Government launch call for evidence to be geospatial world leader: OSGeo:UK Response

Questions:

Please select which of the following best describes you as a respondent:

Respondent	Please mark with a X
Academic	
Business representative / trade body	x
Central government	
Charity or social enterprise	x
Individual	
Legal representative	
Local government	
Large business (over 250 staff)	
Medium business (50 to 250)	
Small business (10 to 49)	
Micro business (up to 9)	
Other - please state	

Call for evidence - three key themes

We have identified three high-level themes that could help our approach to setting a strategy which are as follows:

1. Supporting innovation in the geospatial sector, exploring how to secure cutting edge skills, the right access to data, and opportunities from emerging technologies for the geospatial sector itself
2. Enhancing the UK's geospatial assets, looking at how best to align interests, avoid duplication, and instill best practice across the whole public sector
3. Driving investment and productivity in geospatial applications, asking in which wider sectors the most value lies from better exploitation and use of geospatial data, in the UK and internationally

Our questions

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

Yes

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?

Geospatial skills must be general and fundamental, rather than skills in the use of specific software. We note with great concern agreements brokered between commercial software vendors and UK universities and UK Schools to supply proprietary GIS to all students. This stifles education and innovation in the UK geospatial sector.

Free and open source alternatives (FOSS) to proprietary software must be given equal weight in all state-supported education and training, thereby removing financial and licensing barriers to innovation by individuals with strong skills but limited access to budgetary and legal resources.

Much of the current explosion in the uptake of Earth observation (EO) is being led by organisations (specifically start-ups) in the United States and Europe. These companies are doing this through the use, creation and sharing of open source software. If the UK is to become a major player in the Earth observation and geospatial sector then more needs to be done to make UK developers and scientists the creators of open software rather than

just users. Some might argue that the UK has a strong EO sector, but it is way behind in terms of what is currently leading technology as it is too dependent on a slow moving, project-based model. Support for open source, and strengthened geospatial skill development could enhance the position of UK EO.

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?

Given the increasing role of web technologies and version control in facilitating collaborative software development, plus the ability of free and open systems to democratise progress in software development, web-based computing is key to the flourishing of geospatial technologies.

Spatial databases are vital in delivering high quality spatial systems, and the success of open source packages such as PostgreSQL and in particular the spatial extensions PostGIS and PGRouting, should be implemented and promoted by government systems.

Careers in the sector could be promoted by including elements of the geospatial FOSS software stack in the secondary curriculum for geography and computer science. By freeing users from privatised solutions, innovation can be accelerated and the workforce and the workplace will benefit from incremental gains in much the same way scientific progress stems from information and technology sharing.

Many organisations now advertise for positions where a knowledge of and experience in FOSS software is required. Engaging with universities and trade bodies to create nationally and internationally recognised qualifications in open source software would help applicants and recruiters.

Spatial analysis is increasingly moving away from the graphical user interface (GUI) and into the realm of computer science. The Python computer programming language is common to both the leading proprietary and open source GIS software applications, making Python coding skills highly applicable in GIS. The proliferation of the R programming language has spread from the academic environment into the other sectors, with dedicated geospatial functions as well as an expanding library of packages written by the geospatial community. Using programming scripts to process and analyse data makes workflows more robust and reproducible, and the GIS jobs market is demanding programming skills from applicants. It will be important to offer programming skills to current professionals to ensure that they are not left behind recent graduates with recent programming experience.

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?

The licensing around some Environment Agency datasets such as flood zones is unclear, which means that usage is low. Other datasets such as transport timetables is available in different formats, with different access and licensing constraints across the country, making it difficult to integrate in country-wide solutions. More usage of this data in particular would encourage greater use of public transport.

Other datasets of high value include land ownership and current data on location of underground services in the North Sea, such as pipelines, power cables and telecoms. In general this is still either proprietary or "as-planned", and now out of date

A large number of environmental datasets are made available only for non-commercial use. Climate change related datasets, hydrology and soils data would all be valuable if made truly open data.

Several environmental datasets are not accessible to the Third Sector. Such datasets include the Centre for Ecology and Hydrology (CEH) Land Cover Map Vector data, the Cranfield University NATMAP Vector data, the rural Land Registry field margins and the Rural Payment Agency data on Agri-Environment Schemes, which are subsidised by the taxpayer. Licences for these datasets treat non-profits as businesses when they should be treated akin to academic research institutions for which the data are more readily accessible. This is particularly pertinent when charities are working to help the government achieve its own commitments, for example under international treaties such as the Convention on Biological Diversity and the Sustainable Development Goals.

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.

Address data and standards must be fully open (see https://www.owenboswarva.com/blog/post-addr2.htm for a summary of the current situation). Proprietary solutions such as What3Words should not be promoted as alternatives. They cannot be relied upon to be sustainable in the long-term as they are closed source.

Address Base data should be made more easily available, to enable applications to identify UK properties beyond the front letterbox, which is as far as postcode address file currently reaches.

Open and up to date information on the location and collection times of post boxes would be an extremely useful dataset. The ability to query this information through a web (or

voice-enabled) interface would be extremely valuable, particularly to at risk or elderly people.

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?

The global Earth observation sector is rapidly changing, and those organisations that are deriving most benefit are using open data and open source software. UK universities have been too slow to react to this, and more graduates are required who understand the interface between IT and Earth observation science, and have a better understanding of, and desire to code. Vast amounts of open data are now available, but future development in the sector will depend on creating applications for time series data and having the knowledge to understand how best to manage and deliver those data.

The commission could help link education establishments and SMEs (a wide range of SMEs rather than the usual players) to create and deliver (in tandem) course content that would result in a young labour force with desirable, transferable and much required skills. A commission-sponsored degree and/or professional certificate would, if properly implemented, demonstrate a commitment to growing and enhancing geospatial skills in the UK. Open source software should be a key component of all future courses.

The availability of free and open earth observation data is critical to the development of this sector.

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

The commission could focus on the accessibility and availability of the geospatial datasets as outlined above, which would enable SMEs, Charities and Academia to focus on the development of the technologies and provide the economic growth. Additionally, focusing on the promotion of FOSS software would be valuable across the board rather than specifically to one sector or another.

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

The example of AddressBase going open is a good example of how commerce can better find and complete the addresses of their customers.

Further development to intelligent transport routing, which uses geospatial information to re-route road traffic to a greater extent, may improve performance of road infrastructure.

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

Open licences could enable public servants to develop public software collaboratively and enhance their communication with each other and vendors, rather than filtering their requirements, communication and finances through legacy vendors who run large legacy systems that currently dominate government geospatial applications (such as in proprietary development management solutions).

By opening, and modularising geospatial systems, smaller vendors may be able to provide smaller solutions that contribute to, and maintain, public service solutions as platform type solutions rather than vendor-specific monolithic software architectures.

Long term plans for investment in and support of open solutions would be beneficial - too many platforms have received funding for development but no longer term funding for implementation, which is wasteful of finite resources and fails to demonstrate some of the excellent open source work being undertaken in Government.

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?

Remain a member of the existing European GPS network. Creating our own (a Brexit proposal), would be a colossal duplication of effort and hence a massive waste of money.

A small firm called wayfindr is trying to develop a standard for indoor navigation based on radio beacons for helping people move around large public spaces such as train stations.

If an open standard were agreed, this could create an opportunity for small vendors to contribute to its development, rather than rival companies trying to promote their own patented solution and aggressively compete for market share, which could end up with different beacon systems being used in different train stations for example.

https://www.wayfindr.net/open-standard

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?

The private sector could be encouraged to contribute to open datasets and solutions in contracts. For example, they could contribute to an open AddressBase geocoding solution, which will be of benefit to them enabling the geolocation of their customers' homes with greater accuracy.

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.

- Adoption of open licences
- Removal of rate limits etc
- Simplify discovery by reducing the complexity of data stores or portals: often a list of dataset addresses is all that is required
- Web/mobile developers tend to prefer latitude and longitude for data and web mercator for tiles, yet many systems record spatial information in british national grid, a developer-friendly reusable shared solution to reproject between coordinate systems may improve the link between data and frontend development

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

By promoting and improving standardised data formats, for example in the recording of planning records, or indeed any public service data that includes geospatial information and making metadata on their datasets readily available.

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?

High resolution, frequently updated satellite and aerial imagery
A coordinated involvement in OpenStreetMap, helping to improve their data?
Detailed soils data

Question 15: How can we best develop a single UK strategy, ensuring alignment between the individual strategies across the UK while still allowing for regional variations?

By taking the government as a platform approach to centralisation (standards, coordination) and localisation (implementation, inter-communication)

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

- Promote the need for spatial professionals (either through experience or qualification) at all levels including managerial
- Open standards
- Open licences
- Providing opportunities for public servants to collaborate on shared solutions
- Providing opportunities for small vendors to contribute via standardised record management (i.e. open standards for service delivery systems)
- Simplified procurement for SMEs and a move away from always using larger commercial organisations

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

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

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

See Q2 above: levelling the playing field in education for spatial applications between proprietary and open-source

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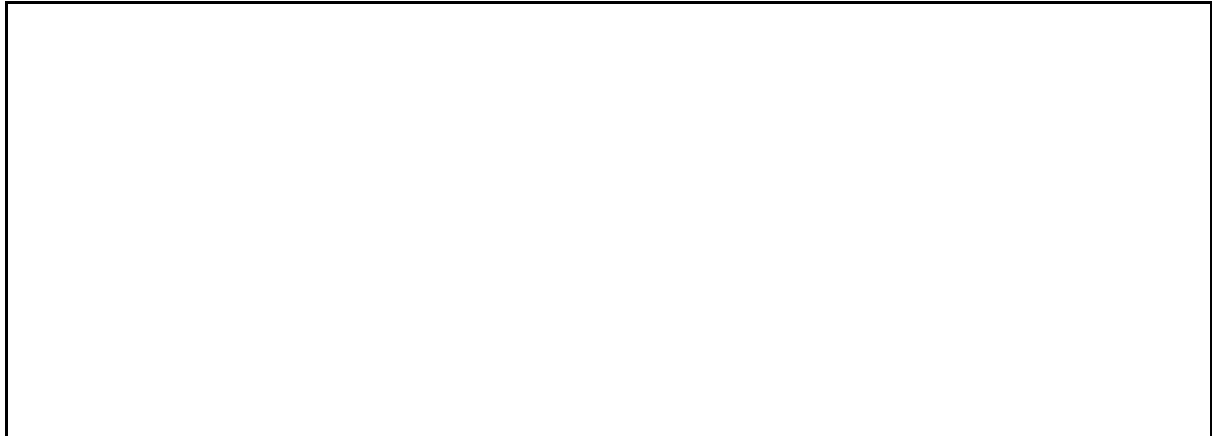
Q20: How best can we make the UK's presence in the international geospatial world more visible?

- By supporting an excellent spatial event such as FOSS4G
- By innovating open standards (see Open311 for example, which was founded by Code4America and is now used internationally, including for fixmystreet's own middleware to improve the british public space)
- By hiring innovative organisations, ideally in groups rather than single vendors to deliver high-profile government geospatial solutions, and allow those innovative organisations to flourish and collaborate

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?

- New York City planning labs (https://medium.com/nycplanninglabs/nyc-planning-labs-one-year-in-1f4c8cbd73aa)
- Philadelphia analytics (http://analytics.phila.gov/)

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