

**INNOVATION, UNIVERSITIES, SCIENCE and SKILLS SELECT COMMITTEE**  
**“PUTTING SCIENCE AND ENGINEERING AT THE HEART OF GOVERNMENT**  
**POLICY”**

**SUPPLEMENTARY EVIDENCE from the**  
**ROYAL ASTRONOMICAL SOCIETY**

1. The Royal Astronomical Society (RAS), founded in 1820, encourages and promotes the study of astronomy, solar-system science, geophysics and other closely related branches of science. The RAS organises scientific meetings, publishes international research and review journals, recognises outstanding achievements by the award of medals and prizes, maintains an extensive library, supports education through grants and outreach activities and represents UK astronomy nationally and internationally. The Society has more than 3000 members (Fellows), including scientific researchers in universities, observatories and laboratories as well as historians of astronomy and others.
2. The RAS is pleased to offer the Committee supplementary evidence on this important topic. It follows the four points listed in the Committee’s call of 24 March 2009.
3. Without having had time to consult its Fellowship widely, the RAS is unable to offer a firm view on the value of a discussion on the balance of investment in science. However, it is clear that to be of lasting value such a discussion should be open and inclusive, and should lead to general conclusions and recommendations.
4. The government decision making process which would follow such a debate should be open and transparent, and the reasoning behind the strategies adopted should be made public. The RAS endorses the five key principles set out in Lord Drayson’s speech to the Royal Society and would suggest that what follows from those excellent principles is not that UK science funding should “favour those areas in which the UK has clear competitive advantage” but that it should favour those areas that are essential for the development of UK science and particularly those in which the UK needs to be competitive in the long term. The implications of adopting a strategy aligned to Lord Drayson’s proposals could be profound for some sectors of UK science.
5. It can also be argued that a top down approach to science funding is at variance with the Haldane principle. Funding scientific research is not like investing to win Olympic medals, where specific short-term objectives can be set and achieved. Science advances on a broad front and has indefinite horizons. Short-term strategies tend to be backward looking and targeted funding does not guarantee success when the goal is to be ‘ranked no1 or no2 in the world’. It is surely better to concentrate on funding excellence and on ensuring that the funding is sufficient to achieve the ambitious goals that should be set.

6. As stressed in many speeches, “it is vital that we maintain our investment in pure, fundamental science”. This most certainly applies to astronomy and astrophysics, which is an area of enormous public interest (as clearly witnessed by the global success of the current International Year of Astronomy), attracts young people at all levels into science (and not just astronomy), draws on a wide range of scientific disciplines, has a superb record of technical innovation and, above all, is an area in which the UK continues to excel.
7. It is generally agreed that the UK ranks 2<sup>nd</sup> or 3<sup>rd</sup> in the world in terms of scientific output in astronomy and space science, measured by papers, citations, or citations relative to GDP. It is also generally agreed that the UK spends less on this research than comparable countries such as Germany, France, and Italy, although obtaining accurate and reliable data is complicated by different national structures and funding methods, and mundane issues such as exchange rates.
8. Astronomy is a global activity, facilitated by large multinational collaborations such as the European Space Agency or the European Southern Observatory, of which the UK is an important member. These collaborations give UK innovation and businesses access to world-wide markets at the cutting edge of technology. Examples include e2v Charge Coupled Devices (CCDs) and other imaging devices, which are used by all major collaborations and space agencies, Surrey Satellite Technology and EADS-Astrium, a major player in the world satellite business.
9. Data handling, storage, management and access are areas of growing importance in all fields, and astronomy is no exception. The international astronomical community is developing advanced tools through the Virtual Observatory (and the UK AstroGrid project) with the goal of making the world's huge astronomical data banks transparently useable, in just the same way that the World Wide Web makes documents all over the world feel part of a single interlinked system. This has implications which stretch far beyond astronomy or even scientific data.
10. In terms of Lord Drayson’s “three criteria” it can be stated that in astronomy and space science
  - The UK already has a competitive advantage, through the continued excellence of the people attracted into the field and judicious past investment;
  - The growth opportunities both at home and within the collaborations such as ESA and ESO are considerable, and the potential benefits to UK technological development (including IT) are very significant;
  - The UK is already in the top group of the “astronomy premier division” and can realistically expect to maintain this position given the necessary funding priorities.

11. In summary, therefore, the Royal Astronomical Society

- Is in favour of an open, inclusive and independent debate on the balance of funding in science;
- Urges a transparent presentation of the government decisions which flow from such a debate;
- Stresses the importance of the Haldane principle, the focus on excellence, and the maintenance of investment in basic science, which underpins all science and without which the long term vitality of the science base would be undermined;
- Is concerned that a narrow focus on “economic impact” could result in funding being diverted to meet short term priorities, to the detriment of basic science and long term growth;
- Notes that the UK is already well placed in astronomy and space science to meet Lord Drayson’s three criteria;
- Recommends accordingly that astronomy and space science must be seen as priority areas for increased funding within the envelope of basic science funding.