

The ODI responds to call for evidence on the UK government's National Geospatial Strategy

Open Data Institute response

October 2018

Introduction

The Open Data Institute (ODI) is an independent, not-for-profit organisation founded by Sir Nigel Shadbolt and Sir Tim Berners-Lee in 2012. The ODI's vision is for people, organisations and communities to use data to make better decisions and be protected from any harmful impacts.

The ODI works with companies and governments around the world to build an open and trustworthy data ecosystem. It primarily does this through:

- sector programmes, which coordinate organisations to tackle a social and/or economic problem with data and an approach based on open culture.
- practical advocacy - working as a critical friend with organisations in the public and private sectors, and creating products and tools they can use to support change.
- peer networks that bring together people and organisations in similar situations to learn together.

ODI response

Our response to the [call for evidence](#) focuses on the need to recognise that geospatial data is infrastructure; and on the importance of a workforce skilled in artificial intelligence and machine learning to ensure that the UK can take advantage of the increasing number of available geospatial datasets.

Our questions

Q1. Is our view of the geospatial data types accurate? If not, what should be included or excluded from this?

1. We recommend that the Commission recognises that geospatial data is infrastructure and adopts the view of geospatial data infrastructure described in this response.
2. Geospatial data infrastructure¹ consists of five components, all of them important:
 - a. **data assets**, such as identifiers, registers and datasets;
 - b. the **standards and technologies** used to curate and provide access to those data assets;
 - c. the **guidance and policies** that inform the use and management of data assets and the data infrastructure itself;
 - d. the **organisations** that govern the data infrastructure;
 - e. the **communities** involved in contributing to or maintaining it, and those who are impacted by decisions that are made using it.
3. Within geospatial data infrastructure are three types of data assets: identifiers, registers and datasets.
 - a. **Identifiers** are crucial to the process of sharing information. Geospatial identifiers provide unambiguous labels or reference numbers for the things described in a geospatial dataset, such as lamp-posts, roads, houses, or administrative areas. They are fundamentally important in being able to make connections between data, which puts them at the heart of how we create value from structured data.² The UK's core geospatial identifiers include: TOID (TOpographic IDentifier); UPRN (Unique Property Reference Number); UARN (Unique Address Reference Number); Office for National Statistics (ONS) codes for administrative areas; USRN (Universal Street Reference Number), Land Registry Title Number; and Land Registry INSPIRE ID.
 - b. **Registers** are lists of reference data that help to improve the consistency and quality in how data is published. They help to build confidence and trust in data by clarifying where different data stewards are referring to the same things in the same way. Registers are typically maintained by a custodian who defines the scope and contents of the list. The work of maintaining a list is often collaborative³ requiring input from multiple organisations. Examples of registers for geospatial data in the UK include: the Foreign and Commonwealth Office's country register⁴ which provides a

¹ <https://theodi.org/topic/data-infrastructure/>

² <https://theodi.org/article/white-paper-enhancing-open-data-with-identifiers/>

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<https://theodi.org/article/registers-and-collaboration-making-lists-we-can-trust-report/>

⁴ <https://country.register.gov.uk/>

list of countries recognised by the UK; the Land Registry's official register of land titles, which will include the identifier and reference data for each title; lists of locations such as National Rail's list of railway stations⁵; and the EPSG Geodetic Parameter Dataset⁶, which provides reference data about different coordinate reference systems.

- c. **Geospatial datasets** underpin our understanding of the natural and man-made landscape around us and how we interact with it. They include data on land cover, height, geology, habitats, water resources, geographic and political boundaries, structures, addresses, utilities and transport networks.
4. We do not think it makes sense to consider "Geospatial services" as a geospatial data type. Products and services require access to geospatial data assets (identifiers, registers and datasets), as well as consideration of other aspects of geospatial data infrastructure such as guidance and policies. A strong geospatial data infrastructure supports an ecosystem of intermediaries and data users that create value-added geospatial services as well as derived datasets and products.
5. Geospatial data exists on a spectrum from closed, to shared to open⁷. Like other parts of data infrastructure, it should be as open as possible while respecting privacy, national security and commercial confidentiality. This is even more important for geospatial data infrastructure because it is a foundation for other parts of our national data infrastructure: restrictions on use of geospatial data can limit the use and utility of other data too.

Q2. In addition to current government policy, what are the areas of geospatial skills where the commission could best focus, to help ensure the necessary capability within the UK for the future?

1. We think that everyone must have the opportunity to understand how data can be, and is being, used. In the context of the geospatial sector, the Commission should consider capability - data literacy and understanding, data science skills and the ability to use and share data to help solve problems - as an important area or theme.
2. The UK should be equipped with the skills in Artificial Intelligence and Machine Learning to take advantage of the increasing amounts of available geospatial datasets - including earth observation data and point clouds - to support the development of geospatial products and services. The Commission must recognise that not everyone needs the same geospatial skills and that there are

⁵ http://www.nationalrail.co.uk/stations_destinations/48541.aspx

⁶ <http://www.epsg-registry.org/>

⁷ <https://theodi.org/about-the-odi/the-data-spectrum/>

different paths to expertise. The ODI's data skills framework is a useful tool for exploring this topic⁸.

3. In addition to these skills, to realise the full benefits of geospatial data to the UK's economy and society, public sector policymakers and service designers, business leaders, startups and community groups need to have a basic understanding of the importance of geospatial data and how it can be used better to achieve their goals. These should include understanding how to navigate privacy issues that may arise when using geospatial data, and approaches for sharing geospatial data while protecting privacy. For example, this might include how and when to normalise or validate address data you collect so that the data is more shareable with other organisations, or how to ensure that Google Maps or OpenStreetMap (OSM) displays the location of a business accurately so that customers are more likely to discover it.

Q3. What are the geospatial skills needs and gaps in your organisations, how can these be most effectively addressed, and how can careers in the sector be best promoted?

1. No response to this question.

Q4. Are there any publicly or privately-held geospatial datasets that are currently challenging to access or use or of insufficient quality, but which you or your organisation would find valuable if these issues could be resolved? Please explain why this would be of value, and how access/quality could be improved?

⁸ <https://theodi.org/article/open-data-skills-framework/>

1. Geospatial data infrastructure helps people, communities and organisations make decisions in almost all aspects of life and across all sectors of our economy. Limits on its openness - including who can access geospatial data assets - creates significant friction that reduces the benefits we stand to gain from it. In her foreword to the 2008 UK location strategy⁹, Baroness Andrews described that “in almost everything, people need to know when and where things happen: place matters.” The UK must make geospatial data infrastructure as open as possible to maximise its value.
2. The Commission should prioritise increasing access to identifiers to help improve the quality, consistency and interoperability of geospatial and other data assets. It should work with both private, public and third sector data stewards to make identifiers available as open data that anyone can access, use and share¹⁰. A 2014 ODI and Thomson Reuters report¹¹ highlights the importance of open identifiers to make connections between datasets. Open identifiers are free from licensing or IP restrictions that might restrict how the identifiers can be used, including to publish derived data. The basic reference data associated with the identifiers should also be made available under an open licence. The report also highlights the need for data stewards to be transparent about how they assign and manage identifiers, and for the provision of a basic set of services that will support reuse of the identifiers (e.g. to help link together data assets from different organisations). At present, some of the key identifiers that underpin the UK’s geospatial data infrastructure and that are not yet open are: TOIDs, UPRNs, UDPRNs and UMRNs stewarded by Royal Mail; UARNs stewarded by the Valuation Office Agency; USRNs stewarded by GeoPlace; and Land Registry Title Numbers and Land Registry INSPIRE IDs. Two important identifiers, UPRNs¹² and TOIDs¹³, both have some Intellectual Property (IP) and licensing restrictions which limit their reuse. For example, TOIDs can only be republished by Ordnance Survey (OS) customers¹⁴. The OS have over the last few years,¹⁵ been permitting customers and licensees of their products to publish datasets that include UPRNs, although the licensing remains complex¹⁶. The UK has many competing¹⁷

⁹ https://data.gov.uk/sites/default/files/uk-location-strategy_10.pdf

¹⁰ <https://theodi.org/article/what-is-open-data-and-why-should-we-care/>

¹¹ <https://innovation.thomsonreuters.com/en/labs/data-identifiers.html>

¹²

<https://www.ordnancesurvey.co.uk/about/governance/policies/addressbase-uprn.html>

¹³

<https://www.ordnancesurvey.co.uk/about/governance/policies/os-mastermap-toids.html>

¹⁴

<https://www.ordnancesurvey.co.uk/about/governance/policies/os-mastermap-toids.html>

¹⁵

<https://www.ordnancesurvey.co.uk/about/news/2015/uprn-release-sharing-location-data.html>

¹⁶

<https://blog.ldodds.com/2015/09/02/how-and-when-can-uprns-can-be-a-part-of-open-data/>

¹⁷ <https://www.owenboswarva.com/blog/post-addr2.htm>

and overlapping identifiers for addresses, property and land which adds complexity to the publication and reuse of data. It is often not clear how identifiers are assigned, how they relate to each other. Lack of reference data, including on boundaries, makes it hard to understand how they align with one another. The identifiers are also typically only published as part of larger datasets. For example, TOIDs and the basic reference data associated with them are only available as part of MasterMap products. This limits their potential uses.

3. The Commission should prioritise increasing access to geospatial data assets that are frequently used to validate or augment other datasets. Current barriers or restrictions to their use ripple through to other datasets, products and services. Two significant data assets of this type that the Commission should focus on are:
 - a. Address data. We describe in detail how access could be improved and why this would be of value in our response to Question 5.
 - b. The current work to increase access to OS MasterMap¹⁸ is a step forward in strengthening the UK's geospatial infrastructure, but there's a lot more to do. In general, this will let users who only need small amounts of data to access it for free, on demand; it does not help those who need larger volumes or who want flexibility in what they do with the derived data they create. The current activities will create some new freemium models but these must continue to be revisited. They must be seen as a step on a journey to an OS Mastermap which is as open as possible, while protecting national security. Being clear that this is the direction of travel will allow both the OS and data stakeholders to develop appropriate business models.
 - c. As the Commission opens up these datasets it must engage with public sector organisations that use them to create derived data, for example the Land Registry or local authorities, to ensure that associated licencing restrictions are removed from those derived datasets.
4. The Commission should prioritise increasing access to other geospatial data assets based on ongoing engagement with, and understanding of the needs of, data users. This is particularly important in the context of:
 - a. supporting emerging technologies - including driverless cars, drones and artificial intelligence - which are likely to require access to specific types of high quality and timely geospatial data and geospatial data infrastructure. Supporting these technologies with access to geospatial data will reduce barriers to business growth and support UK Government investments made through the Industrial Strategy Grand Challenges.
 - b. supporting other policy initiatives such as improving access to democracy, housing and planning, or the creation of a beneficial ownership register¹⁹.
5. The rapidly growing innovation in geospatial technology and increasing competition amongst providers of geospatial data means that some of our public

¹⁸ <https://www.ordnancesurvey.co.uk/business-and-government/products/open-mastermap.html>

¹⁹ <https://democracyclub.org.uk/> <https://mhclgdigital.blog.gov.uk/category/digital-land-services/> <https://researchbriefings.parliament.uk/ResearchBriefing/Summary/CBP-8259>

sector data stewards will need to adopt new and innovative business models. The Commission should also prioritise data assets that help public sector organisations explore new business or revenue generation models, such as freemium APIs or quality guarantees. We discuss this further in our response to Question 9.

Q5: Do you anticipate that any changes will be needed to the both address data and the wider address ecosystem, to support emerging technologies? Please provide evidence of value to support any proposed changes.

1. Addresses are part of our everyday lives: they pinpoint where we live and work and connect us to local services we rely on. The Commission should make a register of address data available under an open licence for anyone to access, use and share.
2. UK Government already controls the rights for most UK address data through the OS and Geoplace. In 2015, the ODI ran a project to explore whether it was possible to recreate the UK's address list. We established that, principally due to the legal uncertainty over who holds intellectual property rights in many current sets of address data, it was not possible and that UK Government would have to intervene to make this data available. The final report contains the evidence of value available at the time²⁰.
3. Subsequently, UK Government started a new £5m project to explore creating an address register. We would recommend that the Commission release the findings of that project to help the wider ecosystem understand the challenges it discovered and where new evidence might be required²¹.
4. The Commission should also explore ways in which the UK's address system will need to adapt to changing user needs and expectations. Emerging technologies, such as Connected and Autonomous Vehicles (CAVs) and drones, may require access to sustainable, high quality address data in new ways - for example, the such as data related to landing paths for drone delivery services. The rise of 'floating transport', such as dockless bicycle hire schemes, and alternative delivery locations, such as parcel collection boxes and delivery to car boot, is likely to result in a broader change in the way we consider addresses. This may mean adopting location systems such as Pluscodes²², in which case we strongly recommended the adoption of open standards to increase adoption and avoid lock-in.

²⁰ <https://theodi.org/project/creating-the-uks-first-free-and-open-address-list/>

²¹ <https://www.gov.uk/government/speeches/geoplace-conference-matt-hancock-speech>

²² <https://plus.codes/>

Q6: How should the commission be looking to develop the UK's capability in Earth observation data, both technologically and to support an effective market?

1. The Commission should ensure that Earth Observation (EO) data collected and maintained by public sector organisations is made as open data for anyone to access use and share.
2. While there are currently over 80 countries with satellites in orbit²³, only a handful of those countries make their satellite data openly available²⁴. This is despite the fact that openly published EO data has been shown²⁵ to drive economic growth, improve societal welfare, expand public and private research opportunities, support innovation, facilitate the education of new generations, and improve decision-making and transparency within government. Where public sector organisations are involved in multinational EO data collection programmes, the Commission should advocate for data to be published to open standards, as openly as possible.
3. Access to EO data will help UK businesses grow skills in, and develop products and services that use, feature detection in different domains, such as agriculture, housing and energy. For example, EO data can be used to tally the number of oil storage tanks in a particular country to produce estimates of consumption patterns and farmers can estimate global crop yields²⁶. It can also be used to help human rights campaigners track population flows or environmentalists to track deforestation in remote wildernesses.
4. The Commission should recognise that access to EO data is particularly important during crisis events, such as flooding and fire²⁷, and that making this data available openly will allow for a faster and more effective response to these crises.

Q7. Which new technologies should the commission focus on to provide new opportunities to process and exploit geospatial data for economic growth?

²³ http://www.unoosa.org/oosa/osoindex/search-ng.jsp?lf_id=

²⁴ https://cdn-images-1.medium.com/max/1400/1*K6CYCDP1YXieYF-fzeegOw.jpeg

²⁵

<https://www.fgdc.gov/ngac/meetings/december-2014/ngac-landsat-economic-value-paper-2014-update.pdf>

²⁶

<https://www.afr.com/technology/how-cubesat-satellites-are-changing-the-world-and-your-privacy-2018-0219-h0wcol>

²⁷ <https://www.tanka.com/>

1. New technologies present opportunities to process and derive insight from geospatial data in new ways.
2. For example, the application of Artificial Intelligence (AI), Machine Learning (ML) and related technologies is making it easier to extract greater value and insights from geospatial data.
 - a. These technologies can be used to identify and extract features like road signs, street names and populated areas from images or even videos. For example, Skynet²⁸ (the machine learning platform of Development Seed²⁹), uses machine learning to extract valuable insights from satellite and drone imagery. Similarly, Tanka³⁰ is using satellite imagery and a suite of AI techniques to detect fires and automate response procedures.
 - b. When applied to satellite imagery, companies can use these techniques to automatically detect infrastructure such as roads or electrical lines, identify objects like ships or airplanes, locate important facilities like hospitals or schools and evaluate crop performance or monitor deforestation. At present, many of the organisations leading in this area are from the private sector. In some cases, the commercial firms developing these techniques are working with public sector organisations to tackle pressing, real-world problems. For instance, using computer vision techniques, the Facebook Connectivity Lab³¹ and the Center for International Earth Science Information Network (CIESIN)³² have produced detailed maps of the distribution of buildings and populations in rural regions of 18 countries across the globe. The maps, which the World Bank have described as³³ “unprecedentedly high-resolution”, were generated at-scale, and can help governments and NGOs develop a more complete picture of population distribution when combined with information gathered from traditional government surveys and censuses.
 - c. When applied to ground-level imagery, on the other hand, machine learning, computer vision and deep learning techniques can help organisations automatically identify important features of the world around us. Google’s Street View³⁴ and Mapillary³⁵, for instance, use deep learning to extract valuable data like street and business names, addresses and front entrances of buildings from their databases of street imagery. This data can be crucial for delivery companies where knowing the exact entrance of a business or residence can save time and money.
 - d. In 2018, the ODI published a report³⁶ on the array of models being used by organisations to develop AI systems. This included proprietary

²⁸ <https://developmentseed.org/projects/skynet/>

²⁹ <https://developmentseed.org/>

³⁰ <https://www.tanka.com/>

³¹ <https://code.fb.com/core-data/connecting-the-world-with-better-maps/>

³² <http://www.ciesin.columbia.edu/aboutus.html>

³³ <https://blogs.worldbank.org/opendata/first-look-facebook-s-high-resolution-population-maps>

³⁴ <https://ai.googleblog.com/2017/05/updated-google-maps-with-deep-learning.html>

³⁵ <https://www.mapillary.com/>

³⁶ <https://theodi.org/article/the-role-of-data-in-ai-business-models/>

algorithm models (using a closed algorithm and open data) and open models (using an open algorithm and open data). The report recommended that the sharing and opening of data in ways that secure and safeguard the trust of people will be vital to building, implementing, and operating AI systems.

3. As well as presenting opportunities for making use of existing data more effectively, the Commission should focus on new technologies and approaches that could be used to collect or maintain geospatial data more effectively. For example, it is increasingly easy for organisations to collect geospatial data with low-cost satellites, cheaper LIDAR³⁷ sensors, and GPS-enabled devices. Meanwhile, collaborative collection and maintenance models can increase quality and reduce costs³⁸.

Q8. How can geospatial data and applications be used to support enhanced roll-out of future technologies?

1. A number of emerging technologies require access to geospatial data infrastructure in their development and adoption. CAVs, for example, require access to a wide range of geospatial data types from different sources³⁹ including: terrain data (related to elevation and terrain type); network data (such as maps and data about the road network); place data (including points of interest); real-time data (about traffic, construction and other incidents); and sensor data (such as in-car cameras and LIDAR).
2. Access to this data is therefore critical if the UK is to lead in the development and adoption of CAVs and other emerging technologies. This will complement other UK Government investments in these technologies, such as through the Industrial Strategy.

Q9: What are the options for how public sector organisations could continue to invest in maintaining and enhancing our geospatial data assets?

³⁷ <https://en.wikipedia.org/wiki/Lidar>

³⁸

<https://theodi.org/article/legislation-gov-uk-improving-the-uk-digital-statute-book-through-collaborative-maintenance/>

³⁹ https://www.nds-association.org/wp-content/uploads/20180605_NDS_AutonomousVehicleSymposium.pdf

1. The Commission should ensure that public sector organisations are committed to publishing open data and removing the friction caused by restrictive data licences.
2. Like our physical infrastructure, geospatial data infrastructure is owned and maintained by a variety of organisations⁴⁰ that span the public, private and third sectors. The stewardship of data infrastructure will continue to evolve in part due to developments in technology making it easier for more organisations to collect and manage data. We agree that “the Commission’s Partner Bodies and other public sector organisations must, alongside their core functions, adapt to the evolving geospatial environment and support the ecosystem and market to innovate and grow”.
3. We recognise that maintaining this commitment over the long term creates challenges in terms of how we ensure sustainable funding for stewardship and access to data assets from the public sector. These challenges are not unique to geospatial data. For example, national meteorological services around the world are facing similar challenges around how they deliver on a public task which is best supported by openly licensed data⁴¹, whilst ensuring that they can continue to invest in data collection and support use of that data by the widest possible set of consumers.
4. Debates about whether to charge licensing fees for access to public sector geospatial data continue, even when the value of making it open are well documented. Research commissioned by the ODI and completed by Lateral Economics used examples, such as US Landsat data⁴², to show that open data will provide an extra 0.5% of GDP than data that people have to pay for⁴³.
5. The Commission should work with public sector organisations to explore different business models - in particular those that represent alternatives to fees generated through restrictive licensing - that will help to ensure sustainable collection and the provision of access to open geospatial data, such as:
 - a. charging for warranties and quality assurance;
 - b. charging for support and consulting around use of data;
 - c. charging for API access and/or tailored online services to enable on-demand use of data within specific sectors or types of application;
 - d. charging for specialised data collection or resurveying of data;
 - e. collaborative maintenance and shared curation of data to remove duplication and increase data quality, accuracy and timeliness.
6. The Commission should support debate on the roles of central and local government in maintaining and enhancing our geospatial data infrastructure. There is a wider need for more understanding of whether devolved

⁴⁰ <https://theodi.org/article/who-owns-our-data-infrastructure/>

⁴¹

<https://www.metoffice.gov.uk/binaries/content/assets/mohippo/pdf/data-provision/odi-the-state-of-weather-data-infrastructure.pdf>

⁴²

<https://www.fgdc.gov/ngac/meetings/december-2014/ngac-landsat-economic-value-paper-2014-update.pdf>

⁴³ <https://theodi.org/article/research-the-economic-value-of-open-versus-paid-data/>

administrations, city-regions and local authorities in the UK have the right level of powers in the context of data collection, use and sharing. Decisions about data should often be made by those closest to the decision; greater devolution for some powers may enable greater democratic involvement, for example through devolved national administrations and city-region mayors. The Commission should explore where, why and which functions or aspects of public sector geospatial data infrastructure should be at local, national and multinational levels and how to ensure appropriate funding at those levels.

Q10: What areas of the underpinning geospatial infrastructure such as positioning technologies, including GPS and indoor positioning systems, and geodetic networks and frameworks to support them, should we be prioritising the development of, in order to support the emerging requirements for geospatial data?

1. No response to this question.

Q11: What role should the private sector have in both the development and maintenance of the underpinning infrastructure and enhancing the UK's geospatial data assets?

1. In addition to public sector organisations, the private and third sectors play a role in maintaining and enhancing the UK's geospatial data infrastructure.
2. Private sector organisations such as Google, Microsoft, Apple and Facebook provide mapping services for developers building applications around their respective platforms, making it easier to integrate maps and location data into their products. Google and Microsoft also provide a number of general purpose mapping APIs that provide access to additional features, including routing and business listings. All of the major platforms use a mixture of open and non-open sources to build their mapping services, and many are investing in additional methods of data capture and collection to improve their offering, allowing them to provide not just 2D maps, but 3D models, street view and access to satellite imagery.

3. The proliferation of GPS-enabled smartphones and devices (connected to a global network of GPS satellites) means that it is now possible to capture information about where people go, how long it takes them to get there and for how long they stay. Companies like Strava⁴⁴, a social network for athletes, Garmin⁴⁵, a GPS-technology company, and Uber⁴⁶, a ridesharing and transportation company, are able to use this location data to generate detailed maps from people's movements. Google is able to collect telemetry data through Google Maps⁴⁷ and, depending on user settings, the Android operating system. Telecoms providers collect similar types of data.
 - a. Data collected by private sector organisations using GPS-enabled smartphones and devices could inform decisions about public transport services, investment in physical infrastructure and much more. City planners and transportation authorities, for instance, argue that they could gain useful insights⁴⁸ from the data collected by private sector organisations about how people move through and interact with public infrastructure like roads, tunnels, transport networks, walkways and public spaces.
 - b. There are already some initiatives underway to make data of this type more widely available to public sector organisations, communities and people. Strava has launched Strava Metro⁴⁹, a toolkit available to city planning departments that provides a detailed view of pedestrian and cycling journeys across urban and rural areas. City planners and departments of transportation are provided with subscription-style⁵⁰ access to data about routes, wait times at intersections, periods of peak travel and even the starting and ending points of journeys within various regions. Uber⁵¹ has responded to repeated requests from public sector organisations and civil society for access to the data it has collected by launching Uber Movement⁵², an online platform that enables analyses of aggregated journey patterns.
 - c. Paid data-sharing agreements and proprietary tools will not satisfy the demands that all cities have for data⁵³. In 2017 New York's Taxi and Limousine Commission introduced rules requiring rideshare and livery companies, including Uber and Lyft, to share detailed data about their

⁴⁴ <https://labs.strava.com/>

⁴⁵ <https://connect.garmin.com/en-US/features/>

⁴⁶ <https://www.inverse.com/article/26156-uber-movement-mapping-app>

⁴⁷ <https://cloud.google.com/solutions/scalable-geolocation-telemetry-system-using-maps-api>

⁴⁸ <https://www.citylab.com/transportation/2018/01/who-owns-urban-mobility-data/549845/>

⁴⁹ <https://metro.strava.com/>

⁵⁰

<https://www.fastcompany.com/90149130/strava-the-app-for-athletes-is-becoming-an-app-for-cities>

⁵¹ <https://www.inverse.com/article/26156-uber-movement-mapping-app>

⁵² <https://movement.uber.com/?lang=en-GB>

⁵³

<https://www.citylab.com/transportation/2017/01/finally-uber-releases-data-to-help-cities-with-transit-planning/512720/>

passengers' journeys on a regular basis. UK Government and local authorities have legislated bus operators to open up data after other attempts to persuade them to do so failed⁵⁴.

- d. By making data as open as possible, private sector organisations can support decision-making and drive innovation. Citymapper began publishing open data in 2017 about its Smartbus routes, stop locations, schedules and real-time arrival predictions. CityMapper was built using open data and the organisation sees the value of releasing their own – it “encourages all transport operators to make their data freely available to enable innovation and accessibility”.
 - e. In some cases, there will be valid reasons why the data cannot be made available as open data, or made more widely available at all – for example, the risk of re-identification of individual people whose journeys are described in the data. As we detailed in a 2018 report, ‘Personal data in transport: exploring a framework for the future’, journey data is personal data⁵⁵. The journeys people take can be used to infer where they work, shop and live - even where their children go to school. One recent study, for instance, demonstrated that it is possible to identify 95% of people in a dataset using only four spatio-temporal data points⁵⁶. There is an ongoing challenge to find the level of aggregation and/or access that enables data to be as open as possible while protecting privacy and commercial confidentiality.
 - f. The Commission should explore best practice in terms of increasing access to this type of data and ensure that public sector organisations have appropriate guidance and powers to gain access (such as mandating the publication of open data or data sharing through procurement and licensing/operational conditions for the services they provide).
4. The Commission should support broader debate around the respective roles of public, private and third sector organisations in maintaining and enhancing the UK's geospatial data infrastructure, and the expectations of what types and level of services it could or should provide. The pace of innovation in terms of data collection and analysis creates a risk that private sector organisations may outstrip the ability for public sector organisations to do the same. There is the possibility that commercial sources could supplant or replace public sector data stewards because they provide higher quality data or services that better meet users needs with closed datasets (as evidenced by the widespread adoption of Google Maps). The potential impacts of geospatial data infrastructure becoming controlled solely by the private sector - such as unprofitable parts of the market, or country, being left underserved - should be explored by the Commission.
 5. There are ongoing debates about whether nations are receiving an equitable share of benefits from technology and data use, with most focussing on the

⁵⁴ <https://www.gov.uk/government/consultations/bus-services-act-2017-bus-open-data>

⁵⁵ https://docs.google.com/document/d/1eBe_hM6lnWf2J_Syco1Gz86fvG7BZpjGF8kNYvw0aal/edit#

⁵⁶ <https://www.nature.com/articles/srep01376>

possible creation of a financial “tech tax”⁵⁷. Governments should also be exploring how to create greater non-financial benefits from large tech firms, particularly given that their size and competitive power means that they can carry a higher compliance burden than other organisations. The Commission should consult on whether public sector organisations should have powers to mandate access, use and sharing of data - in defined ways - held by large firms (perhaps defined as organisations with data about more than 1m UK citizens) for the public benefit. This would be a parallel to the powers that ONS have under the Digital Economy Act to secure data for use in national statistics⁵⁸.

Q12. Do you face challenges when working with geospatial data from across the public sector? If so, what are they and how could value be better released? Are there any technical remedies or standards that could be adopted to improve the interoperability of geospatial data? Please provide supporting evidence of what these remedies could help to accomplish.

1. In February 2018, the ODI, in collaboration with a cross-government team, organised and ran four workshops across the UK with geospatial data users. The workshops identified a number of challenges faced by users of OS data, including SMEs and startups, local authorities and other public sector organisations, educational organisations and members of the open data and OSM community⁵⁹. The challenges are similar to those to be tackled by a recently-announced Hydrographic Office project⁶⁰.
2. The Commission should continue to engage with data users to support the development of technical remedies or standards to improve the interoperability of geospatial data. These should include:
 - a. public sector organisations committing to increase the publication of open data and remove the friction caused by restrictive data licences. Data assets the Commission should prioritise on are described in our response to Question 4.
 - b. where data is not available under open licences, public sector organisations developing better understanding of the impacts of non-open licences⁶¹ and working with their community to discuss and clarify licensing issues (particularly in relation to derivative works). New open data released from public sector organisations may help to unlock

⁵⁷ <https://www.bbc.com/news/business-45813754>

⁵⁸ <http://www.legislation.gov.uk/ukpga/2017/30/contents/enacted>

⁵⁹

<https://docs.google.com/document/d/1AJtrfa93hL4M3TdSy-4LhXJoVLyHeGmiB2vmHyPZYkM/edit?usp=sharing>

⁶⁰

<https://www.gov.uk/government/news/uk-hydrographic-office-to-unlock-the-value-of-location-based-information-as-part-of-geospatial-commission>

⁶¹ <https://theodi.org/article/what-are-the-impacts-of-non-open-licences/>

other data releases, however increased access to non-open data might exacerbate existing problems unless steps are also taken to simplify and clarify its licensing.

Q13. How can the Geospatial Commission act as a more effective customer for geospatial data on behalf of the public sector?

1. A number of OS products are made available for free use by public sector bodies via the Public Sector Mapping Agreement⁶². We agree that the Commission should “continue the work that was started by Department for Business, Energy and Industrial Strategy (BEIS) to renegotiate the current Public Sector Mapping Agreement”.
2. In particular, the Commission should ensure that the geospatial data accessed under the agreement is free from restrictions related to derivative works. Signatories of the Public Sector Mapping Agreement - as other agreements such as as the One Scotland Mapping Agreement, PAF Public Sector Licence and the Aerial Photography Great Britain contract - should be free to create derivative work and release this as open data. This is important to support the goals of public sector organisations, several of which have a commitment to publishing more open data.

Q14. Are there any additional geospatial datasets, from the other partner bodies or other sources, that the public sector would derive significant benefit from having access to, that might have novel and valuable use cases? What would that access look like?

1. The Commission should continue to engage with public sector data users to understand the data assets they could derive benefit from having access to.
2. As well as public sector organisations, the Commission should consider the potential benefits of increasing access to data held by private sector organisations.
 - a. As described in our response to Question 11, this data could include data held by organisations that provide provide mapping services and aggregate data collected by organisations using GPS-enabled smartphones and devices.
 - b. Valuable data might also include locations of services and amenities that the public sector doesn't own or operate, but should know about for

⁶²

<https://www.ordnancesurvey.co.uk/business-and-government/public-sector/mapping-agreements/public-sector-mapping-agreement.html>

planning and statistical purposes, such as food outlets, bank branches and ATMs, pharmacies and nurseries.

Q15: How can we best develop a single UK strategy, ensuring alignment between the individual strategies across the UK while still allowing for regional variations?

1. The Commission, and the National Geospatial Strategy it will produce, represent an opportunity for central commitment, governance and coordination to strengthen the UK's national geospatial data infrastructure.
2. The Commission should work with devolved national administrations and local government to understand the roles of different layers of government in maintaining and enhancing our geospatial data infrastructure. There is a wider need for more understanding of whether devolved administrations, city-regions and local authorities in the UK have the right level of powers in the context of data collection, use and sharing. Decisions about data should often be made by those closest to the decision; greater devolution for some powers may enable greater democratic involvement, for example through devolved national administrations and city-region mayors. The Commission should explore - and encourage experimentation with - where, why and which functions or aspects of public sector geospatial data infrastructure should be at local, national and multinational levels.
3. The Commission will also need to work closely with other central government organisations and groups in the development of the National Geospatial Strategy. This should include the Department for Digital, Culture, Media and Sport (DCMS) and its team working on the National Data Strategy, Cabinet Office (Government Digital Service), BEIS, ONS, and the Ministry of Housing, Communities and Local Government (MHCLG).

Q16: How can we best ensure effective local authority coordination and sharing of best practise, using location data to better deliver public services?

1. In 2018 the ODI conducted research into the role open data plays in the delivery of public services⁶³. The research highlighted three high-level patterns for the ways that open data - including geospatial data - can be used to deliver public services:
 - a. using open data to increase access to services for citizens or organisations;
 - b. using open data to plan public service delivery and make service delivery chains more efficient;
 - c. using open data to inform policymaking.

⁶³ <https://theodi.org/article/using-open-data-for-public-services-report-2/>

2. The research also produced a series of recommendations to support greater use of open data to deliver public services. In particular, the Commission should consider the following recommendations in the context of geospatial data:
 - a. **Organisational collaboration.** The availability of funding for activity is a key determinant of activity. We received 24 responses to the invitation to tender for the local authority Stimulus Fund aspect of this project - we could have funded more consortia if we had had the resources to do so. There is clearly appetite within local government to undertake experiments in this area but there are funding challenges. The Commission should consider funding further activity in this area to help develop new use of geospatial data and deliver better services to citizens, and also to strengthen peer networks between authorities.
 - b. **Data infrastructure, digital skills and literacy.** In the fieldwork, participants referred to the GDS leadership on service design as best practice, such as the curriculum for the GDS academy and the GDS service design manual. As part of the expansion of the curriculum of service design training towards covering data and technology roles and digital competencies, the Commission should consider supporting the development of learning materials specific to the use of geospatial data, including content to help those in non-technical roles understand how open data can support services at a strategic level.
 - c. **Peer networks.** Access to environments for networking and sharing best practice⁶⁴ across different organisations was deemed essential to developing new ways of using data to deliver public services. The Commission should make use of existing, and where necessary convene new, networks of those who are interested and involved in using geospatial data for public service delivery.

Q17: As a result of this analysis, we are prioritising the exploration of possible initiatives in the high-value categories identified:

- **property and land**
- **infrastructure and construction**
- **mobility**
- **natural resources**
- **sales and marketing**

What are the existing or potential geospatial applications which could be scaled-up or developed in order to capture economic value? (We would

⁶⁴ <https://theodi.org/method-report-peer-networks-for-open-data-leaders>

particularly welcome responses from industry and other bodies engaged in these sectors.)

1. No response to this question.

Q18: Are there any other areas that we should look at as a priority?

1. No response to this question.

Q19: What are the main potential private and public sector innovations that will rely on the use of geospatial data to rollout, and are there corresponding regulatory challenges?

1. No response to this question.

Q20: How best can we make the UK's presence in the international geospatial world more visible?

1. No response to this question.

Q21: Where should the UK be looking for points of comparison overseas? Who are the other international exemplars? What best practice is being modelled overseas that we can learn from?

1. Some developments we recommend examining for points of comparison and best practice internationally are:
 - a. the Australian government's steps to open up a wide range of geospatial datasets and resources. Following the 'Declaration of Open Government'⁶⁵ in 2010, the Digital Transformation Agency (DTA)⁶⁶ created data.gov.au⁶⁷ as a means of finding, accessing and reusing public government datasets, including geospatial datasets. At the time of writing there are over 5,500 datasets⁶⁸ from GeoScience Australia alone. In 2014, the DTA launched National Map⁶⁹, an online service that allows users to search through a catalogue of geospatial datasets made openly available by public agencies and overlay them on a three-dimensional map of Australia. The following year the Australian government released a 'Public Data Policy Statement'⁷⁰ reaffirming and formalising its commitment to making "non-sensitive data open by default" with the aim of contributing to "greater innovation and productivity improvements across all sectors of the Australian economy".⁷¹ More recently, the government has released

⁶⁵ <https://www.finance.gov.au/blog/2010/07/16/declaration-open-government/>

⁶⁶ <https://www.dta.gov.au/>

⁶⁷ <https://data.gov.au/about>

⁶⁸

https://data.gov.au/dataset?sort=extras_harvest_portal+asc%2C+score+desc%2C+metadata_modified+desc&organization=geoscienceaustralia&q=

⁶⁹ <https://nationalmap.gov.au/>

⁷⁰

<https://www.pmc.gov.au/resource-centre/public-data/australian-government-public-data-policy-statement>

⁷¹

<https://www.pmc.gov.au/resource-centre/public-data/australian-government-public-data-policy-statement>

PSMA's⁷² Geo-coded National Address File (G-NAF)⁷³ as well as their Administrative Boundaries datasets⁷⁴.

- b. The European Union's (EU) progress in opening up geospatial data. In 2011, following a string of policies supporting open data⁷⁵, the EU published a communication⁷⁶ that pledged to open up data as "an engine for innovation, growth and transparent governance" and pointed to geospatial data as an explicit example of the value of open data. The European Space Agency (ESA) has recently received praise for committing itself to opening up some of its satellite imagery⁷⁷. In 2014, the ESA announced⁷⁸ that it would provide "free, full and open access" to data from the Copernicus programme⁷⁹, including data collected by the new Sentinel series⁸⁰ of satellites. The ESA has since launched the 'Copernicus Open Access Hub'⁸¹, an online platform that provides access to data from all current Sentinel missions through both an interactive graphical user interface and an API.
- c. The United State's commitment to open geospatial data is the archive of US Landsat imagery⁸², which was made openly and freely available in 2009. The global economic benefit of opening up access to this nearly fifty year archive of imagery of the Earth's surface was estimated to be⁸³ \$2.19bn in 2011 alone. These benefits were spread across 38 different primary application areas and stemmed from things like improved long-term environmental planning and monitoring, improved decision making, better enforcement of regulations and increased human safety.⁸⁴ Despite commendable gains⁸⁵ in the years since the 2009 open data policy was implemented, there is currently uncertainty⁸⁶ as to whether this commitment to open government, and by extension open geospatial data, will continue under the present administration.

⁷² <https://www.pdma.com.au/about>

⁷³ <http://data.gov.au/dataset/geocoded-national-address-file-g-naf>

⁷⁴ <http://data.gov.au/dataset/pdma-administrative-boundaries>

⁷⁵ <https://ec.europa.eu/digital-single-market/en/open-data>

⁷⁶ <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A52011DC0882>

⁷⁷

<https://medium.com/radiant-earth-insights/government-satellite-data-and-its-role-in-advancing-global-development-7b6760e803b1>

⁷⁸

https://www.esa.int/Our_Activities/Observing_the_Earth/Copernicus/Free_access_to_Copernicus_Sentinel_satellite_data

⁷⁹ https://www.esa.int/Our_Activities/Observing_the_Earth/Copernicus/Overview3

⁸⁰ https://www.esa.int/Our_Activities/Observing_the_Earth/Copernicus/Overview4

⁸¹ <https://scihub.copernicus.eu/>

⁸² <https://landsat.usgs.gov/usgs-landsat-global-archive>

⁸³ <https://pubs.er.usgs.gov/publication/ofr20131269>

⁸⁴ <https://pubs.er.usgs.gov/publication/ofr20131269>

⁸⁵ <https://blog.mapbox.com/u-s-government-commits-to-open-mapping-c5341db15842>

⁸⁶

<https://sunlightfoundation.com/2018/01/24/under-trump-u-s-government-moves-from-open-to-closed/>

2. The Commission should also look for, and learn from, best practice demonstrated by UK organisations and groups in an international context. For example, OSM has become a key component of international geospatial data infrastructure. Local and national governments around the world are working with the OSM community to ensure that their geospatial data is available to that community and the growing ecosystem it supports. Large commercial organisations like Apple, Microsoft and Facebook build OSM into their mapping services⁸⁷, and companies like Lyft, Telenav and Mapbox are using it as essential part of their products.

Thank you for your time in completing your response to our call for evidence.

Any questions, please get in touch with the Geospatial Commission via geospatialcommission@cabinetoffice.gov.uk

⁸⁷ <https://theodi.org/article/how-are-facebook-apple-and-microsoft-contributing-to-openstreetmap/>