governance arrangements, the space agencies of member states have a clear and direct influence of the direction of the ESA. This model, combined with the recent introduction of the UK Space Agency (UKSA) has benefited the UK. The UK's strength in telecommunications and small satellite technologies has allowed it to take a lead in this area within the ESA. The recently secured funding for the ISIC in Harwell, and the decision to base new telecoms satellite monitoring headquarters in the UK is a vindication of this approach[1] and an illustration of the advantages to the UK of the current governance structures.

3. How effective is the EU's support for research and innovation in the space sector? What effect have changes to the Multiannual Financial Framework (MFF) had on ESA and support for the space sector from the Horizon 2020 programme?

8. It is too early in the cycle of the MFF to make a clear judgement on the effects of changes to the budgets of European space science and technology, and it should be noted that the way in which the ESA is funded – though multi-year contributions from member states directly, rather than through central EU budgeting – will insulate it from such changes. At this stage it is possible that the proposed Horizon 2020 budget may be subject to a significant reduction over the spending period. But even if this is avoided, it is clear that there will be challenges ahead if European space activities are to maintain their current position. As with other international projects, it should ideally be the case that

[1] www.heraldseries.co.uk/news/10044791.Space_centre_investment_sees_100_new_jobs

the ESA budget should have long-term stability as far as possible given the funding pressures on all research budgets. Its role in the global space science and technology communities requires that it is seen as a 'reliable partner', able to engage confidently on the timescales scales required for launches and their longer term developments that typically take years and in and in some cases decades.

4. How effective has the UK Space Agency been and what improvements could be made ? Is the UK effectively exploiting opportunities for growth in the space sector or could more be done ?

9. Since its establishment in 2010, the UKSA has been working to bring together many disparate fields and cultures under a single umbrella. The transition of some areas of administrative and governance functions to the UKSA areas has not been simple or smooth, and there remains work to be done to ensure that relationships between UKSA and closely-related research councils such as STFC and NERC, and their respective academic communities, are maintained and strengthened.

10. However, the rationale for the creation of a UK space agency has not changed. A single focal point, nationally and internationally, will enable a more coherent space science and technology sector within the UK, and allow the UK to punch its weight with international agencies, particularly within the ESA. The recent announcement from the ESA to locate its tele-communications hub in Harwell is a very positive sign.

11. Additionally, when talking about the ability of the UK to exploit and build on the strength of its space sector across the broader economy, the role of the ESA and the need for a strong, central UK voice should not be neglected. Judicious allocation of *juste retour* (understanding the roles of SMEs) and other intangible benefits, and more specifically, working to ensure that ESA's focus is closely aligned with the sectors in which the UK economy has strength, will be essential.

12. The UKSA is still very much a new organisation, building on the work of the previous British National Space Centre (BNSC), and the establishment of a steering group that embraces a range of larger companies and stakeholders within the leadership function of the UKSA was a welcome development. There is a concern that, if the UK economy is to fully benefit from the investment through both the UKSA directly, and also through the ESA programmes, greater use should be made of smaller companies in the supply chains and enabling technology sectors such as photonics. While the space sector is a significant contributor to the UK economy[2], and has been identified as one of the key technologies to bring the UK economy back to growth, such strategies should take account of these technologies and businesses. The

[2] The Impact of Space Derived Services and Data, Oxford Economics 2009 http://www.parliamentaryspacecommittee.com/media/publications/The%20Case%20for%20Space.pdf

space sector does not exist in a vacuum and a strong, broad industrial base is essential to ensuring that the UK can involve itself in high-value supply chains.

13. As it develops, we would look to the UKSA to bridge some of the gaps that have been apparent in the past between space technology and research. It is currently the case that, broadly, the ESA will undertake technical programmes while the national science agencies will take on the data analysis and research. This differs from the approach taken by, for example, NASA which will typically support both the mission and the exploitation of the data produced. There have been recent cases where UK researchers have been involved at a high level in the design and commissioning of ESA programmes, but were unable to access the results of the missions due to funding not being awarded by domestic research councils. For a split arrangement to be efficient and functional, the UKSA and the ESA must work with domestic agencies at an early stage, on the understanding that any UK research council funding will be awarded on a competitive, peer reviewed basis.

5. Does the UK get good value for money from its membership of ESA ?

14. It is clear that the UK receives a significant proportion of what it invests in science back through ESA contracts that support high-technology companies. This, together with the opportunities that such high-level, high-technology international collaborations bring suggests in fact that the UK receives a significant return on its investments. For example, investment through the Advanced Research in Telecommunications Systems (ARTES) has been reported to have produced returns of 7:1.[3]

15. As such, the questions should perhaps instead be : How does the UK's return on investment compare to that in other countries ? And how well does the UK steer this reciprocal investment to best grow its space-related economy ? These are areas that the committee might consider.

16. The ability of the UKSA to drive the ESA into areas where the UK has strength is important, but also important is the strength of the broader UK science and technology base, and the capability of it to 'absorb' this investment. The recent strategies for the space sector have been an advantage and they are long-term ventures requiring a long-term commitment from government will be required if the UK is to keep pace with European competitors.

6. How resilient is the UK's space-based infrastructure ? Are threats from space debris or solar activity being appropriately mitigated ? What role do, or should, ESA and the UK Space Agency play in addressing these issues ?

[3] http://www.publications.parliament.uk/pa/cm200910/cmselect/cmbis/173/173.pdf

17. At the ESA ministerial council on November 2012 the UK agreed to invest £6 million in the ESA Space Situational Awareness programme which retains a focus on monitoring developments in space debris and space weather, and links closely with other national and international programmes[4]. At the same meeting the programme's mandate was extended to 2019[5]. This was a welcome extension of the UK's role in the programme. The UKSA Space Leadership Council includes members from the MOD, DfT and the BIS, and is well placed to advise on all aspects of space weather.

[4] http://news.bis.gov.uk/Press-Releases/UK-secures-1-2-billion-package-of-space-investment-683b9.aspx
[5] www.esa.int/Our_Activities/Operations/Space_Situational_Awareness/About_SSA

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