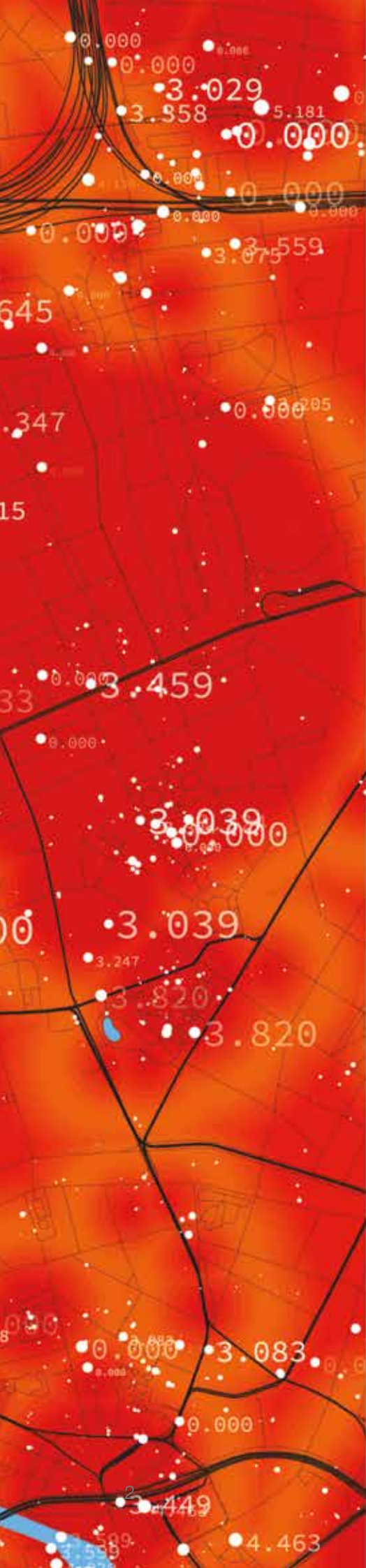




Unlocking the Power of Where:

Key Principles for Delivering the UK's Geospatial Strategy





CGI: the leader in location-enabled services

CGI is uniquely positioned to bring “the power of where” to the UK public sector. We offer a comprehensive set of integrated location-enabled services, underpinned by an unrivalled blend of skills and expertise including geospatial experts, software development, data management and cloud deployment. We provide the design, delivery and ongoing maintenance of location-enabled business and operational applications.

As well as our ability to deliver at scale, CGI has more than 40 years’ experience working with public sector organisations in the UK, helping them harness the power of digital for the benefit of citizens and society as a whole.

CGI’s location-enabled offer encompasses:

- Consultancy – to help public sector organisations unlock the potential of location-enabled applications and services and create a roadmap
- Design and Development – to create specialist applications
- Service Management – via managed services for organisations that do not have in-house expertise
- IP – CGI has built platforms to deliver the above services including GeoData360 and GeoApp 360.

Introduction

Location services are poised to transform the delivery and operations of the public sector, equipping government to tackle the big challenges that face the UK this century. These challenges range from managing environmental resources, achieving the 2050 net zero target for climate emissions, ensuring our national security in a changing world and planning for the future of transport.

In recognition of the tremendous potential for location data services, in June 2020 the UK's Geospatial Commission published Unlocking the power of location: The UK's geospatial strategy - a national vision and framework to position the UK as a leader in location-based innovation and adoption.¹

The geospatial strategy is launched at a time when the Covid-19 pandemic has underlined the value of location data for analysis and decision making. Epidemiology – the study of the distribution of diseases – has used “the power of where” since at least 1854 when Dr John Snow used location data to map the origin of a cholera outbreak in Soho, London.

Location data remains critical to epidemiology and is set to play a growing and central role across society as a whole. Already, according to Ed Parsons, a geospatial technologist at Google, around 10 per cent of the UK economy is reliant on location data. With high levels of smartphone adoption meaning most of the population is walking around with a location-based device, there is immense scope for growth.²

“ . . . by 2025 the UK will have a coherent national location data framework. Future technologies will be underpinned by data about events occurring at a time and place. Location data will be the unifying connection between things, systems, people and the environment ”

Unlocking the power of location: The UK's geospatial strategy.
Geospatial Commission, June 2020

Identifying key principles for success

CGI is a global leader in the development and deployment of location-enabled technologies and services, with particular focus in the public sector. In this paper, CGI draws on this experience to offer 4 Key Principles for fulfilling the UK's geospatial strategy. These principles are formulated to support the strategy's mission of accelerating innovation, driving adoption and delivering on the potential of location data.

At the heart of the 4 Key Principles is integration: location data is most valuable as an analytic and decision-making tool when it is fused intelligently with data from other sources and integrated into business and operational systems.

The 4 Key Principles are expanded upon later in this paper. In summary, they are:

- 1. Democratise the power of where:** about the importance of delivering location-enabled services into the hands of end users.
- 2. Embrace “open” as an enabler:** the benefits of building location services and applications on open principles.
- 3. Join the dots, enable the connections:** the need to reach across organisational boundaries to give access to data, enable data sharing and the fusing of data from different sources to improve real-time decision making.
- 4. Secure by design:** security must be at the heart of all location-enabled solutions to protect sensitive data, safeguard applications and give confidence to users.

Throughout, this paper uses real world examples, showing how UK public sector organisations are working with CGI to leverage location data.

¹ Unlocking the power of location: The UK's geospatial strategy. UK Geospatial Commission. June 2020.
<https://www.gov.uk/government/publications/unlocking-the-power-of-locationthe-uks-geospatial-strategy>

² Mobile Consumer Survey 2019. Deloitte. <https://www2.deloitte.com/uk/en/pages/technology-media-and-telecommunications/articles/the-market.html>

The Power of Where

Location data is about unlocking “the power of where”: it is said that 80 per cent of data has a location element, referring to events that occur at a specific place and time. Geospatial applications harness this location data and use it to inform analysis, drive decision-making and enable better outcomes.

The “power of where” touches citizens’ lives in many ways – often, without us being aware of it. It is most fully unleashed when location data is fused with software engineering capabilities and integrated into business and operational systems. Mapping is an obvious use for location data – but there are many more as will be seen in this paper, particularly when data from different sources is integrated into location data-enabled applications.

Looking at the some of the work CGI is doing with public sector organisations across the UK reveals diversity of location data-enabled applications. These include:

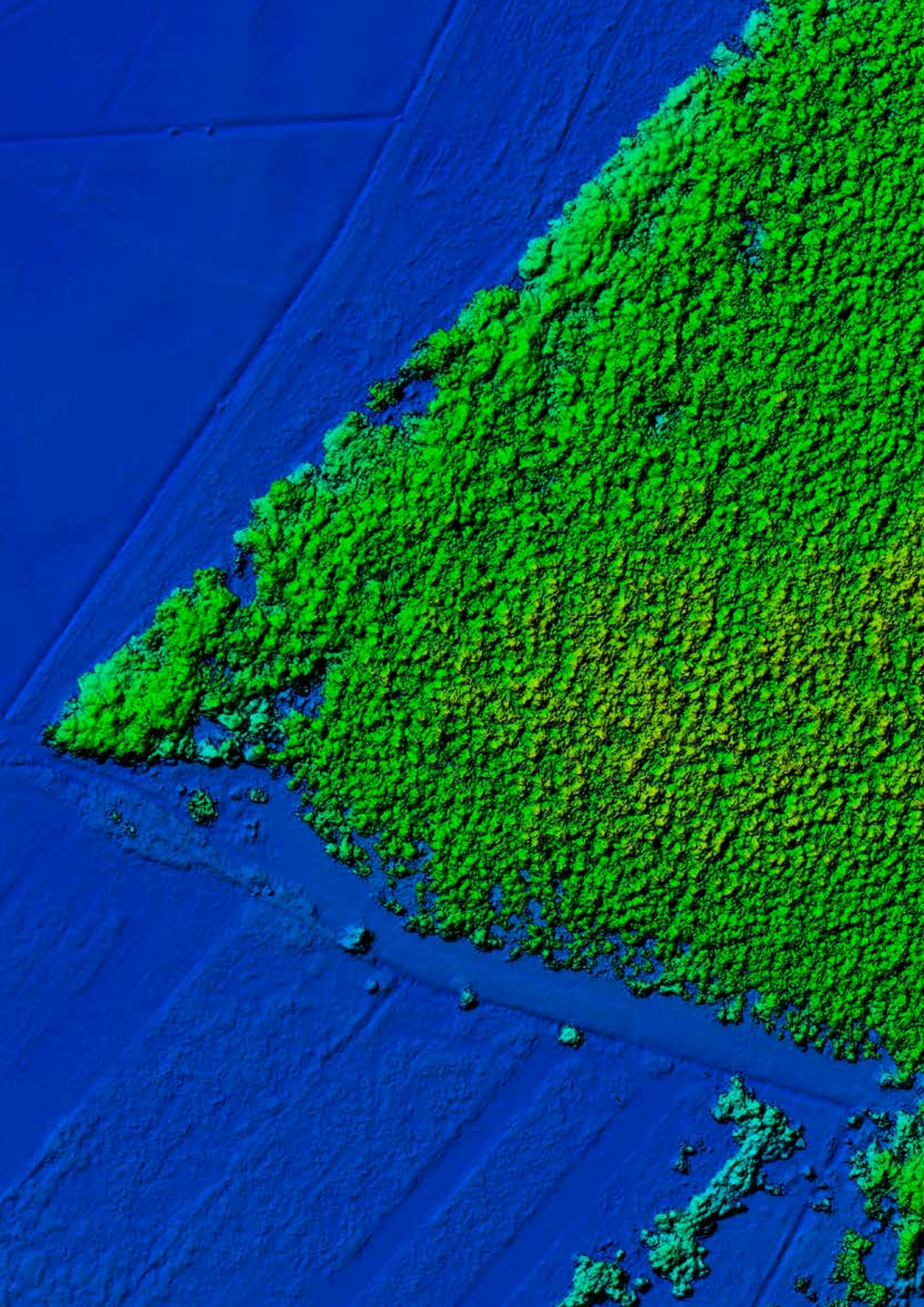
- **Systems that support agricultural payments for farmers in Europe**
Earth Observation (EO), processed by CGI, is used to validate payments to farmers
- **Satellite data that informs weather forecasts**
CGI processes image data from the European Space Agency’s (ESA) Meteosat satellites to extract weather information
- **Windstorm risk assessment**
Working with KNMI, the University of Reading and the Met Office, CGI has developed an operational data service for assessing the impacts of windstorms as part of the Copernicus Climate Change Service.

Unlocking “the power of where”

Much of the work carried out by UK public sector organisations revolves around location data, particularly for planning and the management of resources. These agencies hold vast amounts of location data – and they have access to vast amounts of other kinds of data relating to things as diverse as demographics, housing, health or crime.

However, in some areas the public sector has barely begun to unlock “the power of where”. Often, public sector organisations do not have a complete inventory of the data – literally, they do not know what data they hold. Organisations may not be able to access their data because it is held in different locations or hidden behind firewalls. Finally, there is often a lack of awareness about the potential for location data-enabled innovation in the public sector, coupled with a shortage of the skills required to harness this potential.

The next section outlines the UK geospatial strategy. It explores how the strategy can enable public sector organisations to harness “the power of where” by integrating location data into their operational and business systems.



Overview on the Geospatial Commission's UK strategy

The publication of the Geospatial Commission's UK geospatial strategy is an important moment in the exploitation of this powerful technology, with important implications for the adoption of location data applications in the public sector.

Unlocking the power of location: The UK's geospatial strategy is based on four missions for developing location-enabled data, services and skills:

1. Promote and safeguard the use of location data
2. Improve access to better location data
3. Enhance capabilities, skills and awareness
4. Enable innovation

The missions go some way to addressing the barriers that prevent public sector organisations from exploiting the potential of location data. Missions 1 and 2 in particular speak to the issues around access to location data. Mission 3 addresses the key issues around awareness and skills. If the first set of Missions are delivered, Mission 4 (Enable innovation) should follow.

The 4 Key Principles later in this section will provide recommendations - based on CGI's experience working across UK government agencies - on how public sector organisations can deliver the missions.

Making a difference in the public sector



Unlocking the power of location: The UK's geospatial strategy. Geospatial Commission, June 2020

The UK geospatial strategy identifies nine opportunity areas for deploying location data. Looking through the lens of public sector innovation, and with reference to the government's policy priorities, CGI has identified Transport, Environment and Emergency Response as key areas of opportunity. In addition, based on its deep experience supporting the UK's armed forces, CGI identifies Defence as a further area of exceptional potential.

These areas – Transport, Environment, Emergency Response and Defence – are natural priority candidates for the deployment of integrated applications that incorporate location data. Effective use cases in these areas will demonstrate the potential of location-enabled applications and provide the logic for wider and faster deployment of this powerful technology across the public sector.

Environment: protecting our world

Location data has a vital role to play in driving how the UK manages its natural resources. This has gained urgency since the UK became the first major economy to target net zero greenhouse emissions by 2020. Here, location will be essential in areas such as monitoring the UK's carbon stocks and emissions – particularly, when married with technologies such as automation, AI and analytics.

CGI's partnership with the Department for Environment, Food & Rural Affairs (Defra) is a good example of how location data can help the country tackle environmental challenges. CGI helps Defra store and process satellite data, providing access to the critical Analysis Ready Data (ARD) that Defra needs to better inform policy and safeguard the environment. CGI is also using this data to support climate projects outside the UK, in Malaysia and Indonesia, highlighting the global reach and impact of UK-developed location-enabled technology.

Transport: keeping the UK on the move

Data is transforming mobility, allowing transport systems to work more efficiently, reducing congestion and allowing more journeys to be made without disruption on the UK's crowded road and rail networks. Underlining the importance of data in this area, in 2019, the Department for Transport launched its Transport Data Strategy to study how the UK's transport sector can use data more effectively.

Applications which use location, fused with data from other sources, are already demonstrating their value in transport. CGI is working with rolling stock operator Angel Trains to monitor and detect maintenance problems before they can impact the performance of its fleet. Here, CGI fuses information from onboard Internet of Things (IoT) sensors with location data to provide a comprehensive real time dashboard on each train's operational status. As well as pre-empting faults, Angel Trains can use the information displayed on the dashboard to manage down fuel consumption.

Data can also change travel behaviour, helping citizens choose greener and healthier modes of transport. CGI has partnered with the Welsh Government to develop a platform that uses integrated location, combined with data from other sources, to promote active travel choices, such as walking and cycling, by giving citizens rich information about their travel options for any given journey.

Emergency response: safeguarding citizens

There is an obvious need for greater use of data-driven applications in emergency response: with access to relevant integrated data from healthcare and police, for example, paramedic teams could arrive faster to the scene of an incident, equipped with all the information they need to make better decisions about patient care.

While the UK geospatial strategy specifically identifies emergency response, any public sector organisation involved with protecting citizens or national security will benefit from wider deployment of integrated data that includes geospatial data including the police, fire and rescue services, social services and Border Force.

Integrating location data into police intelligence systems can enhance operational capabilities and support analysis-led policing to tackle challenges such as county lines. Looking forward, fusing location with data from police and other sources such as social services can help law enforcement intelligence evolve into predictive systems that can anticipate crime, helping police prevent harm to the public.

Defence: protecting our country

Although not included as an area of opportunity in the UK geospatial strategy, defence is clearly an area where location data, integrated into operational systems, can deliver benefit to the public. Location data has always played a crucial role in protecting the UK and the proliferation of threats in traditional and non-traditional domains such as space and cyber-space make it increasingly important to develop holistic systems which make trustworthy data and information available to decision makers at the right time.

CGI works with customers across the UK Defence and Intelligence sector to deliver location systems and services which:

- Optimise the blend of off-the-shelf and bespoke systems
- Maximise the ability to re-use data and rapidly generate new insights upon demand
- Incorporate cutting edge data processing and analysis technologies to fuse disparate and diverse data sources
- Implement the highest levels of information security and trustworthiness

One example of this approach is CGI's involvement in delivering the Field Deployment GEOINT (FDG) capability which provides mapping, digital geographic information, and imagery-derived intelligence to UK forces.

The ability to make trustworthy, timely data available is important for all public sector users, not just defence. In a cyber-critical era where any vulnerability will be exploited by an attacker, the need for leveraging these principles across the public sector becomes increasingly important.

CASE STUDY 1

Streamlining service delivery

Integrated data from multiple sources, including location, plus intelligent automation transforms service quality and improves efficiency for The Coal Authority.

The Coal Authority (TCA) manages legacy issues, including subsidence damage claims, associated with the UK's historic coal mining industry. With 25% of the country's housing stock lying within coalfield areas, accessing a CTA mining report is often an important step in the conveyancing stage of house purchases.

CGI has enabled the TCA to digitise and automate its mining report service, end-to-end. The new system uses intelligent automation to generate the reports, integrating data from a number of sources including Ordnance Survey and a commercial partner which provides address validation. At the front end, an intuitive web interface makes it easy for users to self-service.

More than one million reports have now been generated by the TCA's digital mining report service. Benefits of the streamlined service include:

- Reduced transaction costs for the TCA and for citizens
- Faster transactions: reports now take minutes, and sometimes just seconds, to produce
- 100% increase in mining report productivity – 600 reports are generated every day
- 59% of users now rate the service as excellent

CASE STUDY 2

Making data accessible

Before it can be integrated into business and operational systems, raw data needs to be processed into Analysis Ready Data (ARD). CGI helps Defra access a timely, reliable and cost-effective way to get the data it needs to power environmental management and protection applications.

The Department for Environment Food & Rural Affairs (Defra) safeguards the UK's natural environment. It uses huge volumes of data for everything from simple visualisations to complex machine learning algorithms. According to Defra's calculations, generating ARD was a significant expense, accounting for 70% of the cost of using Earth Observation data from the European Space Agency's SENTINEL satellite system.

CGI tackled the challenge of providing timely, reliable and cost-effective ARD in three ways. Using the cloud offered a flexible way to store and access the large amounts of imaging data needed by Defra's applications. Automation was used to manage the complex process of turning the raw imaging data into ARD. Finally, CGI designed a further cloud-based solution to store the large volumes of ARD.

CGI's solution has enabled Defra to make full use of ARD in key projects including illegal forest felling detection, assessing water pollution and quality due to road run-offs, houses or farmland.

- Enables Defra to take advantage of ARD across multiple projects
- Developed and deployed in just 3 months
- Cloud-based solution reduced ARD storage costs by more than 90%

Realising the UK geospatial strategy: 4 Key Principles

The Geospatial Commission's UK geospatial strategy sets out a framework for the development and adoption of location-enabled applications and services across society, based around four missions. In this section, CGI describes 4 Key Principles that support the delivery of the strategy in the public sector.

Derived from more than 30 years' experience of working with UK public sector organisations to deliver geospatial innovation, CGI has identified 4 Key Principles to drive and accelerate the delivery of location data services in government. While focused on three of the opportunity areas identified in the UK geospatial strategy, plus Defence, the principles can serve to drive geospatial innovation and the adoption of integrated location data applications across all society.

1

Democratise the power of where

To fully realise the power of where, government organisations need to put integrated data-enabled applications into the hands of end users by exploiting connected and IoT devices and leveraging the power of automation and AI. These applications are "integrated" in the sense of fusing data from different sources, including location data, and using it to generate meaningful insights.

As well as helping users - and organisations - work more effectively and efficiently, more users interacting with the applications will mean more opportunities to learn and develop applications in the field. Engaging users with location data services in this way can drive a virtuous cycle of innovation and improvement.

2

Embrace "open" as an enabler

Integrated data means fusing data from different sources, including location sources. It therefore makes sense for public sector organisations to adopt integrated data applications built on "open" – open standards, open architecture and, in-line with Government guidance, open source. Open makes it easier for data to be shared between different sources and allows data to flow between different applications which supports the first Key Principle (Democratise the power of where).

With open as an enabler, organisations are not tied to any one system or technology so they can continue to innovate and improve.

3

Join the dots, enable the connections

To make integrated data possible, public sector organisations need to make relevant data accessible and be willing to share it, internally and with other organisations. Applications will need to reach across organisational boundaries. As noted, data may come from different sources within a single organisation.

Joining the dots is often more about culture than technology: many public sector organisations may be reluctant to share their data. They may have only a limited experience of working with other organisations on data-driven technology projects.

4

Secure by design

Security must be at the heart of any system. Given "the power of where", it's perhaps even more imperative that integrated applications have watertight security protections and protocols given their power and the extent to which they interface with different data sources.

As well as safeguarding the data in the application and ensuring it is trustworthy, robust security will protect the public and the public interest, and give confidence to users, helping to promote adoption.

Conclusion

Integrated data-driven applications that harness the power of where have vast potential to transform the delivery of public services in the UK, making them more responsive to citizens, more effective and more efficient. These applications can enable the UK to drive progress on topics as diverse as safeguarding the environment, post-pandemic recovery, protecting the vulnerable and securing the borders post Brexit.

CGI welcomes the UK geospatial strategy as an important and timely stimulus for the development and exploitation of location data. Every day, we demonstrate “the power of where” for our public sector clients and partners. We believe this is the right strategy to advance location data adoption and innovation in the UK.

The 4 Key Principles outlined in this paper are based on CGI’s experience of delivering applications and services to public sector organisations that integrate location data with business and operational systems. These principles are based on our experience and we hope they provide a useful framework for organisations who are setting out on this path.

Location-enabled services have demonstrated their value in a growing number of use cases, some of which are referred to earlier in Unlocking the Power of Where. However, the UK public sector is only beginning to exploit “the power of where”, and the potential for these location-enabled applications will only grow as more of the world is wired (or connected wirelessly) into digital networks. CGI hopes that this paper can add to the momentum already underway, supported by the publication of the UK geospatial strategy.



About CGI

Founded in 1976, CGI is among the largest IT and business consulting services firms in the world. Operating in hundreds of locations across the globe, CGI delivers an end-to-end portfolio of capabilities, from strategic IT and business consulting to systems integration, managed IT and business process services and intellectual property solutions. CGI works with clients through a local relationship model complemented by a global delivery network to help clients achieve their goals, including becoming customer-centric digital enterprises.

Learn more at cgi-group.co.uk

© 2020 CGI Inc.

