Coronavirus and Geospatial Technology

There is no doubt that almost everybody has been affected in some way by the Covid-19 virus. In this article we have brought together news items which show how the pandemic has impacted on the geospatial industry, either by making use of geospatial data and technology to monitor and control infections and help treat or support medical staff, or to change the way that geospatial companies or practitioners work.

Response from large organizations

The most obvious use of geospatial technology is providing visualizations of the spread of the disease. Print media and television make use of this but tend to use maps from third party providers; for example, the BBC uses John Hopkins University https://coronavirus.jhu.edu/map.html which in turn uses Esri to display their data. The statistics on travel shown at the Downing Street briefings use telecommunications data which identifies when an individual moves from one cell tower to another and is then stationary for at least 30 minutes. Examples of this type of data can be found on the Newcastle Urban Observatory site, which is providing observations on Newcastle and further afield.

Esri is helping the community at large with location intelligence, GIS and mapping software, services and materials for monitoring, preparing for and responding to the impact of the outbreak. Disaster response teams have been formed in many countries. ArcGIS dashboards are being widely used to visualise and monitor the spread of the virus in local communities, provinces, states, countries and worldwide.

Esri has its own portal, the Covid-19 GIS Hub.

In the United Kingdom, Ordnance Survey (OS) has been supporting a wide range of public bodies over the last month as Covid-19 has developed: https://www.ordnancesurvey.co.uk/about/covid-19. Experts and analysts from OS have formed an Emergency Response Team to help the NHS, emergency services and local authorities in their response to the pandemic. Access to data has also been a major consideration by OS. This is why, in addition to the data available for the public sector under the new Public Sector Geospatial Agreement (PSGA), OS has now released an additional Covid-19 licence for developers building Covid-19 specific services.

Since February, use of Ordnance Survey's digital mapping and outdoor adventure planning tool and app *OS Maps* has increased by 78% despite the nation entering lockdown. Views of the *OS Maps and the* recently added *National Cycle Layer Network* have increased by 98% since February as people are discovering cycling routes near where they live. www.getoutside.co.uk/covid is a one-stop shop for up-to-date information on what to do and where to go safely outdoors across England, Scotland, Wales and Northern Ireland.

Look also here to learn how a data alliance can aid our economic recovery.

Greenspace visualization â€" the greenspace layer has been a popular dataset during lockdown used by consumers and for health analysis.

A report in the August ISPRS eBulletin covered the work done in China by Professor Deren Li and his team at Wuhan University. They used space-based remote sensing and geospatial technologies to fight the epidemic prevention battle in Wuhan; for example, they assessed the impact of the construction of Huoshenshan and Leishenshan hospitals on the surrounding environment. Geospatial information technology was deployed in various areas, including traffic guidance management, transportation of prevention and control materials, robots for disinfection, food and medical equipment deliveries to the hospitals, as well as the logistical management of electric bikes provided for medical personnel to get to and from work.

Track and trace

Contact tracing is an essential technique for fighting the spread of the virus. This has been done in various ways around the world but details are not easy to determine. The John Hopkins University Centre for Health Security reports that in South Korea contact tracing incorporates patient interviews as well as the use of medical records, cell phone GPS records, credit card transaction records, and closed-circuit television. There are also reports that China has used phones to record travel history and CCTV for facial recognition, using AI and

machine learning. Deren Li has advised the Chinese government on how to use full big data from mobile phones to identify people who should be isolated, the key persons to trace, and those who are risk-free. China also uses a central database and collects and stores data.

Managing social distancing citizen behaviour

Restrictions on the way in which we behave have led to the development of apps which assist organisations in planning their space to ensure social distancing and also for individuals to keep their distance.

The European Global Navigation Satellite Systems Agency (GSA https://www.gsa.europa.eu/GNSS4Crisis) has a web page on GNSS for crises and lists Apps for Covid-19 response which cover such issues as queue management and response management. Companies such as Bentley and Trimble are offering software packages which can respond to the restricted conditions required to work whilst Covid-19 is present.

Software, such as Bentley's Legion, has been very useful for the simulation and modelling of foot traffic and in planning for social distancing and optimizing the use of space and mitigating risk.

Many cities are setting up temporary bike lanes to relieve pressure on public transport. To set up these new cycling paths safely and efficiently, cities and towns are deploying mobile mapping solutions, such as the Trimble MX7 together with Trimble Business Center, for quick data capture, planning and design of new bike lanes.

Through the established Mapping for Emergencies programme, OS has been supporting the government's response to the pandemic in several ways. Examples include identifying supermarkets with large car parks to help with screening and/or testing locations and identifying care homes and pharmacists. They are also supporting route planning and measurement of pavement widths and any issues with social distancing in Britain's towns and cities.

Information sharing and data fusing

Combining different types of information could be essential for evaluating where resources should be allocated. An example of this is Trimble Connect which is an open collaboration platform for design and construction that connects project stakeholders with the data they need to inform decisions and improve team efficiency. Trimble reports that the number of invitations to collaborate on projects increased 58% in April over the previous month.

GNSS and satellite image data

The Group on Earth Observations (GEO) has invited GEO Work Programme activities, GEO Members, Participating Organisations and Associates to share information about projects using Earth observations to support monitoring, response or recovery actions related to the Covid‑19 pandemic. GEO has published a list of Earth observations projects responding to Covid‑19, http://earthobservations.org/covid19.php.

In China, Deren Li has used Night Light Remote Sensing Monitoring to show the resumption of work and production in Chinese cities.

Academia and learned societies

Geomatics departments in the UK and around the world have mainly been involved in setting up remote teaching programmes and assessing the effect of travel restrictions on the September student entry. This has presented a range of challenges; for example, determining which learning management systems and video communications platforms are suitable and how to reach those students without an adequate internet connection or with poor ICT quality. Some excellent lessons for blended learning have come out of this and many organizations such as FIG and ISPRS have run webinars and virtual sessions and conferences.

There are also opportunities; for example, an InnovateUK competition has been announced offering £20 million for ambitious technologies to build UK resilience following the Covid-19 outbreak.

Conclusions

Geospatial data has been widely used in responding to the Covid-19 pandemic and many organisations have made use of the data in innovative ways. New ways of working have been introduced and new uses have been made of existing software and technology. What has not yet been determined is whether small companies will survive, or whether individuals who may have been furloughed or made redundant will manage.

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https://www.gim-international.com/content/article/coronavirus-and-geospatial-technology