Space Policy 32 (2015) 44–53

Contents lists available at ScienceDirect

Space Policy

journal homepage: www.elsevier.com/locate/spacepol

# Open data policies and satellite Earth observation

Ray Harris [a,*], Ingo Baumann [b]

[a] Department of Geography, University College London, Gower St, London WC1E 6BT, UK
[b] BHO Legal, Hohenstaufenring 29-37, 50674 Köln, Germany

ARTICLE INFO

*Article history:*
Received 20 March 2014
Received in revised form
15 January 2015
Accepted 15 January 2015
Available online 16 February 2015

*Keywords:*
Data
Open
Full
Free of charge
Data policy
Earth observation
Space

ABSTRACT

From the Heads of State of the G8 nations, the European Union, international organisations, through to national laws and policies, there is a strong momentum for full, free and open access to public sector digital data so that the benefits of public investment in such data can be maximised with as few barriers to use as possible. While open data for society at large is a relatively new phenomenon, the space sector has been accustomed to open data for all of its existence, especially in astronomy and navigation, but also in Earth observation. In the context of the open data debate, the purpose of this paper is to examine 21 policy and legal instruments concerning open data made by a range of organisations that in one way or another relate to Earth observation data and therefore contribute to the critical examination of the effectiveness of the open data movement. Based on these documents, the paper discusses common issues such as changing perspectives on the desirability of open data, commercial use, and licences and exceptions, and concludes that open access to Earth observation data requires more specification in order to clarify the conditions of access and so to realise fully the potential benefits.



## 1. Introduction

### 1.1. The momentum of open data

From Heads of State of the G8 nations, the European Union and international organisations, through to national laws and policies, there is a strong momentum for full, free and open access to public sector digital data so that the benefits of public investment in such data can be maximised. Public sector digital data have already been paid from public funds and therefore taxpayers should not have to pay twice for those data. The case for open data has often been made in science, for example in genetics[1] and in ecology.[2] At its General Assembly in 2014 the International Council for Science (ICSU) endorsed a report[3] that called for open access to data and to the scientific literature. In a speech in December 2011, Nellie Kroes, Vice-President of the European Commission responsible for the Digital Agenda in Europe, linked open digital data to the "new gold", and claimed that the direct and indirect gains across Europe through full and open access to public sector information will be of the order of €140 billion per annum.[4] A UK Royal Society report in 2012[5] estimated that open data were worth £25.1 billion (€30 billion) per annum to the UK economy in 2011 and that this will grow to £216 billion (€250 billion) per annum by 2017 as data become more integrated into the knowledge-based economy. The benefits of open access to data include an increase in the number of users, the attraction of new user groups exploiting the data, and an increase in the number and diversity of commercial applications, all together potentially leading to economic growth, new jobs, improved science, better governance, empowerment of citizens, and a greater ability to address societal or environmental challenges.

However, Janssen, Charalabidis and Zuiderwijk[6] from a survey of literature and interviews in the Netherlands have identified five

* Corresponding author. Tel.: +44 1483281368.
*E-mail addresses:* ray.harris@ucl.ac.uk (R. Harris), ingo.baumann@bho-legal.com (I. Baumann).

[1] Hayden E C, Geneticists push for global data-sharing, *Nature*, 5 June 2013.

[2] Reichman O J, M B Jones and M P Schildhauer, Challenges and opportunities of open data in ecology, *Science* volume 331, 11 February 2011, 703–705.

[3] *Open access to scientific data and literature and the assessment of research by metrics*, International Council for Science, Paris, 17pp, available at http://www.icsu.org/general-assembly/news/ICSU%20Report%20on%20Open%20Access.pdf, accessed 3 September 2014.

[4] Opening Remarks, Press Conference on Open Data Strategy, Brussels, 12 December 2011, European Commission – SPEECH/11/872. The text can be found under: http://europa.eu/rapid/press-release_SPEECH-11-872_en.htm.

[5] *Science as an open enterprise*, Royal Society Science Policy Centre Report 02/12, pp 104. The text can be found under https://royalsociety.org/uploadedFiles/Royal_Society_Content/policy/projects/sape/2012-06-20-SAOE.pdf.

[6] M Janssen, Y Charalabidis and A Zuiderwijk 2012 Benefits, adoption barriers and myths of open data and open government, *Information Systems Management* 29, 258–268.

http://dx.doi.org/10.1016/j.spacepol.2015.01.001
0265-9646/

myths on open data, relating to how the potential benefits may not be realised in practice. These five myths are the following.

1. The publicising of data will automatically yield benefits
2. All information should be unrestrictedly publicised
3. It is a matter of simply publishing public data
4. Every constituent can make use of open data
5. Open data will result in open government

The theme of these myths is that the availability of open data in itself does not mean that the data are used. This is the story of much of Earth observation data in the past three decades too. In the context of Copernicus,[7] Sawyer and de Vries[8] argue from a theoretical and empirical point of view that much practical work is needed to realise the economic benefits of open Earth observation data. The European Union, for example, therefore strongly supports the development of Copernicus downstream services and applications under its Horizon 2020 Programme.

### 1.2. Open data and Earth observation

While open data are relatively new for society at large,[9] some parts of the space sector have been accustomed to open data for all of its existence. Space-based astronomy in particular has always regarded open access to data as the norm. For the signals in the civil domain, the US provides worldwide access to its Global Positioning System (GPS) free of charge. Much satellite Earth observation data are open and free of charge, especially at medium to low spatial resolution.[10]

The open access debate is important to satellite Earth observation. For decades, the Earth observation sector has seen different views between those who want open data that are free of charge at the point of use in order to maximise the scientific and societal benefits of the data, and those aiming to create a commercial sector similar to satellite communications in which investment in operational systems is self-sustaining. National security and foreign policy considerations also play an important role.

### 1.3. Relevant definitions

While the debates on open data and the diverse policy and legal documents on the subject widely employ the terms *free, full* and *open*, these terms are not always used in a consistent manner. The Open Knowledge Foundation (OKF) is highly influential in open data developments and gives a valuable if lengthy definition of *open* access,[11] applying the definition to a wide range of content such as books, music and films; scientific, historical or geographic data; and government and administrative information. The short version of the Open Knowledge Foundation's definition of open data is as follows:

> "Open data is data that can be freely used, reused and redistributed by anyone – subject only, at most, to the requirement to attribute and share-alike."[12]

In the UK the Open Data Institute[13] (ODI) defines open data as:

> "Open data is information that is available for anyone to use, for any purpose, at no cost. Open data has to have a licence that says it is open data. Without a licence, the data can't be reused."

In Europe the European Union Open Data Portal[14] defines its open data as:

> "Data are free to use, reuse, link and redistribute for commercial or non-commercial purposes."

In relation to science data, the Panton Principles on open data in science have been very influential.[15] The Panton Principles are based on the assertion that:

> "By open data in science we mean that it is freely available on the public internet permitting any user to download, copy, analyse, re-process, pass them to software or use them for any other purpose without financial, legal, or technical barriers other than those inseparable from gaining access to the internet itself."[16]

The term *free*, thus, should be reserved for data that are free of charge because the term open already covers the meaning of freely available.

In line with the non-discriminatory[17] approach to open data the term *full* should mean that access to all the data and not just a part of the data is provided, unless restrictions are explicitly stated, for example for security or data protection purposes or in case of technical limitations.

The difficulty of using definitions that are not sufficiently precise can be illustrated for example by the claims for data from the Flock 1 constellation of miniature Earth observation satellites first launched in early 2014.[18] Planet Labs, the owner of the Flock 1 constellation, claim that:

> "We will operate the world's largest fleet of Earth imaging satellites to frequently image the entire planet and provide open access to that information."[19]

Elsewhere in its summary of Flock 1 data, Planet Labs specifically refers to open data, but later they also summarise their strategy:

> "The best way to tap into the full potential [of the Flock 1 data] is to make it universally accessible with affordable pricing",

[7] Copernicus, previously known as GMES (Global Monitoring for Environment and Security), is the European Programme for the establishment of a European capacity for Earth Observation, http://www.copernicus.eu.

[8] *About GMES and data: geese and golden eggs: Study on the economic benefits of a free and open data policy for GMES Sentinels data*, Geoff Sawyer and Marc de Vries, European Association of Remote Sensing Companies (EARSC), Brussels, 6 December 2012, 80pp.

[9] Bates J. The strategic importance of information policy for the contemporary neoliberal state: the case of Open Government in the United Kingdom, Government Information Quarterly, volume 31 (3), 2014, 388–395. Murray-Rust P, Open data in science, Serials Review, volume 34(1), 2008, 52–64.

[10] For example MODIS, NOAA AVHRR and Envisat MERIS data.

[11] See the website of the Open Knowledge Foundation http://opendefinition.org/od/.

[12] The text of the definition can be found under http://opendefinition.org/.

[13] http://theodi.org/guides/what-open-data.

[14] https://open-data.europa.eu/en/data/.

[15] See for example the report of the *Ad hoc* Strategic Coordinating Committee on Information and Data (SCCID) of the International Council for Science (ICSU), 2011.

[16] The text of the Panton Principles can be found under http://pantonprinciples.org/.

[17] See Von der Dunk F, Non-discriminatory data dissemination in practice, Earth observation data policy and Europe, ed R Harris, A A Balkema Publishers, 41–50 and also the UN Principles on Remote Sensing 1986, http://www.oosa.unvienna.org/pdf/gares/ARES_41_65E.pdf.

[18] Planet Labs has launched over 70 small satellites termed "doves" in its Flock 1 constellation to provide regular Earth observation image coverage.

[19] Planet Labs, www.planet-labs.com, accessed 27 February 2014.