

Disruptive Technology

Future trends in geographic information management

David Henderson
Managing Director, OSGB

(david.Henderson@os.uk)







UN-GGIM
UNITED NATIONS
COMMITTEE OF EXPERTS ON
GLOBAL GEOSPATIAL
INFORMATION MANAGEMENT

**Future trends in geospatial
information management:
the five to ten year vision**

SECOND EDITION

<http://ggim.un.org/UN-GGIM-resource-documents/>

“Nuclear powered vacuum cleaners will probably be a reality within 10 years.”

Alex Lewyt, President of Lewyt Vacuum Cleaner Company, 1955

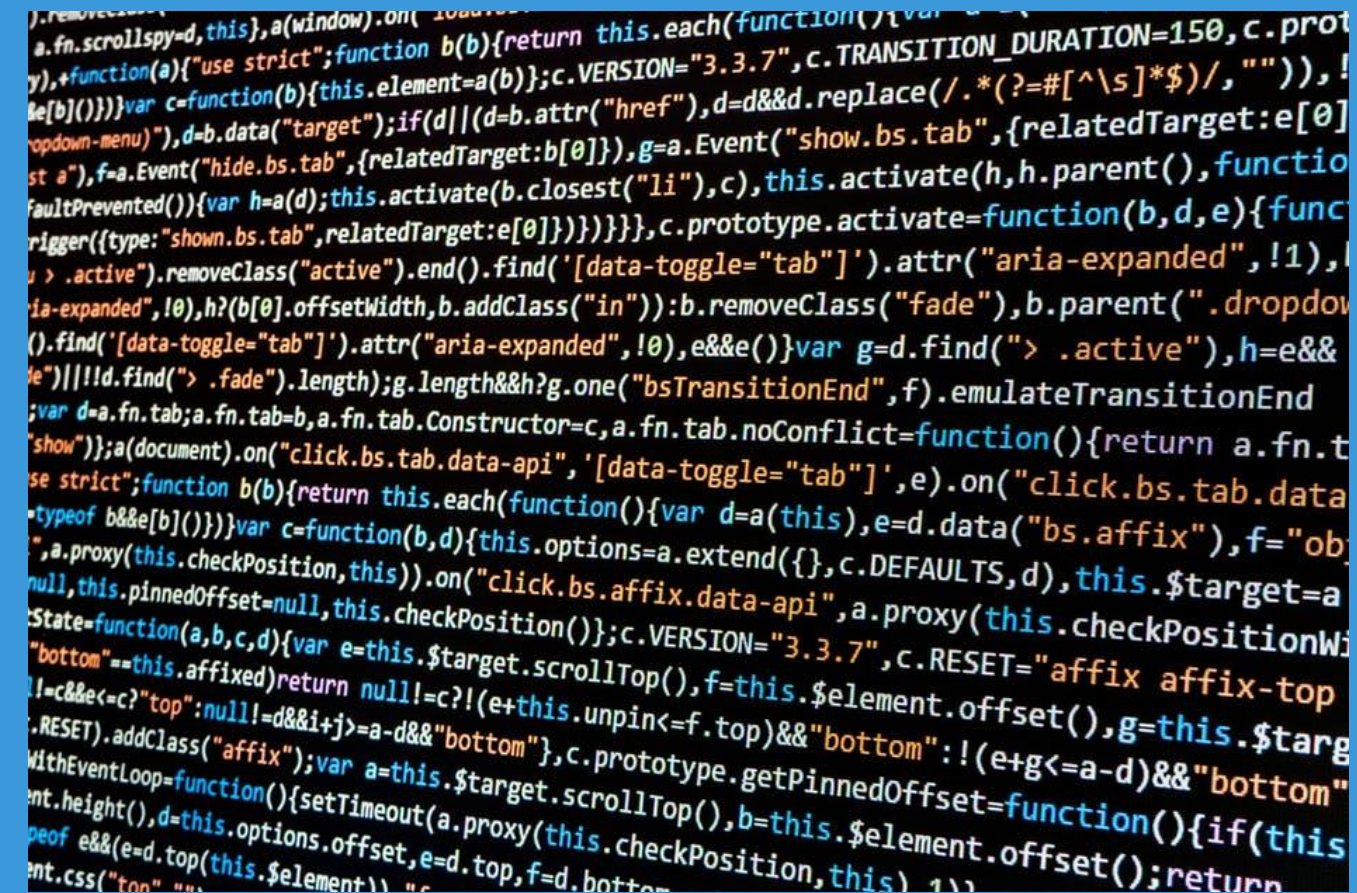
“Before man reaches the moon, your mail will be delivered within hours from New York to Australia by guided missiles. We stand on the threshold of rocket mail.”

Arthur Summerfield, U.S. Postmaster General, 1955





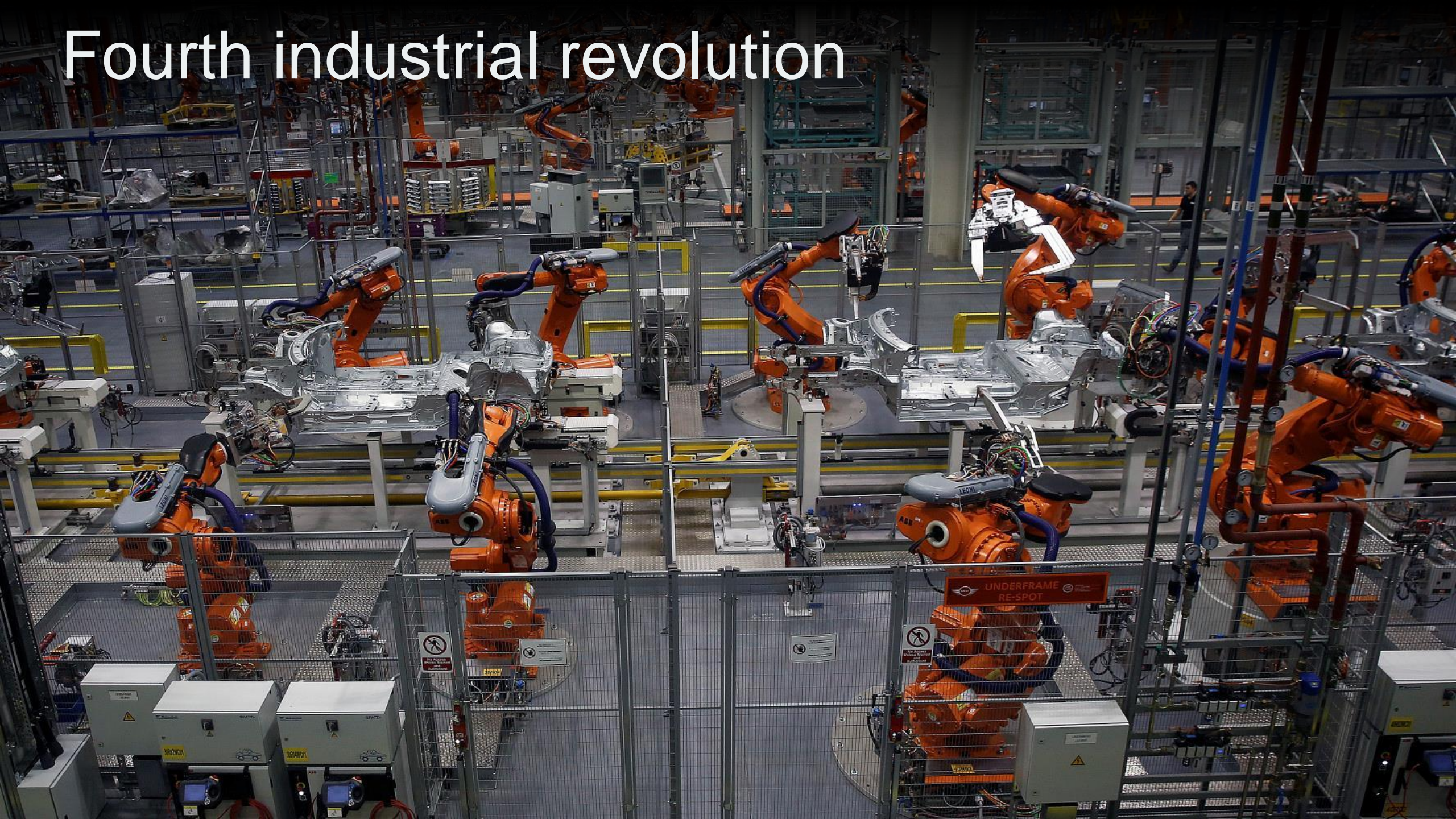
Data data everywhere



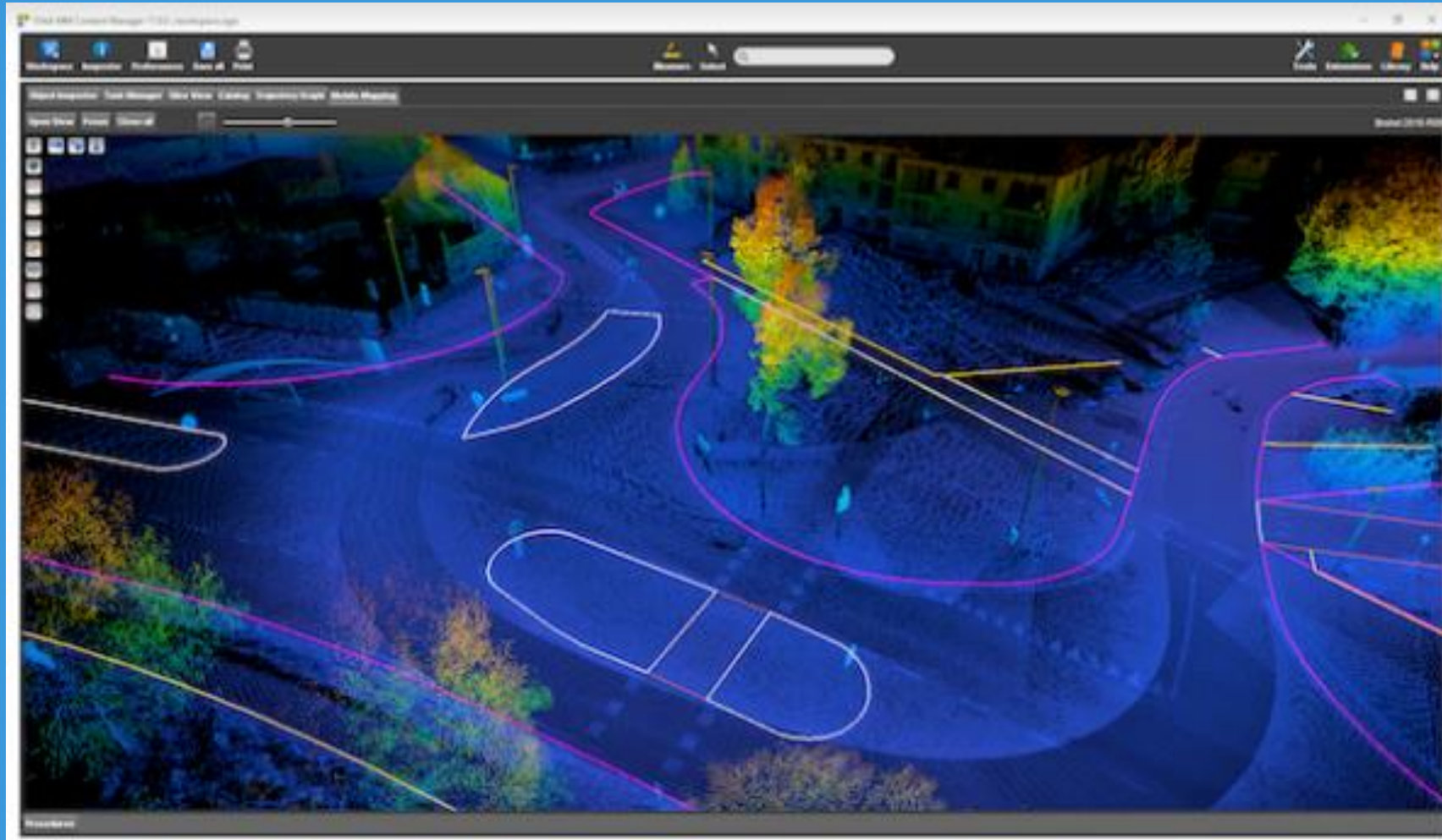
Data as a platform / service



Fourth industrial revolution



Everything happens somewhere



Digital Britain





3D

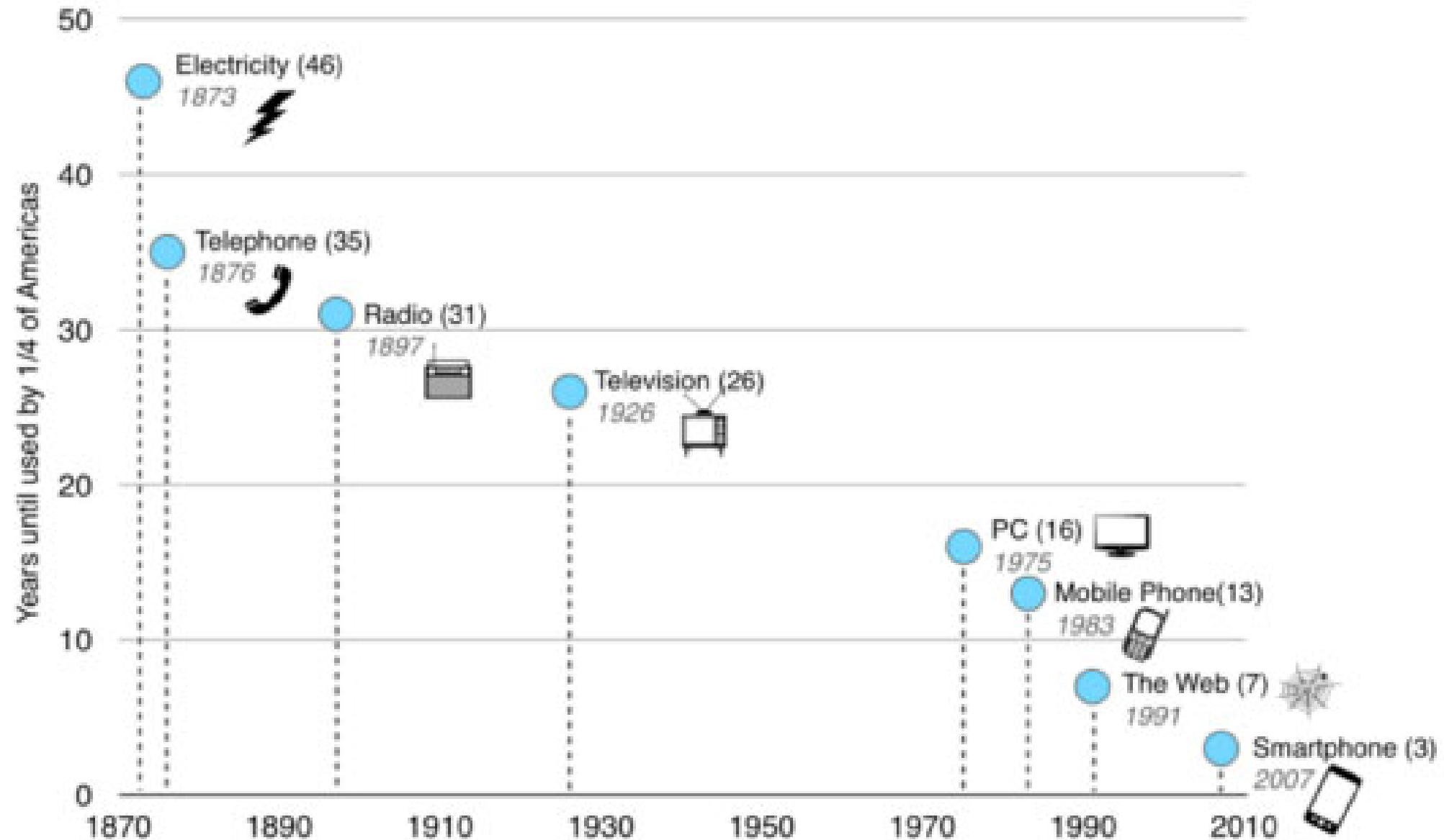
4D



Starting point from prediction

Technology Adoption

Years until technology is used by one-quarter of American Population



Source: Singularity.com and Nielsen

By 2050 the world
population will have
increased by
2 billion

(source: OECD environmental
outlook 2050)



70%

of people will live
in cities.

Meaning over the
coming decades,
the equivalent of a
city of 1M
inhabitants every
week

(source: UN Habitat)



The number of
people over 80 will
reach

400M

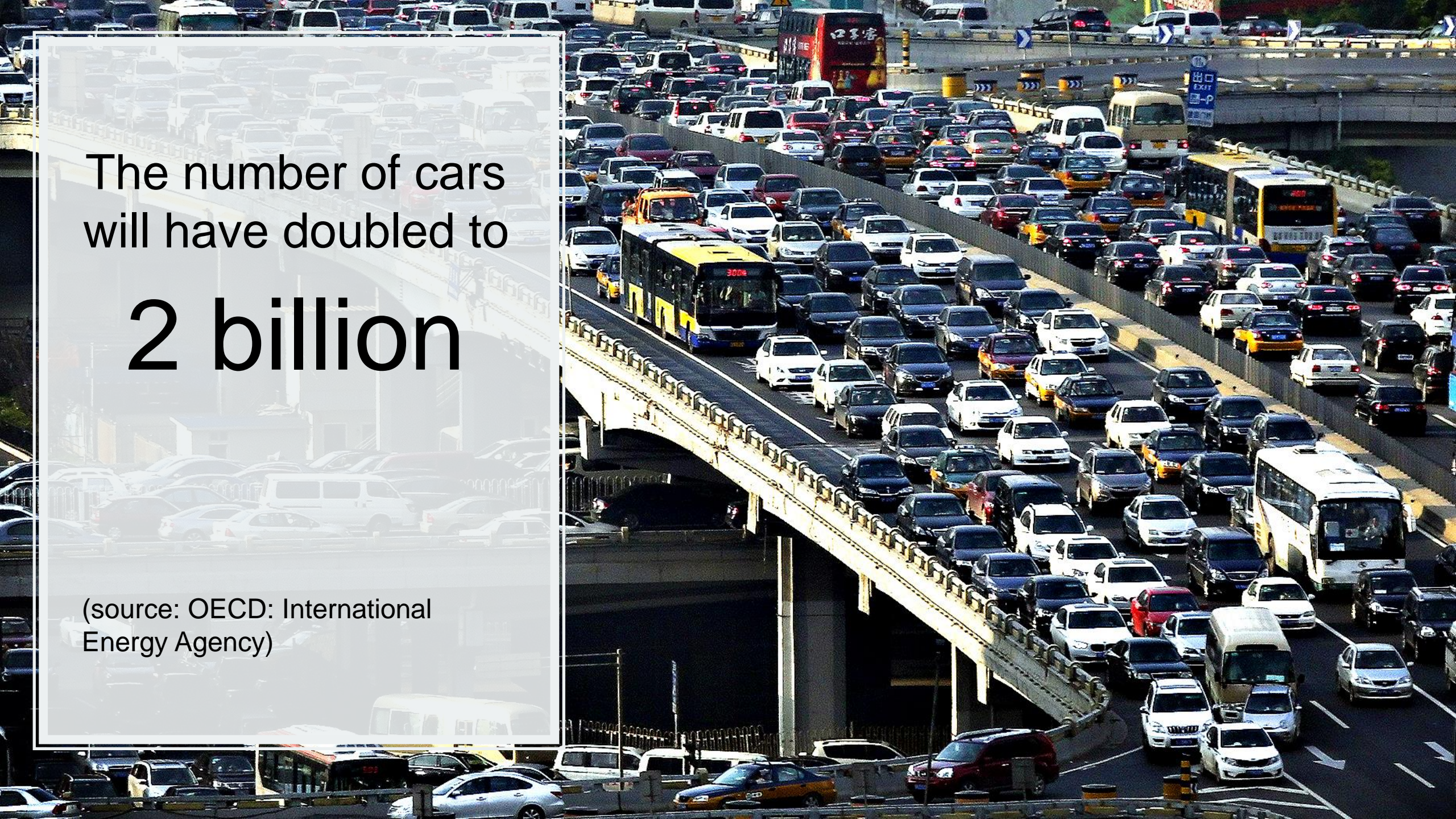
(source: WHO)



There will be over
150M
climate change
refugees due to the
rise in sea level.

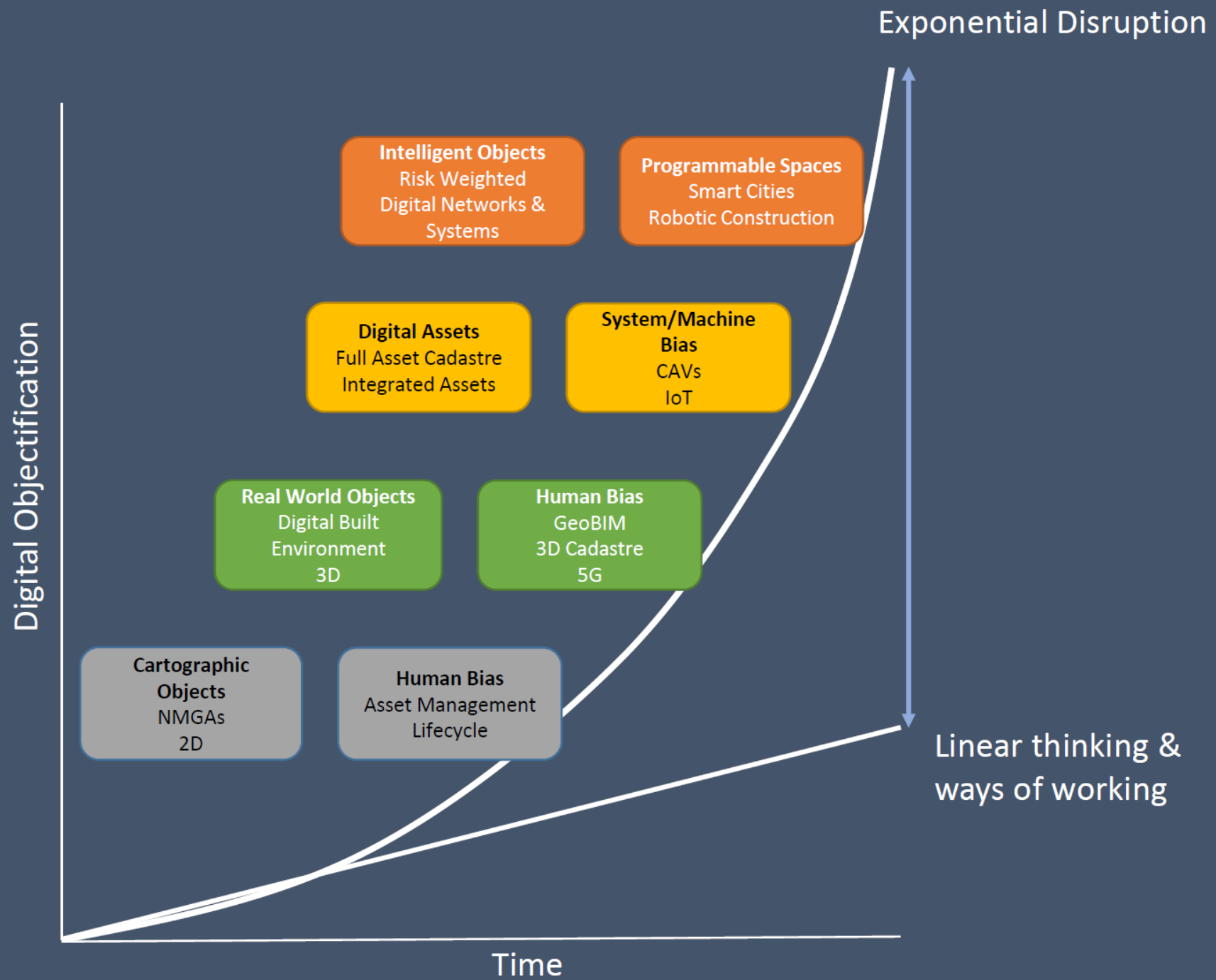
(source: International Organisation
for Migration)



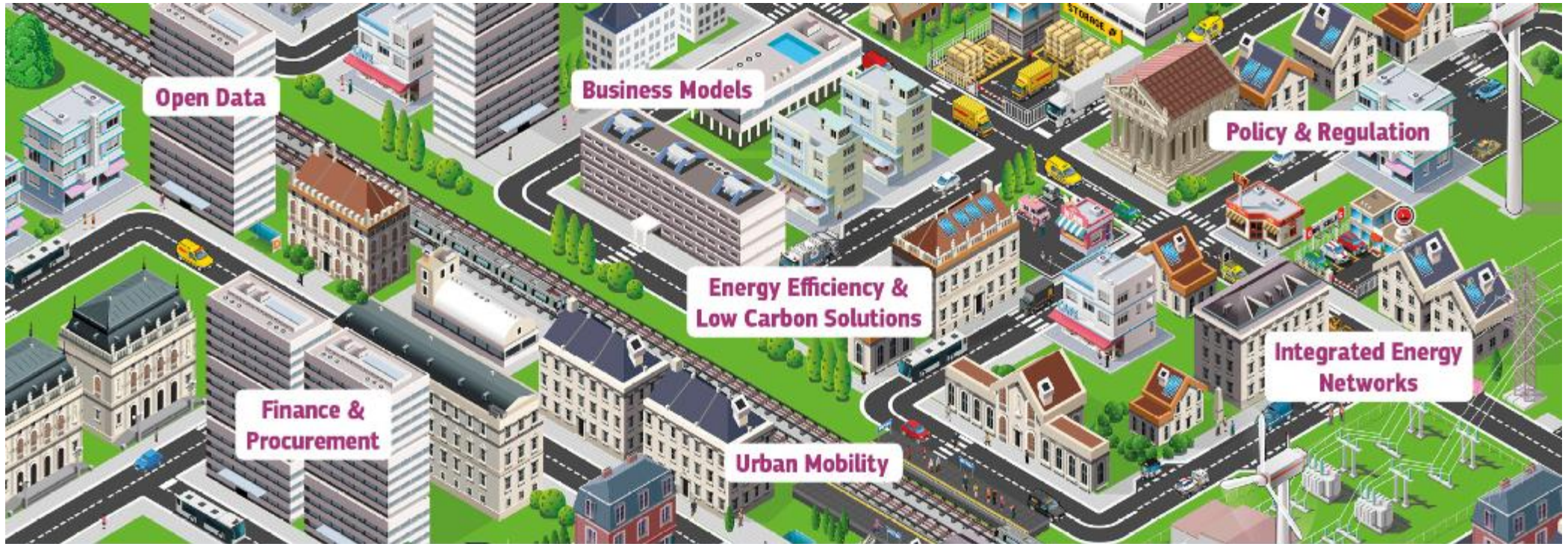


The number of cars
will have doubled to
2 billion

(source: OECD: International
Energy Agency)



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

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



Towards 'Smart'

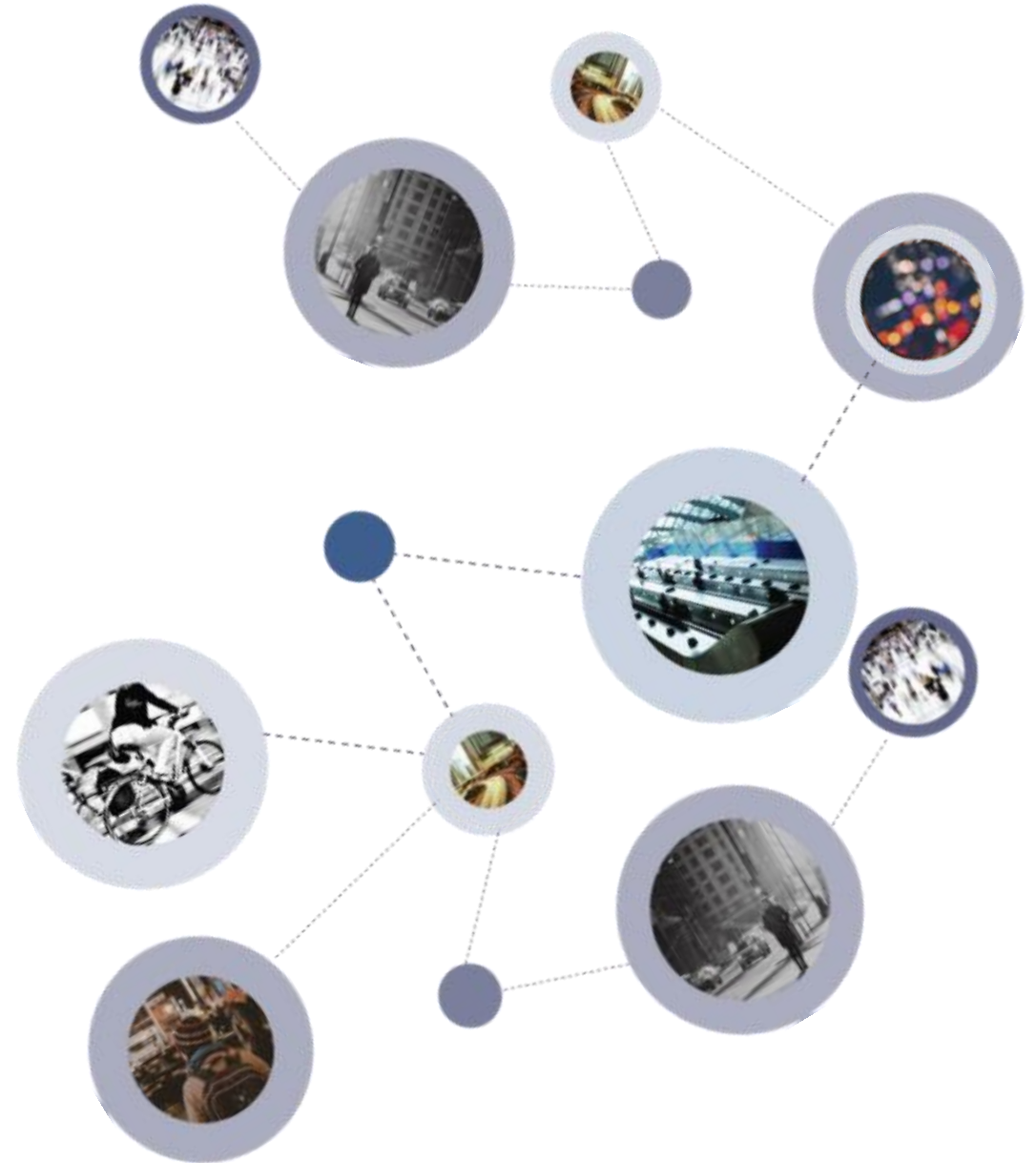


Smart Pilots - exploring the case for new data content in the **built environment, subsurface, supporting place making**

Enabling new technology to be more cost effectively implemented, maintained and to deliver an improved customer experience; specifically 5G, IoT and CAV

New business models – e.g. City Data Exchanges, Mobility as a Service

Places need an understanding of what is available and where they are starting from. We are evolving **city smart** packages of services



CityVerve



IoT demonstrator, Innovate UK part-funded, 20 strong consortium MCC leading
24 months duration, from 1st July 2016

Ordnance Survey will provide the **geospatial glue**
Capturing new and **enhancing** existing content
API suite and **web services**
Research and analysis of content requirements, emerging technologies and systems
Geospatial platform of CityVerve activity, services and assets



Future Cities Pilot



Interoperability between city level and building level open standards
Provision of **better services** to citizens using shared data

Local and central govt. depts. sharing and **coordinating data** more effectively
Challenging silo mentalities in departments and groups

Developing insight and enabling more **effective decision making** with improved sharing and collaboration



Atlas/E-CAVE



Connected and Autonomous Vehicles feasibility study

Determine if mapping content is required to support autonomy and if so, the data model

How best will data be **served and shared**

Cloud based?

Onboard?

Vehicle to vehicle?

Evaluating the **creation of mapping** from on-board technology



AI / ML



A deep learning programme in which OS are training a model on our **RGB imagery**, and using **MasterMap topography layer** as a highly detailed labelling method for the landscape.

To assist with:

- Mobile Mapping and automated feature extraction
- Rules based-classification: change detection, feature identification (roof models)



The screenshot shows the Microsoft News Centre UK homepage. The main article is titled "Ordnance Survey used Microsoft AI to 'see' roofs – and it could save you money", dated February 15, 2018, by a Microsoft reporter. Below the article title are social media sharing icons for Facebook, Twitter, and LinkedIn. A large landscape photograph is displayed below the text. At the bottom of the screenshot, four smaller images are shown: an aerial view of buildings with yellow outlines, a map with blue outlines indicating building footprints, a map with green outlines indicating building footprints, and a close-up photograph of a brick roof with two chimneys and a satellite dish.

5G Planning



Planning tool to aid network operators to plan 5G rollout

5G is essential to enhance and support a **connected environment**

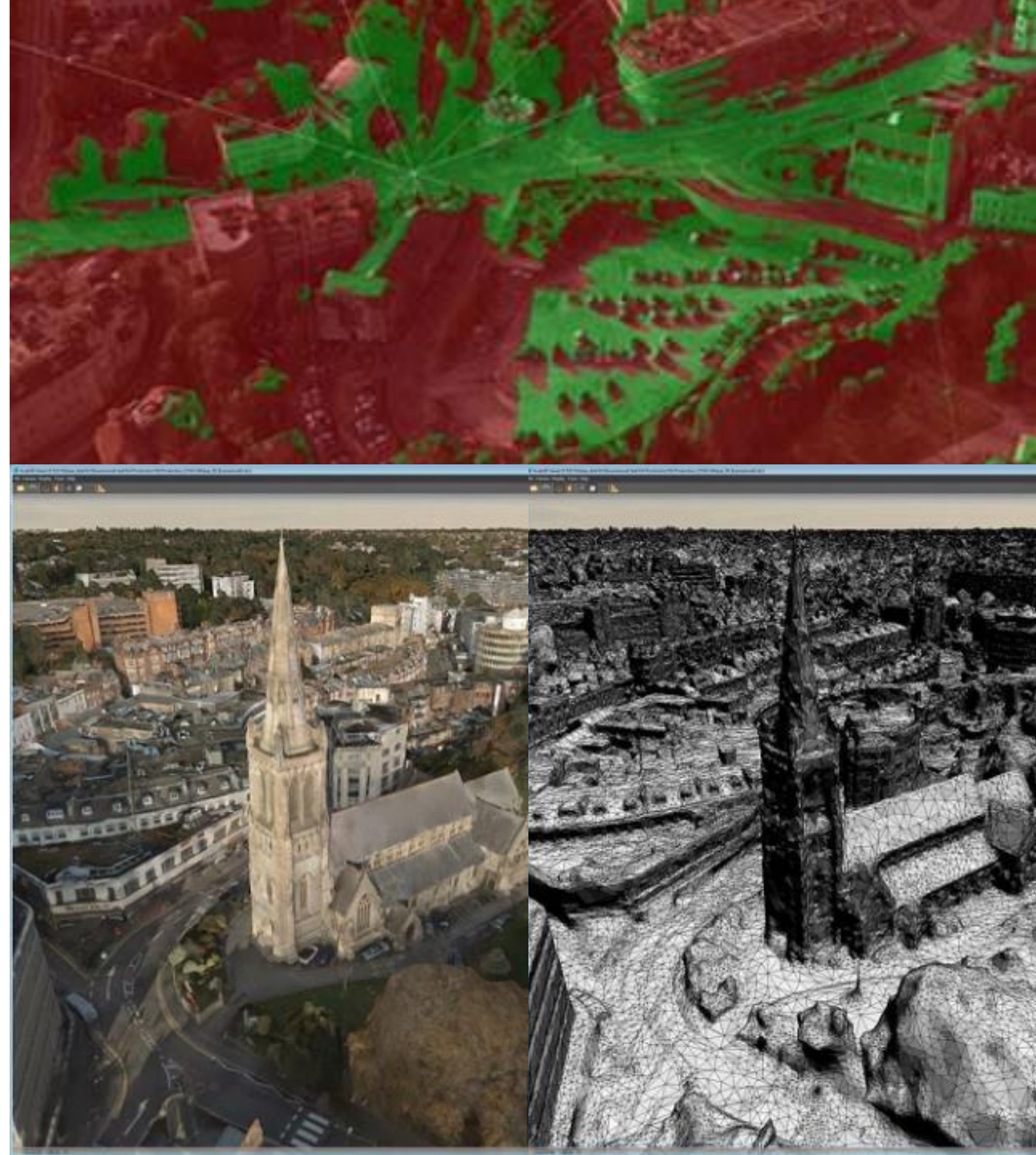
Develop a **3D test bed to** help simulate radio propagation

High frequency 5G can be affected by leaves on trees and atmospheric changes

Smart map of the future

OS data, meteorological data and radio spectrum data will be **interoperable**

Develop standards for future network planning



OS and BIM L3



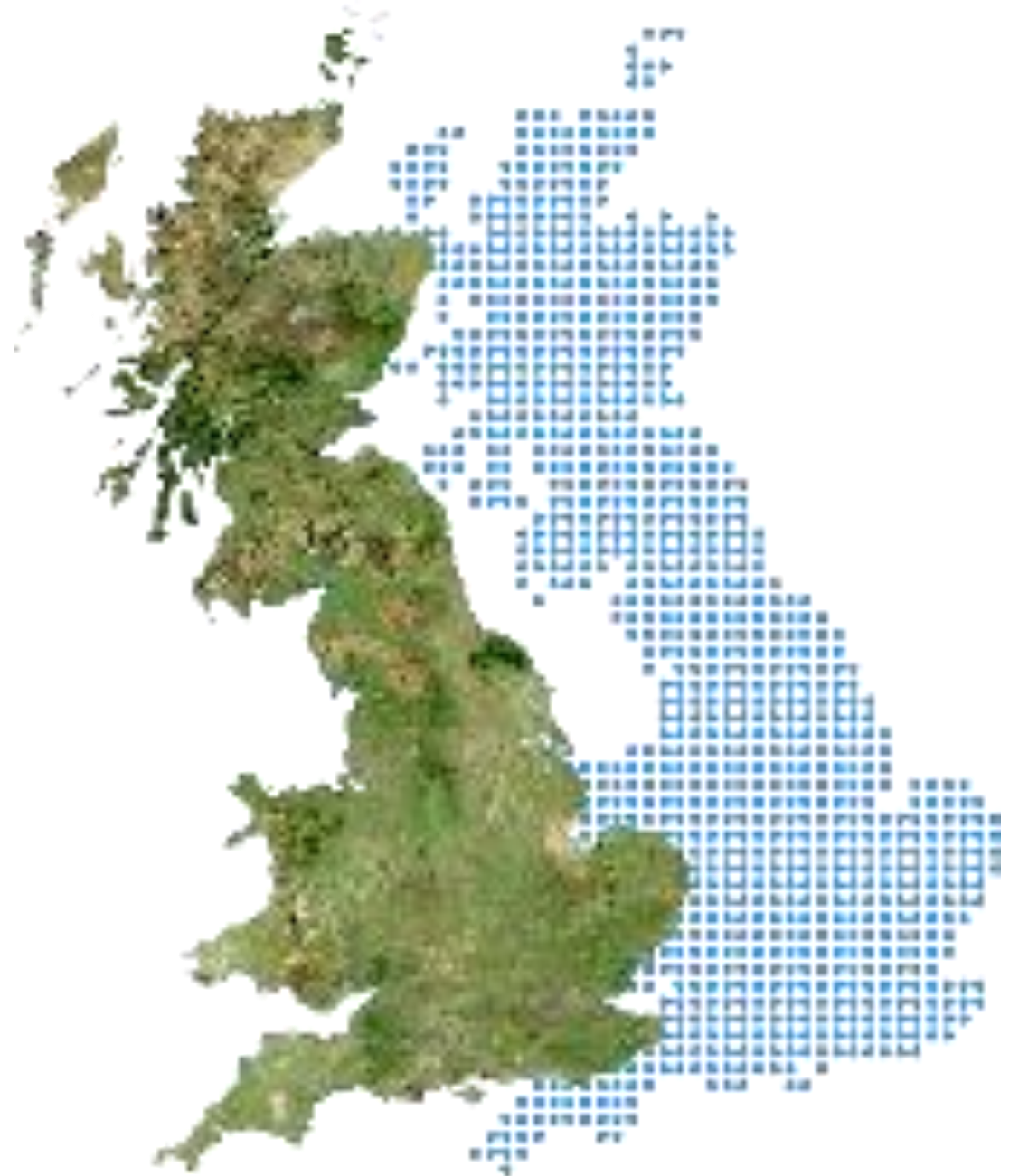
Government-led national strategy
OS as **subject matter experts** for
geospatial.

A geospatial ecosystem of **connected**
data and content.

Virtual design through merging the
inside/ outside/above/below world

Underpinned by a **Real World Object
Model** – the “**digital twin**”

Supports and improves **connectivity
and interoperability.**



Staying ahead of the curve:

Rising supply: 90% world data generated in past two years

Decreasing costs of storages and processing: stored & managed in the cloud

- IoT, automation, 4th Industrial Revolution
- Maintenance – currency, accuracy, detail.
- Large amounts of raw data are available. This data needs to be ‘processed/managed’ to be actionable.
- Pace of change in geospatial technologies.
- Competition – Crowd, global platforms, other government agencies: all can bypass national mapping agencies.
- Public task v open data v commercial business.
- Access to political and fiscal investment.
- Capacity to change

Summary

- Change is constant: need to be constantly vigilant
- Don't do it all yourself: find partners, work outside of your normal networks
- Need to focus efforts (or it will consume all your resource!): meet the user requirement (don't assume users are happy with your offer)
- Manage change holistically: not as isolated projects (maximise the layering effect)
- Be open to ideas: especially those that challenge your thinking
- Work backwards from your future

Thank You