Science and Technology Select Committee: inquiry into Satellites and Space: request for input into RAS submission

Response from the National Oceanography Centre, the UK's premier centre for ocean science from coast to deep ocean, www.noc.ac.uk prepared by Dr Christine Gommenginger, Dr Paolo Cipollini and Mr Stephen Hall – any queries please contact Hall on sph@noc.ac.uk
The UK ocean science community is a long-standing user of satellite data with a global reputation for deriving information of benefit to science, society and economic growth.

On 14 December the Government published its National Space Policy document. The next day, Major Tim Peake became the first UK astronaut to join the International Space Station. Against that background, the Committee is launching an inquiry into Satellites and Space, to inform the Government's promised UK Civil Space Strategy in 2016. Satellite technology is one of the 'Eight Great Technologies' identified by the Government in 2013. The Committee welcomes written submissions by Friday 29 January 2016 on the National Space Policy and the following issues:

1. What satellite-based capabilities should the Government particularly support — telecommunications, navigation, earth observation, space science, or others — and how?

1.1 The National Oceanography Centre (NOC) has a keen interest in satellite-based capabilities, particularly Earth Observation, which forms an essential component of the global ocean observing system needed to understand and monitor ocean and environmental changes. NOC also uses services from Navigation and Telecommunications satellites to support its scientific research activities with advanced communication and positioning capability. While Telecommunications and Navigation satellites clearly offer promising market and growth opportunities, UK investments in Earth Observation are perceived to be at risk, possibly because the benefits of Earth Observation to the UK are more subtle and can be easily overlooked. Yet, Earth Observation serves a multitude of needs and users: it stimulates innovation in scientific research and the upstream space industry, contributes to national good through improved public services, provides opportunities for economic growth in the upstream and downstream sectors, and fosters international cooperation. A good example of the wide-ranging benefits of Earth Observation is found in global sea level observations from satellite altimeters, which support ground-breaking scientific research on global, regional and coastal sea level change, deliver essential data for ocean forecasting and coastal flooding management and underpin various commercial services. As we enter the era of quasi-unlimited free data from the EU Copernicus Sentinels, the UK should strengthen its national activities in Earth Observation to ensure it can reap the rewards of its investments. There is an urgent need to strengthen the arguments in support of long-term UK investments in Earth Observation by quantifying the financial value of Earth Observation to the UK - accounting of course for its ability to yield competitive advantage and economic growth, but also including the financial value of the wider scientific, public and societal benefits and impact it delivers.
1.2 An additional area of ocean-related satellite capability comes from the requirement to police the growing number of very large Marine Protected Areas (MPAs) that the UK is designating around British Overseas Territories in the Atlantic (Ascension, South Sandwich islands and South Georgia), Indian Ocean (British Indian Ocean Territory) and Pacific (Pitcairn). More large MPAs can be expected in future. To patrol these very large areas without using ships or permanent staff in the region requires the use of high quality remote sensing systems based in space that are able to identify illegal marine operations such as fishing, dredging and mining, with sufficient temporal and spatial definition to allow identification of perpetrators and allow time for intervention. This ties-in closely with defence-sector requirements such as marine spatial monitoring, anti-submarine surveillance and high-bandwidth video links for autonomous and unmanned vehicle operations. It would be helpful to encourage closer links between the marine environmental protection community and defence-sector specialists to foster knowledge exchange, transfer of best practice

and build upon the common needs of both communities, especially in exploring how to link the use of autonomous or remotely-operated patrol platforms (surface vehicle, submersibles and aircraft) with shore-based command and control via real-time and near real-time satellite links.

2. What steps should the Government be taking to build markets for both new satellites and the 'space services' that they provide (such as space-based internet services or high resolution imaging)?

The future success of new satellites and "space services" depends on their ability to address the needs of users and markets looking for new data, products and capability. Careful analyses of these needs and of UK strengths in the context of international competition are essential. This requires excellent national capacity assessment and coordination, the enunciation of clear national priorities and long-term commitment by government (5+ years budget lines instead of annual). The UK Space Agency is well placed to perform the national coordination role to help 1) identify national strengths in academia, government and industry, 2) commission analyses of users needs and market opportunities, and 3) consult UK academia, government agencies, public bodies and private sector to identify and set national priorities and opportunities.

3. What is the impact of the current UK regulatory environment on growth in the satellites and space sector? Is it conducive to new players, such as SMEs and start-ups, entering the market? Has the regulatory environment kept pace with innovations in satellite/space technologies?

3.1 NOC has limited experience of the UK regulatory environment on growth in the satellites and space sector and prefers not to comment.
3.2 However there are examples of international regulations where globally-agreed reforms would be helpful to the sector. For example when operating marine autonomous or remote-controlled systems within the waters of some nations, the use of satellite based communications is either illegal or highly restricted. This prevents the use of state of the art systems that requite regular two-way communications back to shore base or mothership. It would be helpful for the UK to encourage global open access to satellite communications for scientific uses.

4. What mechanisms are needed to encourage investment in UK space and satellite technology, and improve access to finance?

Space and satellites are capital intensive and high-risk ventures. Unless economic returns are clear-cut and supported by a viable business case, there is understandable reluctance by the private sector to invest. This is particularly true for Earth Observation where benefits are not immediate and often indirect (see response to Question 1). This is where government intervention can play a key role, by helping to identify national strengths in the context of international competition and opportunities, and by sending out clear signals about national priorities and long-term commitment.

5. Is the Government striking the right balance between national and European/international endeavour?

The UK is a major player in the European Space landscape, where it engages in large challenging projects thanks to international cooperation via the European Space Agency (ESA), the European Union (EU) and EUMETSAT. In Earth Observation, the UK has benefited over the past two years from markedly improved national coordination and clarity of purpose, which helped to strengthen the UK voice and its impact within ESA, the EU and EUMETSAT. While UK investments through

European endeavours is gradually becoming consistent with the UK position as 2nd strongest economy in Europe, the level of national investments in research in the UK remains very challenging. Academic research in the UK is being hit particularly hard by the shortage of funding from Research Councils to support the type of cross-disciplinary research relevant to Space and Satellites.

6. What are the key challenges facing the Government and industry in developing and implementing new space capabilities and services? What are the technical barriers to further growth in the sector, including the lack of a UK launch capacity?

Given the existence of several competitively-priced launch services worldwide, NOC does not see the lack of UK launch capacity as a barrier to growth. Developing UK launch capacity will require significant investments and will need to be supported by sound evidence that there is a viable market with sufficient sustained demand to recoup the initial investments. However we note the existence of UK-based initiatives such as the 'Skylon' single-stage-to-orbit system using the innovative 'Sabre' engine and appreciate that if this technology became commercially available, it could offer reduced costs to reach orbit and encourage technology innovation. Commercial low orbit spaceflight emerging from passenger operations along the lines of Virgin Galacgtic may also offer new opportunities, especially if proposals for a UK launch and recovery facility become reality.

Key challenges to growth include: gain knowledge and understanding of UK strengths and capabilities; provide support to identify user needs and market opportunities in an internationally competitive market; provide clear statements about national intent and priorities and long-term government commitment; overcome the reluctance by industry to engage in new capital-intensive high-risk space ventures, particularly in areas where benefits are deferred and indirect (like Earth Observation).

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