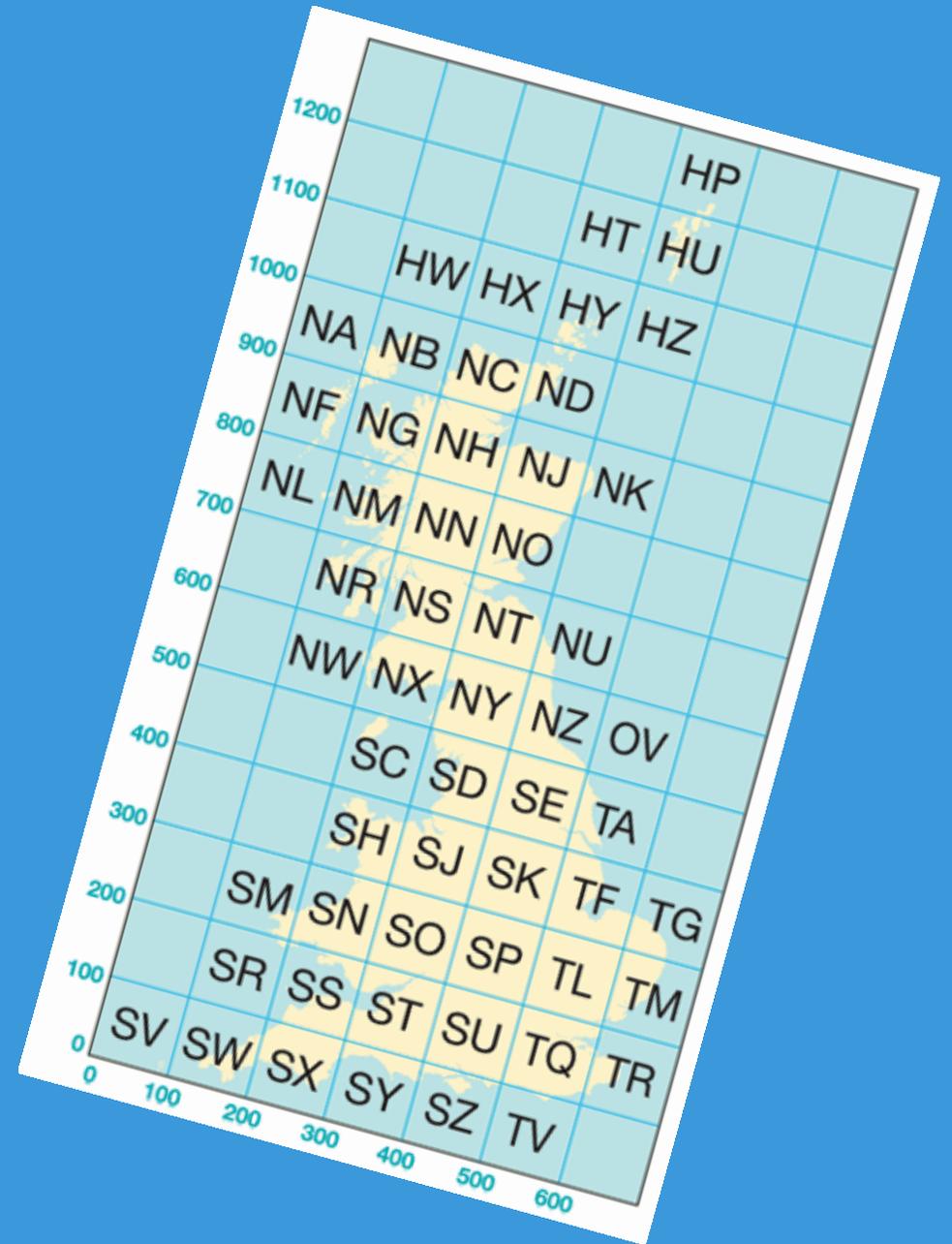


Beyond GB and Geo

*National Mapping
in Transformation*



MAKING A VITAL CONTRIBUTION TO TODAY'S ECONOMY

- 4,500+ public sector organisations using OS data
 - Public sector use cases - policy development in central government to front line local government service delivery.
- Unique in offering guaranteed levels of authority, currency and coverage for GB with security of supply
- OS data used extensively in key service industries:
 - Land and property, financial services and energy & utilities
- Working through 400+ licensed partners to provide added value services:
 - Geospatial data distributors, Value Added Resellers, Mobile/Digital Platform Providers and System Integrators
- OS plays a vital, global role in geospatial subject matter expertise
 - Working with the academic community, resilience/ defence/ emergency planning, standards, innovation, R&D bodies



GEOSPATIAL UNDERPINNING GB

Land & Property

- Built Environment portfolio management
- Accelerating new build programmes
- Promoting the creation of Digital and Smart economy
- Supporting Government strategy & legislation
- Land Registration and surveying for Land Registry

Financial Services

- Portfolio risk management
- New business management
- Fraud detection

General Commercial

- Logistics planning
- Journey management

Resilience & Security

- Civil Contingencies Secretariat
- MOD and Security Agencies
- Critical National Infrastructure (road, rail, flood defence)
- Emergency Response Services and planning

Energy & Infrastructure

- Increasing resilience, smart meter rollout, mains replacement programme, demand side management
- Supporting 4G/5G rollout
- Encouraging competition in non-residential water networks, private sewer/pump adoption, leakage reduction
- Connected Transport – environmental impacts, buried assets

Natural Capital

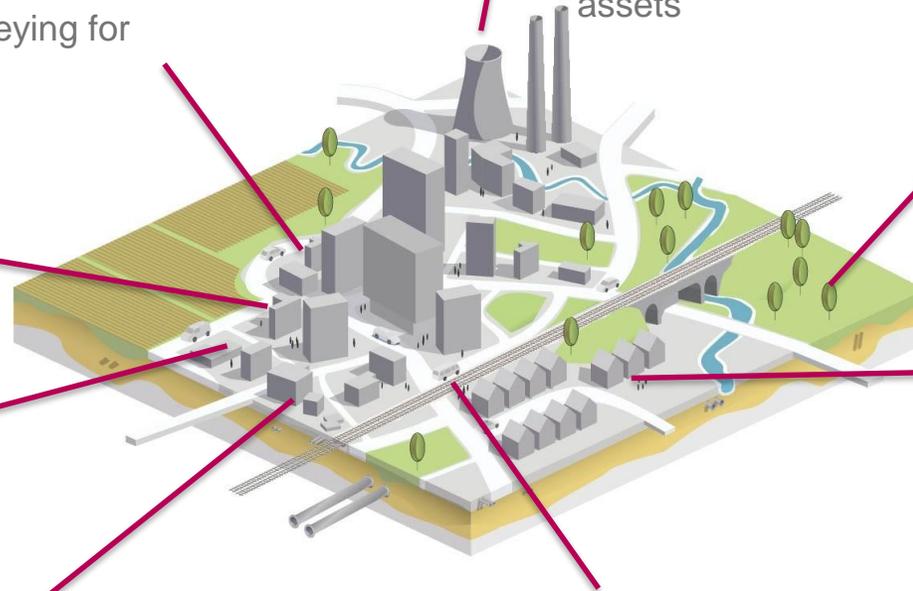
- Land Use monitoring (RPA Farm Grants)
- GreenSpace access
- Flood defence management & planning

Local Authority Services

- Street works planning
- Planning applications
- Boundary management
- Education services
- Waste management
- Citizen engagement
- Benefit fraud detection
- Asset Management

Health & Social Services

- Asset management & patient care optimisation
- Social Care spectrum
- Community First Responder App



‘The world’s most valuable resource is no longer oil, but data’





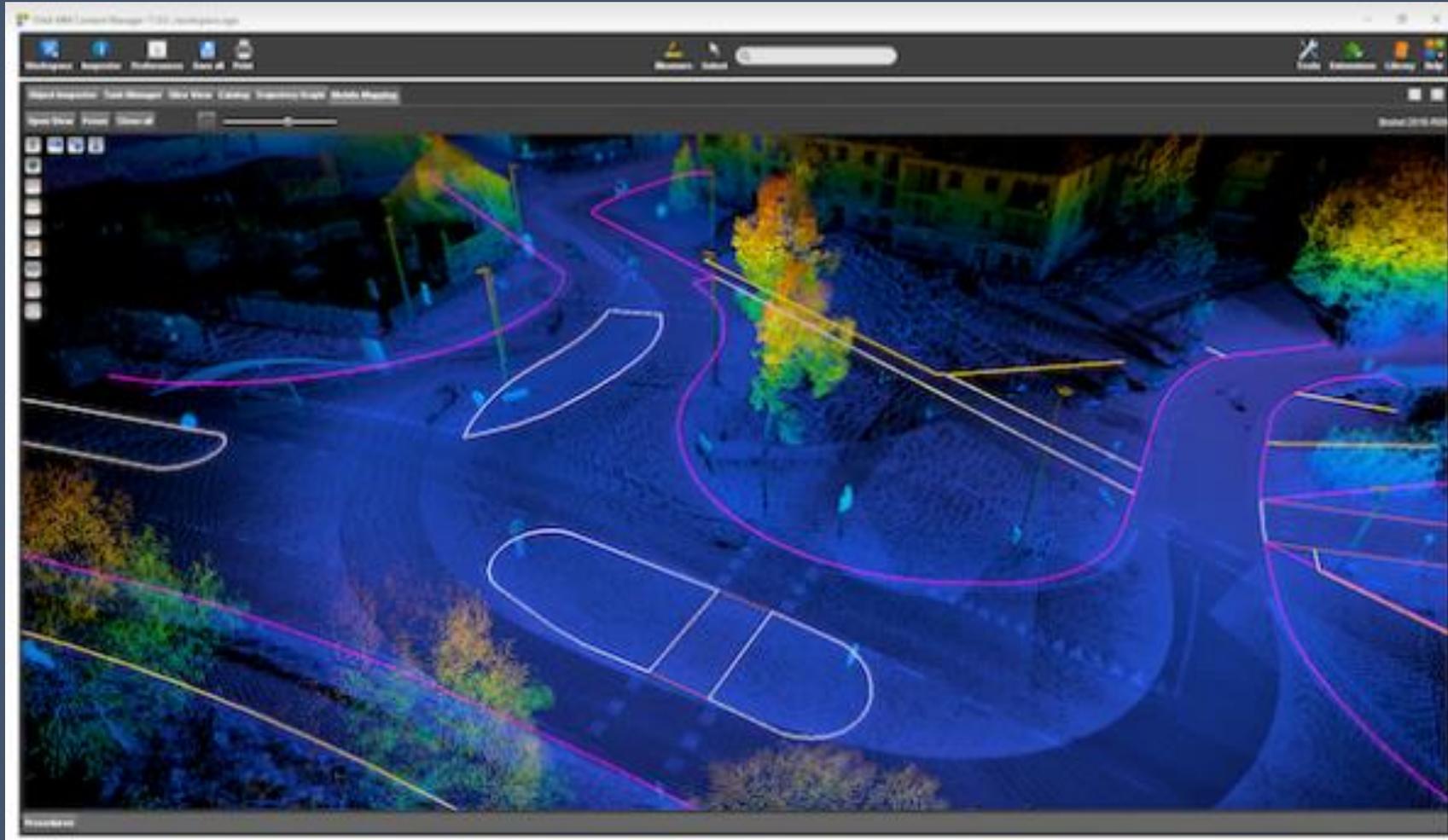
“Its digital, stupid”

Data data everywhere

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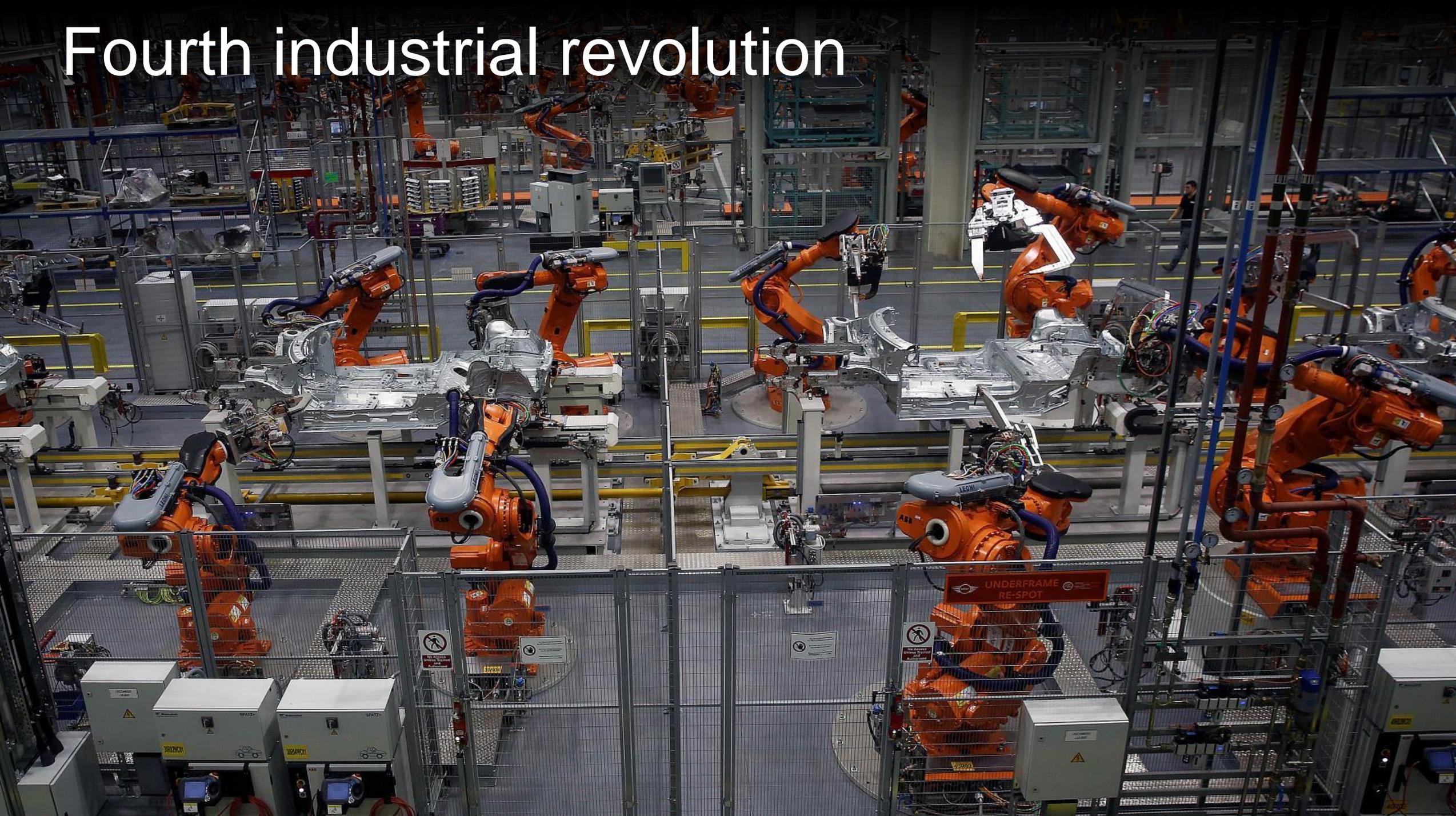
Everything happens somewhere



Data as a platform



Fourth industrial revolution



Digital Britain





OS have captured and attributed...



31,257 Points

- Lamp posts
- Bus stops
- Cycle racks
- CCTV
- and more...



Discovering insight and
generating new value

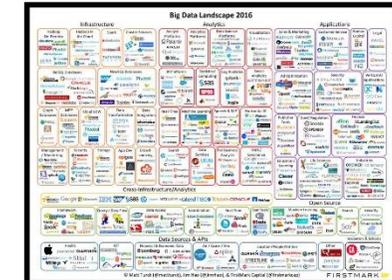
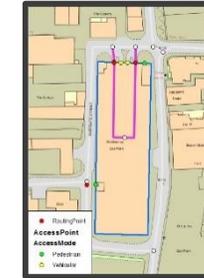
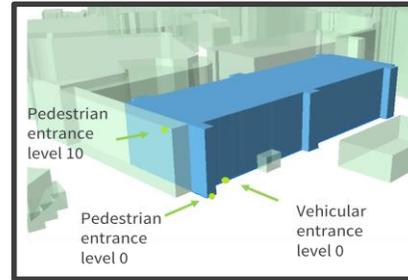
@Geovation



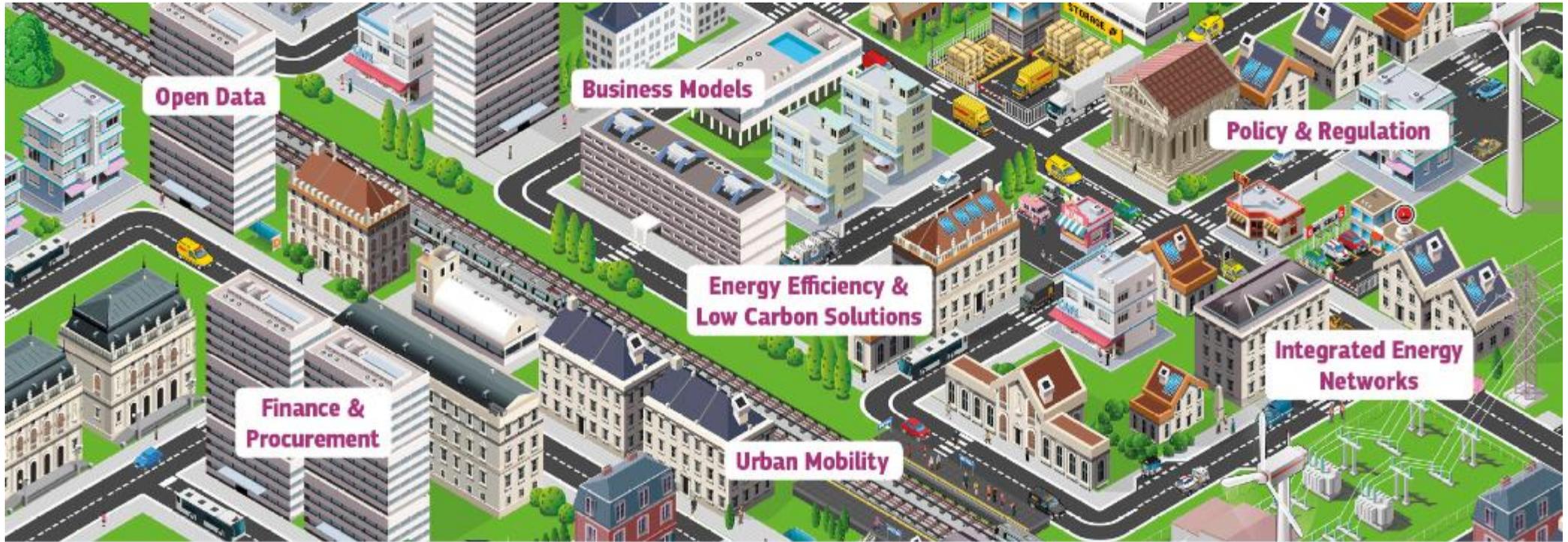
From outputs to outcomes

DEMAND FOR GEOSPATIAL CONTENT HAS CHANGED

- New opportunities and new use cases present a different demand:
 - Real time
 - Real world
 - Machine to machine
 - High volume
 - Predictive modelling
 - Cognitive thinking
 - Big data
- And, above all else, outcome driven



THE DIGITAL REVOLUTION IS TRANSFORMING USERS' DATA NEEDS



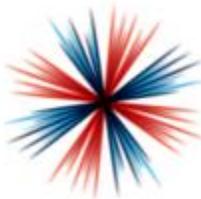
Department
for Environment
Food & Rural Affairs



25-Year Environment Plan



Department for
Business, Energy
& Industrial Strategy



**INDUSTRIAL
STRATEGY**



Department for
Digital, Culture
Media & Sport

Policy paper

UK Digital Strategy 2017



OUTCOMES – NEW GEOSPATIAL NATIONAL ASSETS

Energy & Infrastructure

Financial Services

Local Authority Services

Land & Property

General Commercial

Natural Capital



1. HMG Services:

- i. Sustainable, managed agriculture
- ii. Brexit growth – boarder control, trading routes,
- iii. Intelligent, connected urban planning
- iv. Effective, targeted Emergency Services
- v. Disaster planning & management
- vi. Connected & informed citizen engagement

2. Technologies:

- i. Autonomous vehicles
- ii. National 5G network
- iii. Sustainable energy
- iv. Smart Infrastructure – connected, secure, resilient,
- v. Connected, multi-modal transportation

3. Geospatial Assets:

- i. Government's National Digital Geospatial framework – above & below ground data, extending into the air & off shore, incorporating the built & natural environments
- ii. Smart City Data Exchange
- iii. UK geospatial exemplar – BIM, CAV, 5G, autonomous surveying
- iv. UK Geospatial innovation community

‘The potential economic value of [geospatial] data is huge.

To maximise the growth of the digital economy...the government will establish a new Geospatial Commission to provide strategic oversight....’

UK Government budget statement
22 Nov 2017

Global experiences

GLOBAL TRENDS



RECENT OS EXPERIENCE



OBSERVATIONS

- Each country has their own unique drivers for investment in geospatial
- Drivers fall into at least one of three categories: Economic, Environmental, Societal
- Countries investing heavily in geospatial have made an intrinsic link at the highest level of government between geospatial and achievement of national strategies or national use cases
- Move from geospatial policy frameworks to geospatial being a natural, intrinsic consideration in all major policy frameworks – Part of the critical national infrastructure and the national conscience
- Advances in technology (machine learning, blockchain) a major driving force (automation, reduced costs, increased security) and are rapidly moved from research into production
- Realisation we are in the data and information age (not the maps and products age)
- UN recognition (UN-GGIM) and realisation that GI is part of the national infrastructure
- A small, but growing minority are becoming disillusioned with SDI and are focussing on a global data infrastructure

UN-GGIM

To make accurate, reliable and authoritative geospatial information readily available to support national, regional and global development.



UN-GGIM:A GLOBAL INITIATIVE

Formal inter-governmental UN Committee of Experts to:

- Discuss, enhance and **coordinate Global Geospatial Information Management activities** at senior political levels.
- Make **joint decisions and sets directions** on the use of geospatial information within national and global policy frameworks.
- Address global issues and **contribute collective knowledge as a community** with shared interests and concerns.
- Develop effective strategies to **build geospatial capacity** in developing countries.



UN-GGIM: INTEGRATING DIFFERENT DOMAINS

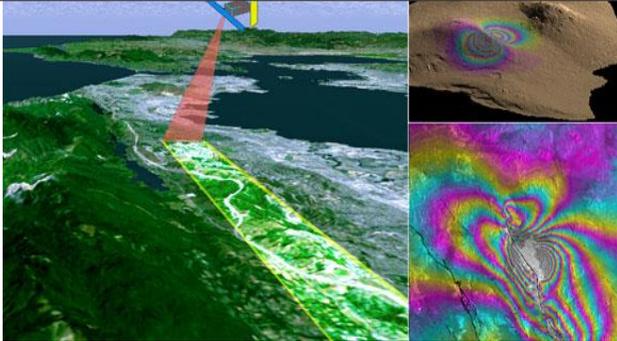


Statistics



Mapping

Remote Sensing



Land Administration



Geography underpins the 2030 Agenda for Sustainable Development



Analysis by the United Nations Committee of Experts on Global Geospatial Information Management, shows that:

- Geospatial information has a direct contribution to at least 15 indicators
- Geospatial information has a significant/supporting contribution in at least 9 indicators



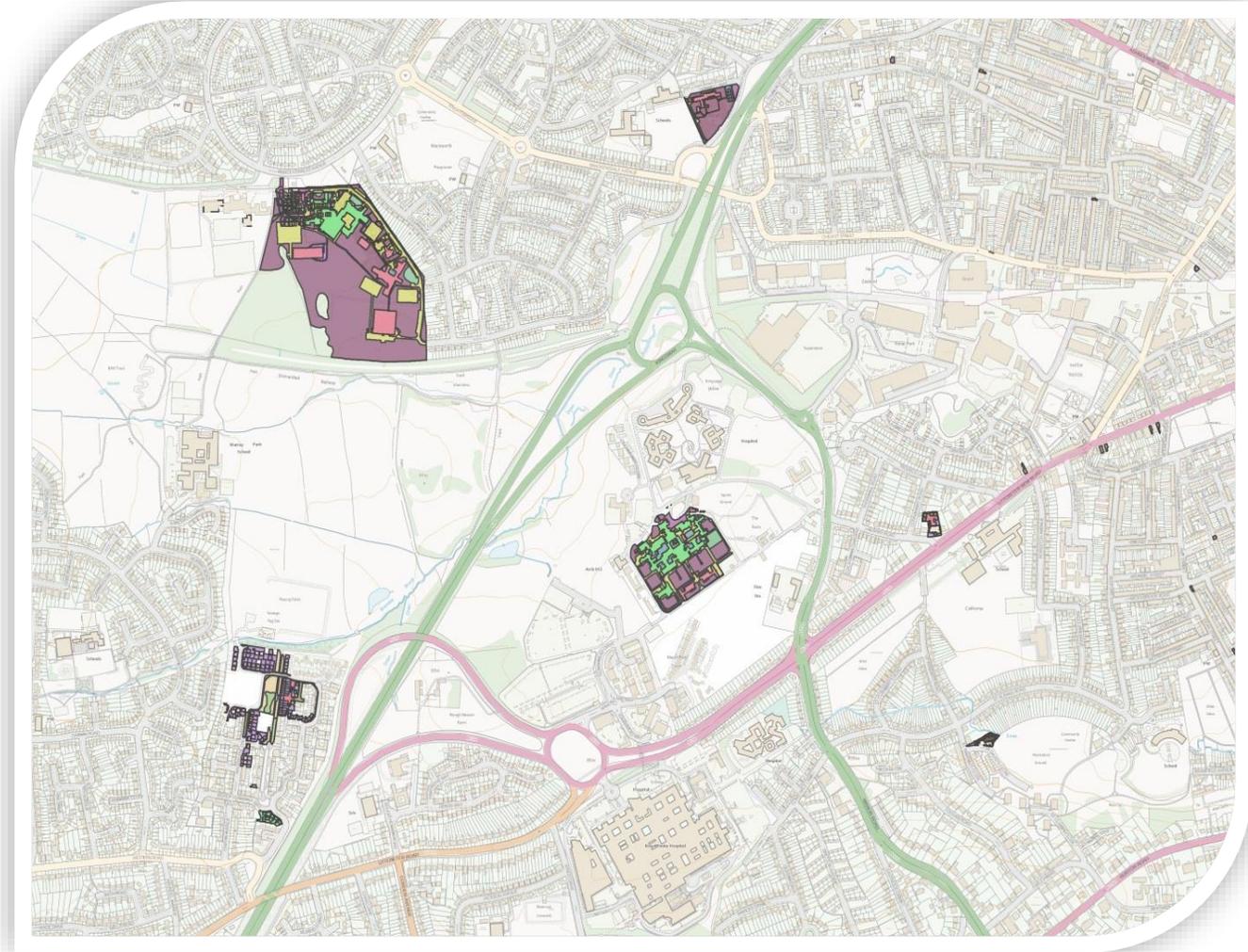
Geospatial & Statistics

DCLG – DEPT COMMUNITIES & LOCAL GOVERNMENT

Land Use Change Statistics

National statistics published annually for over 30 years by DCLG describing the estimated amount and location of change

- Since 2013 provided polygonised land use change derived by conflating and analysing mid-year snapshots of several OS products
- Residential address changes derived through change history in OS AddressBase Premium



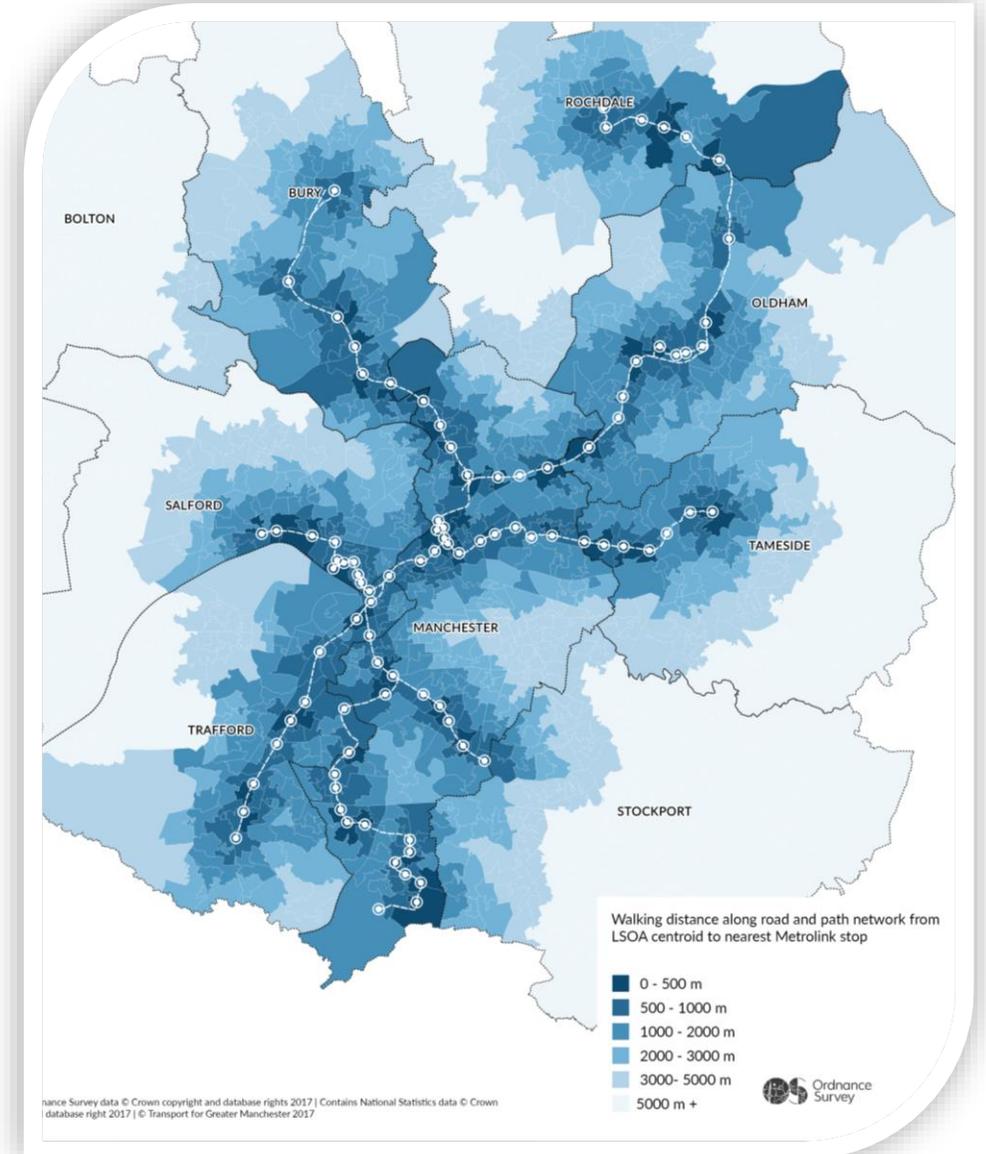


GMCA – GREATER MANCHESTER COMBINED AUTHORITY

Manchester –Regional Analytics

Discovery project investigating the scope for insight creation, within open data and OS PSMA data, around the changes taking place across the authority.

- AIMS To publish geographically derived statistics against Lower Super Output Areas so as to enable analysis in conjunction with existing statistics



Earth Observation

EARTH OBSERVATION HAS CHANGED

Utilising new technologies in space science:

- COTS technologies & services (componentised) is leading to:
- smaller pay-loads
- cheaper construction
- Cube satellites

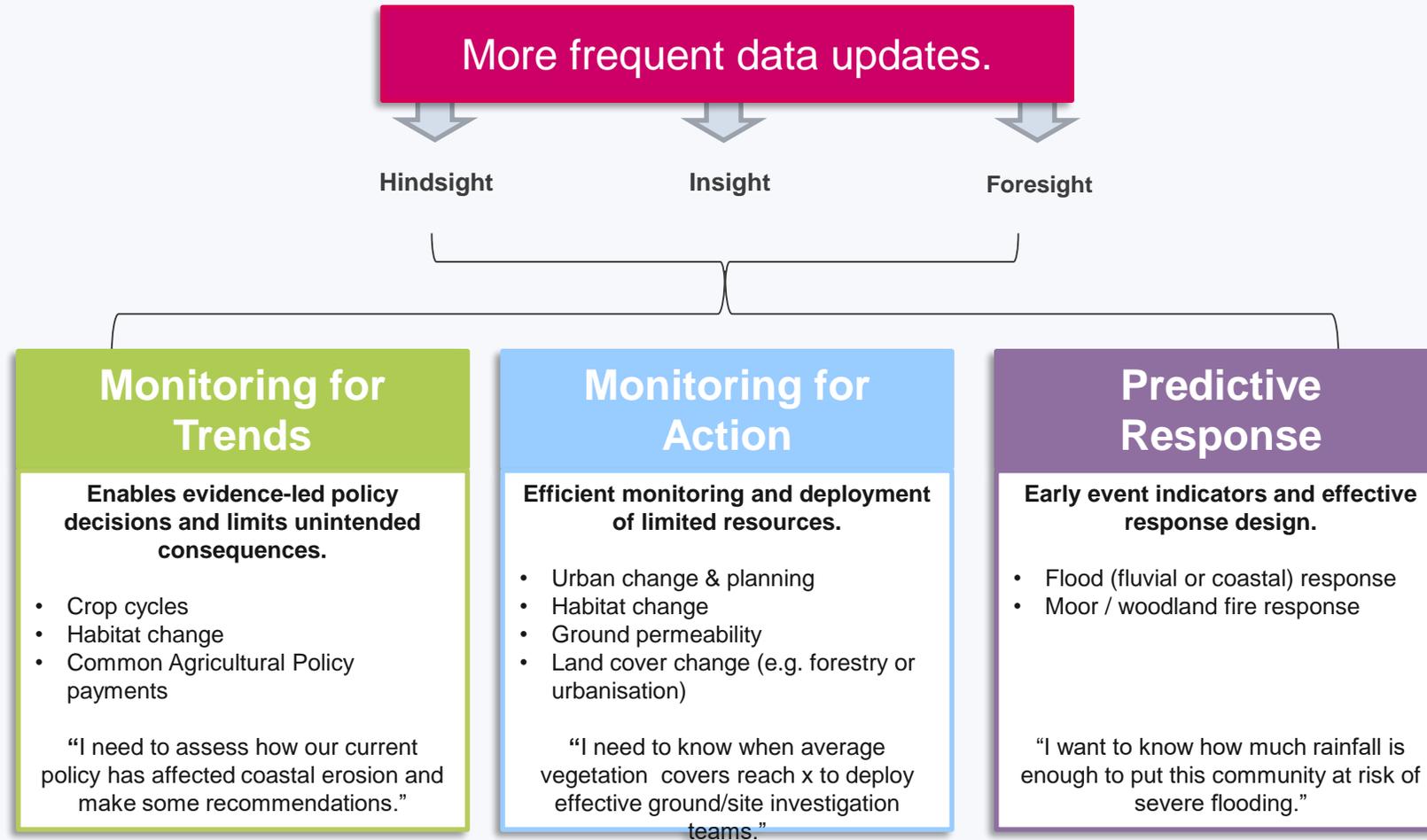
It is an industry that could **not** have existed 10 years ago

More launch options (Russia/India/China)

- Leading to significant growth in **all** aspects of satellite deployment (inc. Earth Observation)

It is offering a potentially disruptive source of data to the market

EO IS DRIVING BETTER, MORE EFFICIENT DECISIONS



EARTH OBSERVATION DATA DOES HAVE LIMITATIONS



Imagery from Copernicus data viewer at <http://viewer.globalland.vgt.vito.be/viewer/>

Certain types of challenges arise when working with EO data:

- ▶ It is susceptible to cloud cover issues.
- ▶ Land Cover classification is susceptible to variation.
- ▶ Land Use identification is difficult to derive.
- ▶ Relating data to real world objects presents a challenge.

▶ Actionable insights derived from relating 'real world objects' to EO data will unlock benefits.

EO ACTIVITIES



Support to UK-GEOS (full time secondment)

Pilot project: assessment of coastal erosion monitoring from EO sources. An OS led (SSGP funded) study with input from EA, SNH/Dynamic Coast, Scot Govt

Defra: EO Centre of Excellence

EODIP MI06: streaming lining RPA's land change detection to improve control efficiency

An OS led (Defra funded) study with SAC to examine EO suitability to detect features appropriate to RPA processes.

Defra: UK GEO-CEOS coordination board

Coordination of UK engagement with international EO coordination bodies.

Group on Earth Observation (GEO) secondment:

Representing the UK in development of GEO Disaster Risk Reduction programme



Department
for Environment
Food & Rural Affairs



Being disruptive

OS Smart

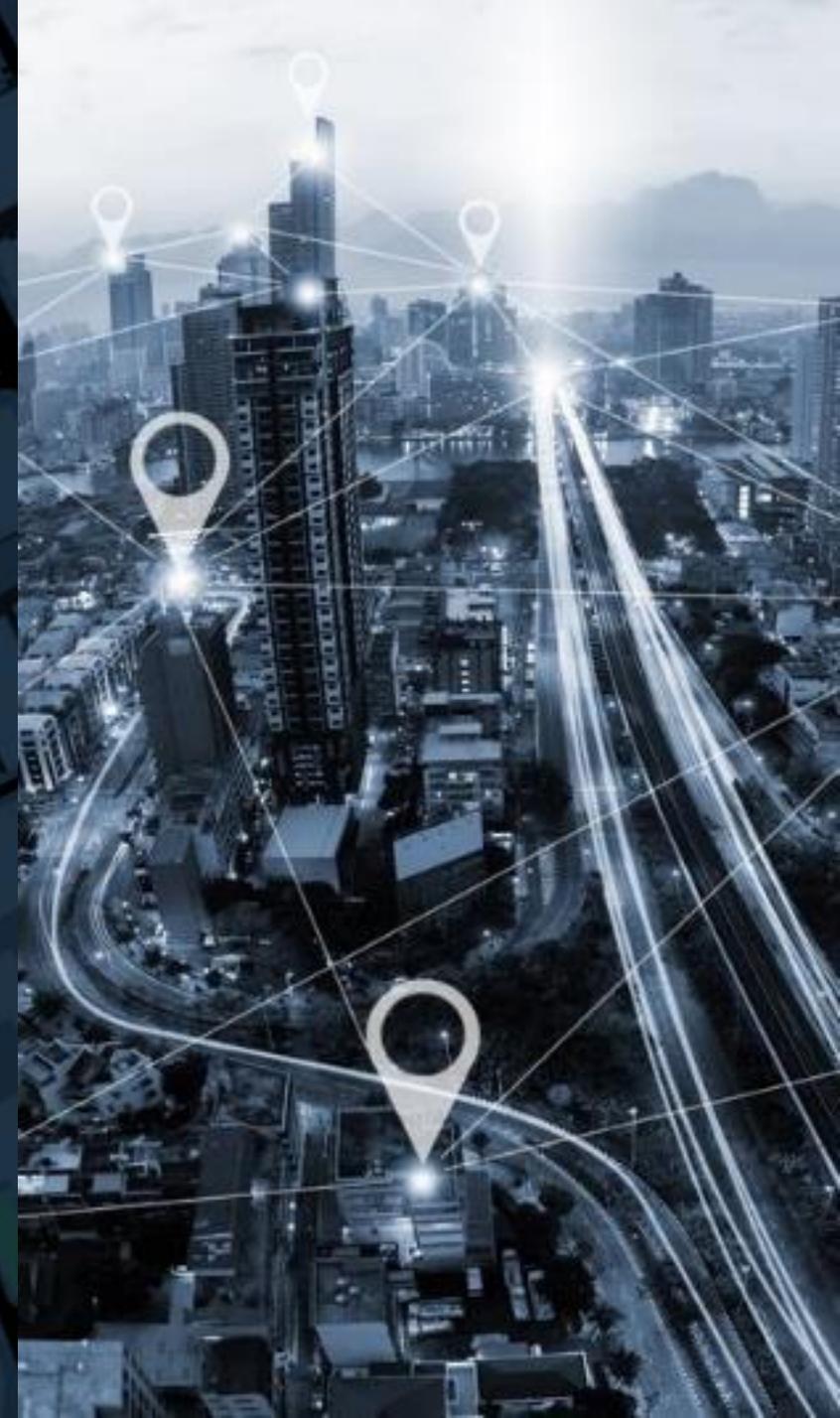


Ordnance Survey

OS and Smart

Striving to enable and create:

- A differentiated and connected digital economy
 - Authoritative, exportable methodologies
 - Integration of complex third party location and semantic data
- Effective collaboration in new technology areas such as IoT, 5G, BIM and CAV
- Improved quality of life for citizens and profitability for services

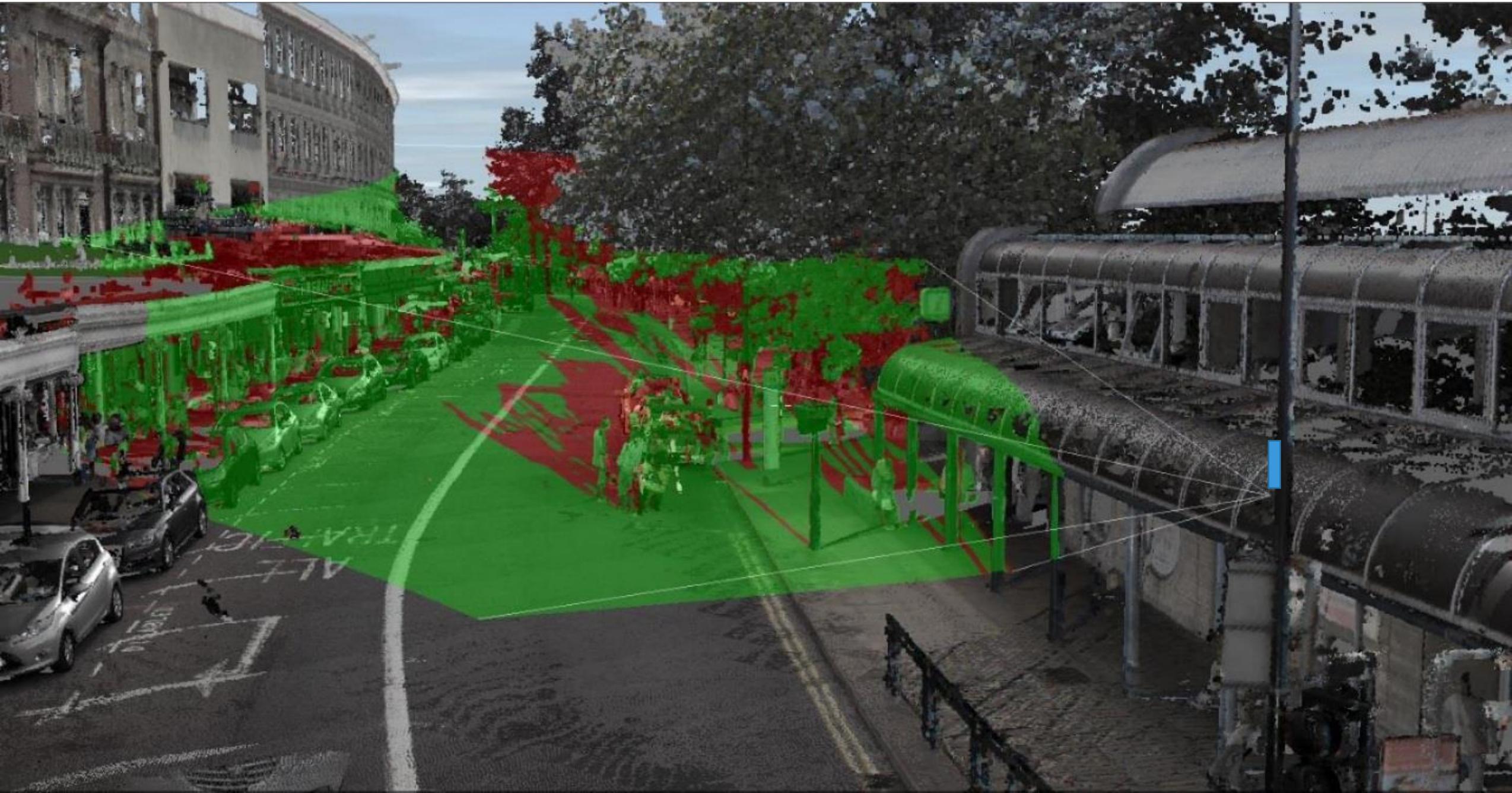


5G



Ordnance Survey

High-frequency 5G signal propagation is highly affected by line of sight



Connected Autonomous Vehicles

CAVs – the data exchange challenge, and opportunity

CAV safety will require robust and real-time communication between multiple proprietary vehicles and infrastructure assets. Geography is central to this. How can we enable data exchange in a way that supports the public good?

This is at the heart of the **E-CAVE** project.

A scalable **cloud-based data exchange** for use by the CAV testbeds, which will:

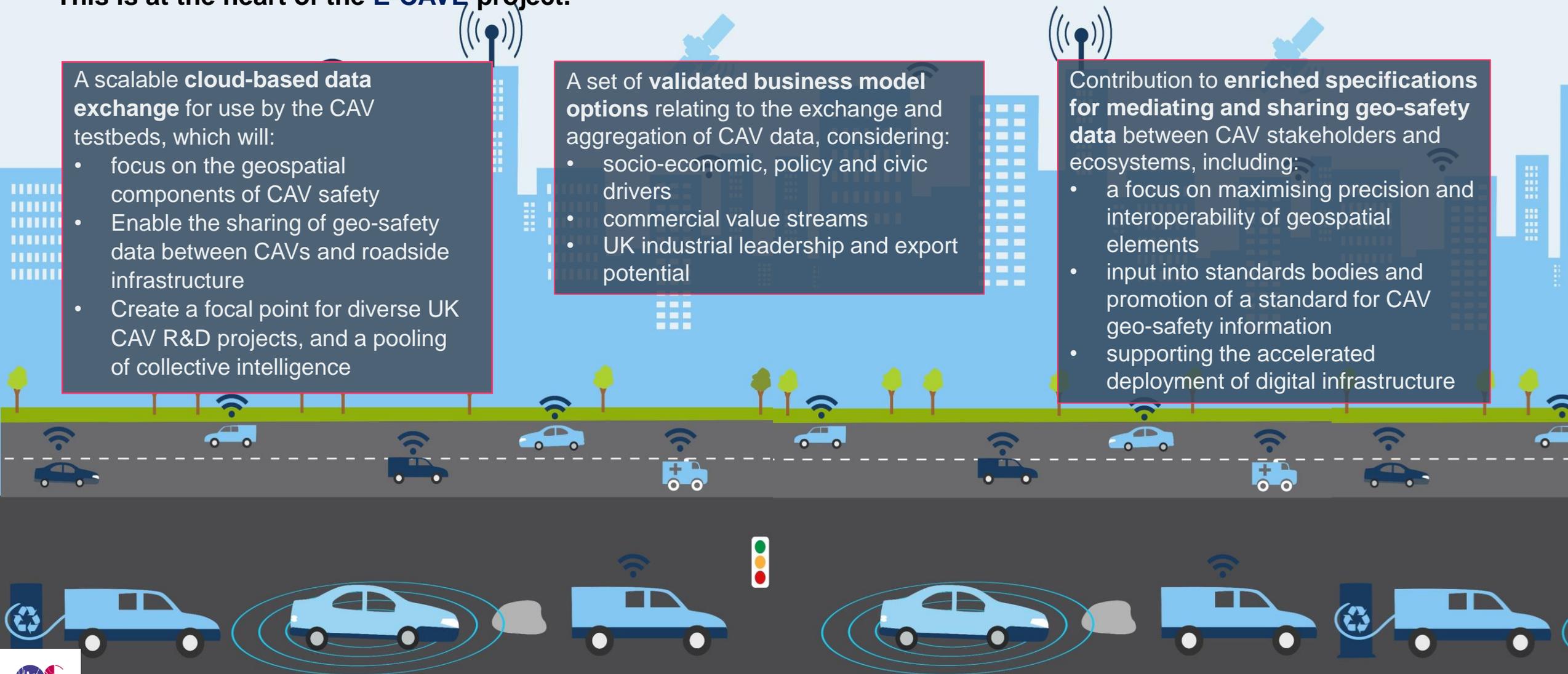
- focus on the geospatial components of CAV safety
- Enable the sharing of geo-safety data between CAVs and roadside infrastructure
- Create a focal point for diverse UK CAV R&D projects, and a pooling of collective intelligence

A set of **validated business model options** relating to the exchange and aggregation of CAV data, considering:

- socio-economic, policy and civic drivers
- commercial value streams
- UK industrial leadership and export potential

Contribution to **enriched specifications for mediating and sharing geo-safety data** between CAV stakeholders and ecosystems, including:

- a focus on maximising precision and interoperability of geospatial elements
- input into standards bodies and promotion of a standard for CAV geo-safety information
- supporting the accelerated deployment of digital infrastructure

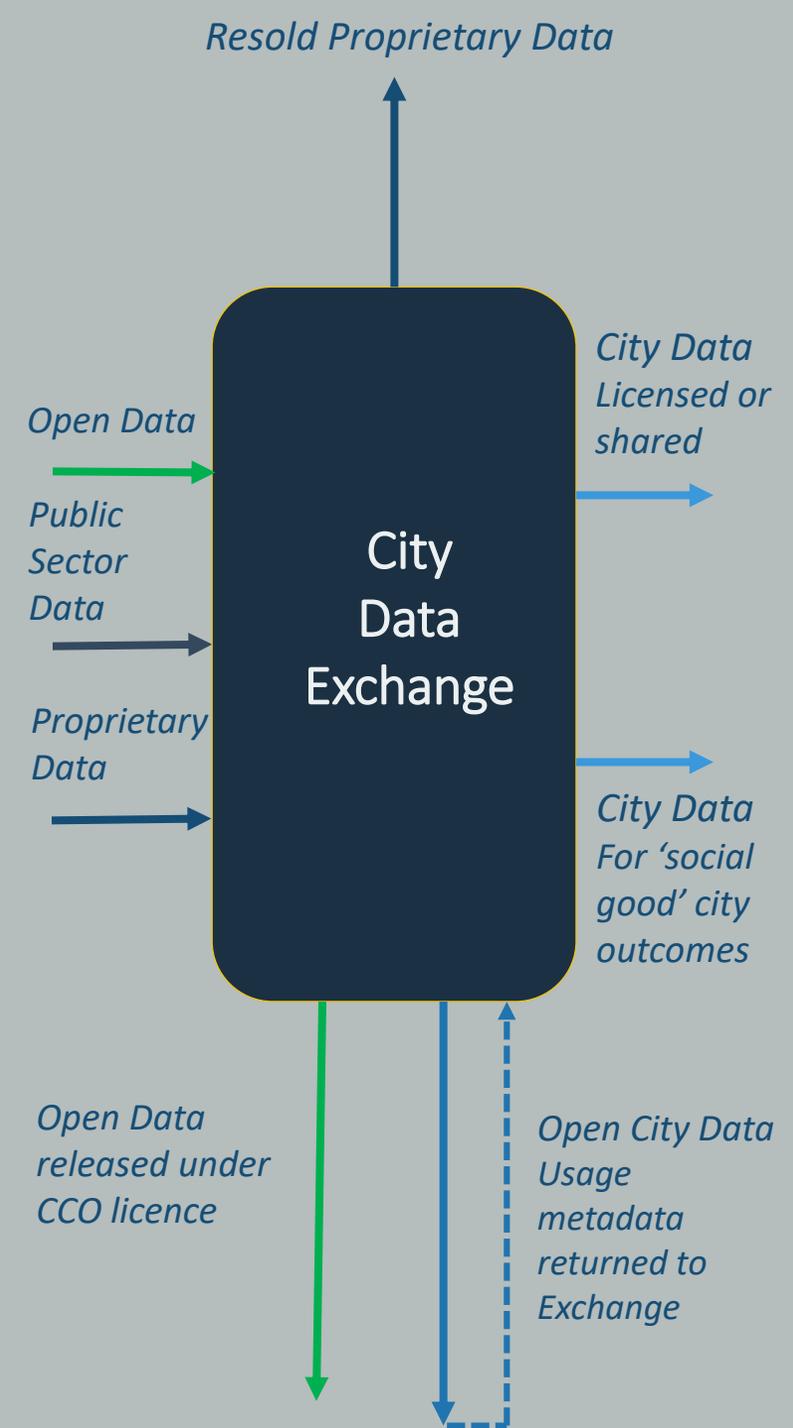


Data Exchange

Project: CityVerve Legacy

Creating value from the Demonstrator data and relationships

- The objective is to create an enduring legacy for the citizens, businesses and public sector institutions in Manchester from the use-cases and technologies developed within CityVerve.
- Developing a City Data Exchange - an essential element of Smart City infrastructure which enables sustainable investment in smart outcomes.
- Aggregation, publishing, sale, purchase and sharing of a wide variety of data from multiple sources (including IoT) between all users.
- Harvesting and licensing of usage metadata as a tradable information component.
- Builds on the Copenhagen concept and aims to define new commercial and 'public task' models beyond the current constraints of 'open' versus 'commercial'.



Project: CityVerve Legacy

Putting Geo at the heart of the legacy

- City Data Exchange - underpinned by geospatial data and frameworks.
- A rich understanding of location/place aspects of data provides differentiation and unique aspects.
- Location as the lowest common denominator can ensure that users have confidence that they are using the right asset/right data/right object etc
- Time-based information further enhances uniqueness / confidence
- A spatial and temporal engine, with strong visualisation and analytical tools at its front end will be an enabler for data sharing and procurement

of the brightest minds and pioneering
smart, innovative, inspiring Manchester.



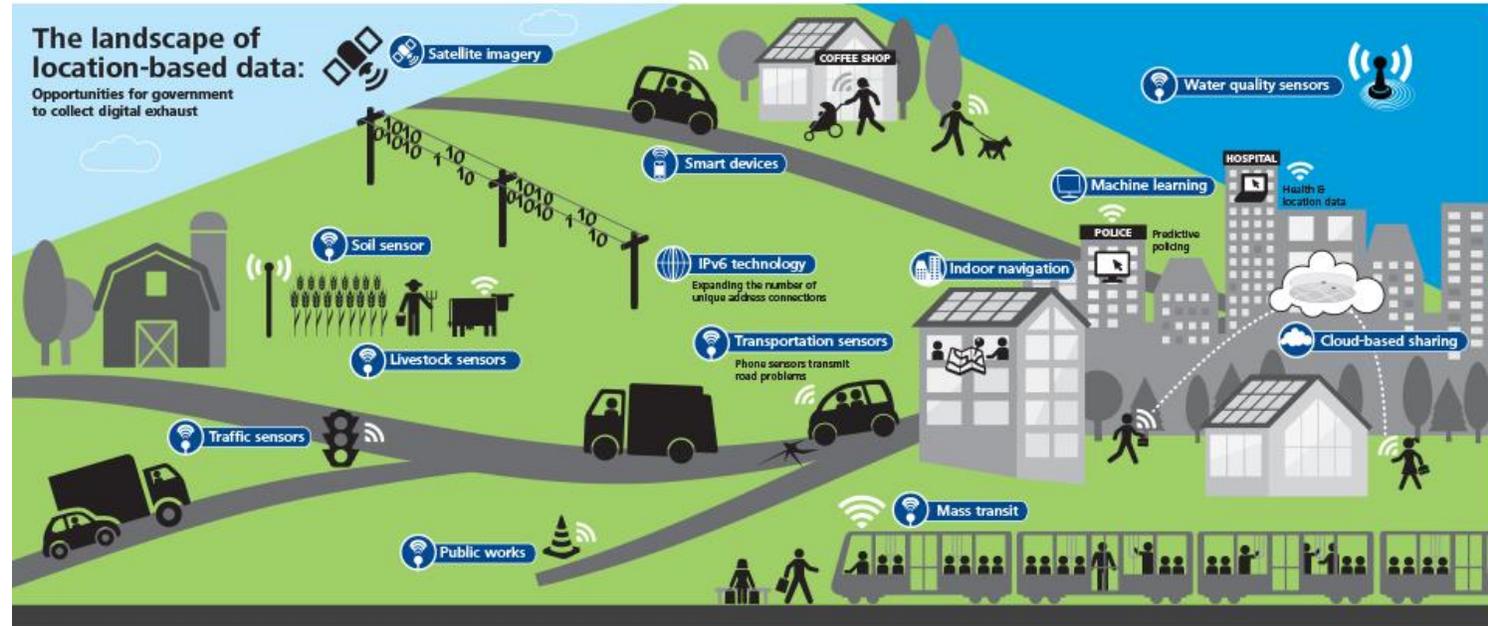
Project Iceberg

- An exploratory research project in collaboration with Future Cities Catapult and British Geological Survey, with the long-term aim being to help increase the viability of land for development and de-risk future investment through better use of subsurface information.
- The full potential of the subsurface data integration and subsequent sharing needs to be countered against the prevailing bias towards siloed delivery of services which are often incentivised on efficiency over better (long term) outcomes. This project proposes a data framework to unify subsurface data.
- Again, location is the common denominator that can integrate varying data sources across different domains.



RESPONDING TO THESE DEMANDS

1. Facilitate and support development of national standards, protocols and information architecture for a **National Digital Twin**.
2. Transform OS infrastructure to enable:
 - I. Capture additional user driven content
 - II. Capture and consume more accurate, detailed and current data (**micro-geographies**)
 - III. Develop a **data model** which is authoritative, federated fully integrated, extensible and secure
 - iv. Enable the overlaying and integration of alternative interpretations of the real world (**3rd party/multi-source data capability**)
 - v. Serve **machine readable** and machine driven data environments
 - vi. Provide data services to support **analytics**
3. Deliver **Data-as-as-Service**
4. Lead and support the creation of a vibrant innovator and insight led **Geospatial Ecosystem** to meet national needs



Being supportive

GEOVATION



HM Land
Registry



Geovation helps Britain's location and property startups address social, economic and environmental challenges using open innovation methodologies.

INNOVATION AND ENTREPRENEURSHIP

- In a world that is changing faster than ever, innovation is a commercial imperative.
- Innovation and entrepreneurship are traits that correlate closely.
- **It's all about how we handle risk.**
- We believe that our future success is critically dependent on our relationship with the broader innovation community – and startups in particular.
- For OS and HMLR that meant looking again at how we support and fund innovation in location and property technology: **Geovation**

PROGRESS REPORT CARD

- Launched on 2 July 2015
- £11.3 Million Raised
- 90+ New Jobs Created
- 1000+ community members
- 40 company members
- 12 major partners



GEOVATION HUB

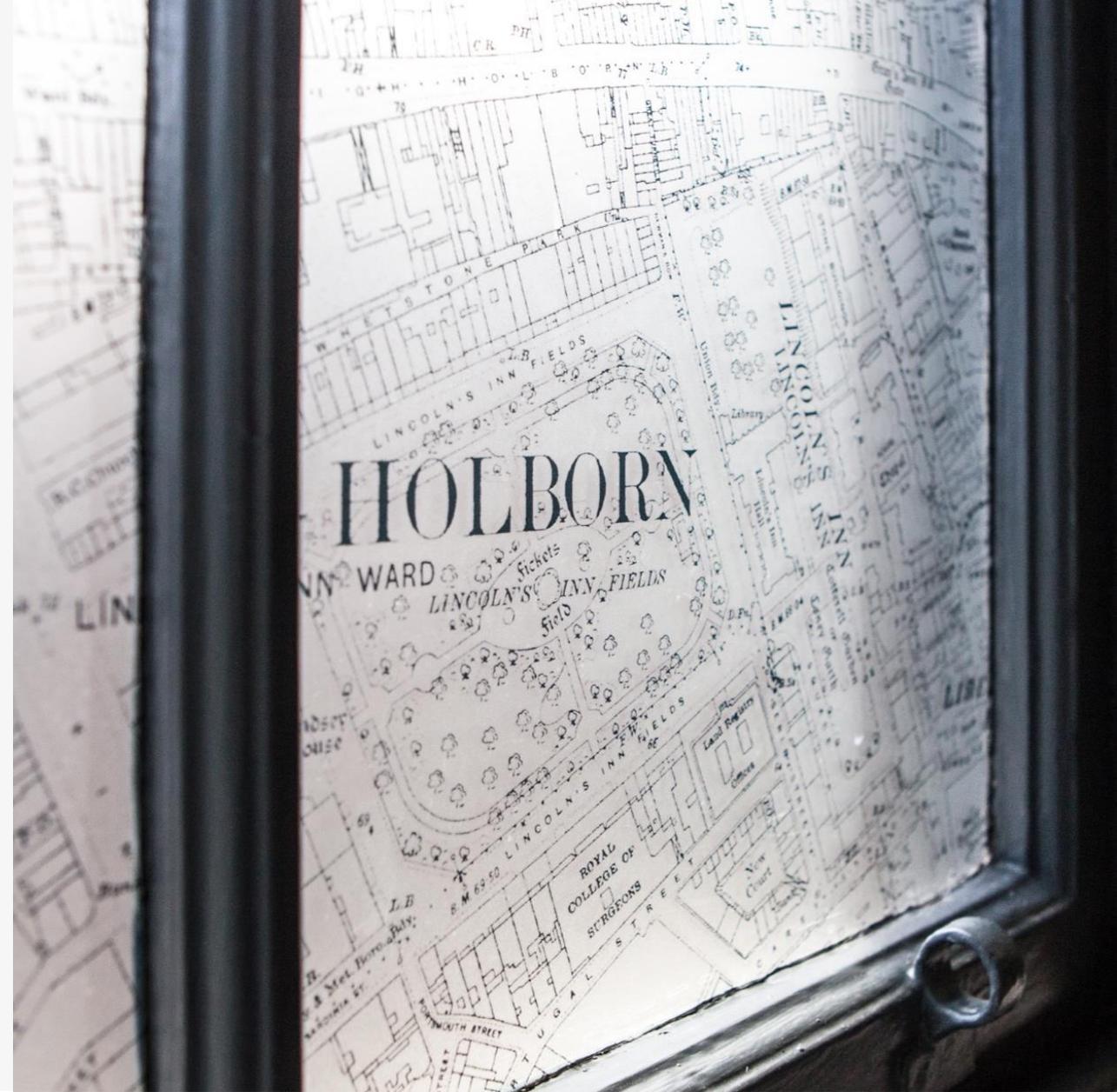
Incubate

GEOVATION CHALLENGE

Inspire

GEOVATION PROGRAMME

Accelerate



The **Hub** is an incubator space designed to support **individuals, SMEs** and **corporate innovators**

The **Challenge** invites the geospatial community to develop innovative solutions to the world's most pressing issues

THE PROGRAMME

- 2 open calls per year each for Geo and Proptech
- **10-15 companies** selected per year
- Selected companies each receive:
 - **£20,000 grant funding**
 - **£20,000 office space**
 - Access to up to **£120,000 software development support.**
- Programme content is customised to each company's needs

Accelerator Funding Partners



OUR STARTUPS

Shipamax

podaris

pedals.

FATMAP

cityseer



FLOCK



localistico

Signalbox

OpenPlay
Easy. Sports. Booking.



OPENCAPACITY



PASSIVE EYE

URBAN INTELLIGENCE®
Informing Spatial Decisions



GeoSpock

get rentr

Safe & The City

FLOWX



ORBITAL WITNESS

askporter

Explain

Being involved

The AGI – who, what, and why?

We're an organisation that's run **by members, for members**, and we have a strong presence here in Scotland. We give you:

- access to knowledge, from enthusiastic experts
- news from the industry (standards' news, innovation, jobs, projects, events, seminars, GISPro, and more – all free)
- opportunities to help shape the future – **we work for you**
- recognition from your peers (and your boss)
- the chance to be heard by your colleagues and competitors
- new connections socially and professionally
(bring on the GeoDrinks!)

The AGI: we bring location to life.

- maximising the use of geographic information for the benefit of citizens, good governance, and commerce.

AGI Scotland – give us a try



The graphic features a person's hand interacting with a digital map on a tablet. The map shows topographic lines and a blue river. The AGI logo is prominently displayed in the center. To the right, the text reads 'SCOTLAND ANNUAL EVENT' with a calendar icon above 'February 27th' and a location pin icon above 'The Lighthouse, Glasgow'. At the bottom, the hashtag '#AGIScot18' is shown in blue.

agi

SCOTLAND

ANNUAL EVENT

February 27th

The Lighthouse, Glasgow

#AGIScot18

AGI Membership:

- free for students
- individual members
- corporate members

- You can join online,
(it takes one minute!)

[/agi.org.uk/](https://agi.org.uk/)

Questions