

UK Space Agency input to the open data consultation.

Overall:

The UK space agency supports a number of programmes where data is acquired using public funds, often managed by European Space Agency (ESA) or the European Commission (EC). On publicly-funded space programmes, the agency is generally supportive of open data principles in order to stimulate innovation and growth. In some cases programmes also need to be mindful of threats posed to security through unchecked access, notably some Earth Observation (EO) programmes and Space Situational Awareness programmes (SSA). The UK space agency suggests that in considering the need to maximise enterprise and market making in the use of Open data, the transparency and open data strategy will also need to consider security issues.

The government can stimulate enterprise and market making in the use of open data by supporting appropriate investments to ensure that UK businesses and entrepreneurs can easily access and manipulate data, transforming them into marketable and exportable products and services. Previous investments in the International Space and Innovation Centre (ISIC) support this access and investments as part of a proposed Space TIC and to support a facility for Climate and Environmental Measurement from Space (CEMS) are also under discussion. The government also has a role in ensuring public and private sector users make best use of the data available, driving efficiency and innovation, and users need to be supported in doing this. The UK Space agency GIFTSS (Government Information from the Space Sector) programme is an example of such support.

For some science programmes there may be a period, immediately following the launch of a mission, where the lead scientist has a period of exclusive access to the satellite data before these data are made accessible to the broader community or where scientists 'win' exclusive access to mission data until they have published their first scientific results.

Earth Observation:

EO satellites circle the Earth acquiring a range of different measurements about the Earth's Oceans, Land and Atmosphere. ESA are developing and operating a range of one-off missions addressing specific environmental research questions. These data are primarily used by the Environmental Research community, and increasingly by the value-adding downstream sector which generate products and services using these data. The UK space agency encourages the maximum uptake of these data, primarily directed at the environmental research community, and ESA operate a policy of free and open access to data from their programmes.

The UK is a member of the Group on Earth Observations (GEO) which coordinates efforts to build a Global Earth Observation System of Systems, or GEOSS. GEO was launched in response to calls for action by the 2002 World Summit on Sustainable Development and by the G8 (Group of Eight) leading industrialized countries, and supports the principle of open data sharing.

The Global Monitoring for Environment and Security programme is a joint ESA/EU programme to provide Europe with an independent, autonomous environmental monitoring capability drawing largely from data from EO satellites. The data and information policy for this programme has not been agreed. The UK space agency supports the principle of a free and open data policy for the GMES satellites to maximise uptake of data and services, both in the environmental sector and for general public, and to stimulate enterprise and growth in the downstream sector. In the space sector we have recent evidence to support the fact that there are real benefits in investment in EO¹ and considerable potential in the downstream sector to realise such growth².

We also recognise that there is potential for such freely available data to be misused, when GMES is operational it will be important to monitor data uptake in order to pick up any trends which may suggest misuse. Recognising that timeliness and resolution present the highest risk variables, the UK space agency has proposed that the definition of a data policy should differentiate between GMES services which require rapid access to GMES data and those that don't. The commission should also consider building algorithms into the data management standards to monitor usage across all data types, (incl "rapid access" data). Governance should then be set up to address any issues of concern that may be flagged by the monitoring process.

In addition to realising growth in the downstream sector, the GMES programme should not adversely impact the competitiveness of European commercial data providers as they contribute to GMES services. In practice this means (1) GMES should not develop sentinel missions which directly compete with privately-funded European missions (2) adequate licensing schemes should be set up with commercial data providers (where their data is a key input to GMES services) to avoid withdrawal of private investment in those space infrastructures.

Space Situational Awareness:

SSA is broadly defined as characterizing the space environment and its effects on activities in space, it combines positional information on the location of objects in Earth orbit using optical telescopes and radars, commonly known as space surveillance, with information on space weather and near earth objects (NEO). Military and intelligence SSA applications also include characterisation of orbiting objects in space and their capabilities, limitations, and intent.

SSA data can broadly be divided into two categories, that relating to the population of man-made objects in orbit about the Earth, and the space environment which those objects and the Earth reside within. Data on the objects tends to be classified for security or commercial reasons, although the United States, which operates a global SSA network, does release data on the majority of objects in orbit to the public. It is important to respect the security interests of our allies and to protect the

¹ OECD Space economy at a glance 2011

² Size and health of the space sector, A report for the UK space agency, Oxford Economics, October 2010

commercial interests of our industry in seeking to release SSA data more widely. Space environment (or space weather) is a natural phenomenon which is derived from a wide range of scientific instruments and by its nature is more freely accessible, both in terms of cost and availability.

Space weather is a range of natural space phenomena, originating far from the Earth, that create adverse environments for key technologies operating in space, in the atmosphere and on the surface of the Earth. The impact on advanced technologies is crucial as our vulnerability has grown over recent decades due to our dependency on these technologies.

There is a growing interest in SSA which is reflected in a number of new SSA initiatives both in Europe and elsewhere. The European Space Agency (ESA) has a preliminary programme running until 2012 to which the UK Space Agency has contributed 1M Euros, and for which proposals for an expanded Phase 2 are expected to be made at the ESA Ministerial in 2012. The European Commission (EC) is also considering initiating a programme, and there are on-going bilateral negotiations between various European nations and the United States.

SSA is an inherently international and cooperative venture: it requires a network of globally distributed sensors and data sharing between satellite owners and operators and sensor networks. SSA also forms the foundation of space sustainability as it enables safe and efficient decision making and operations, and promotes stability and transparency.

Given the range and diversity of users of space today, together with the increasing vulnerability of technological systems on the ground to space events, the stakeholder community is large and diverse. Clearly the overarching issues of long-term security of access to space must be a concern at government level. While many government departments certainly recognise that they are stakeholders, they would not generally see the implementation of SSA itself being within their remit. The Cabinet Office has perhaps the broadest view and recently added certain risks from space, notably space weather, to the national risk register and has responsibility for ensuring resilience of critical national infrastructure in relation to these risks. In case of risks materialising, and indeed before-hand, there is a need for rapid and accurate advice to the business, media and public. MoD clearly has strong interests in the military and environmental threats which arise to its own and allied space assets and to its own use of the space environment, and MoD already has many unique assets and capabilities which are important in the context of SSA. Other government stakeholders are DfT, DECC and BIS: aviation and ground transport can be affected by loss of GNSS services which can arise from, say, a major space weather event and similarly national power distribution systems could be upset leading to power cuts. Loss of access to meteorological, broadcasting, navigation, communications or environmental satellite services could have major economic impacts.

However, SSA stakeholders are wider than government departments, reaching down through many agencies and businesses. Satellite operators may need warnings of

expected adverse space weather, as might power companies so that action plans can be implemented. Aviation authorities, airlines and pilots will need alerts to decide on the degree of radiation risk to aircraft, aircrew and passengers and whether to allow aircraft to take off. Satellite, aircraft and terrestrial system designers will need accurate information on extreme space environments so they can implement affordable engineering resilience measures. The public and businesses will require accurate information on any events that may affect their own lives and the technology they use (e.g. car GPS, satellite broadcasts or flights).

Robust data security and governance of SSA systems and data are key to ensuring the broadest uptake of capability and development of services while at the same time respecting security and commercial concerns. The UK Space Agency will work with other government departments to ensure that the emerging SSA capabilities developed at European level do not compromise the security of ourselves or our allies while at the same time ensuring that critical data is made available to relevant stakeholders in a timely manner.