

Mapping the future

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Maps are at the core of what fascinates us as geographers; they are the record of our endeavour, a scientific tool to measure and explain the world around us, and a work of art to be appreciated and enjoyed.

RSGS has a remarkable map collection, ranging from 16th-century maps of Scotland through 19th-century maps of India to present-day city plans. We greatly value this collection, accessible and enjoyed by RSGS members,

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vibrant map collections, curated by specialists and used by many. Now these are rare. We have metamorphosed into a digital world.

In 1971, the Ordnance Survey began to use computers to simplify its large-scale mapping. By 1995 it had replaced its triangulation network with Global Positioning Systems (GPS) and digitised all of its mapping products, making Britain the first country in the world to have a complete programme of electronic mapping. While some of the traditional craft of putting a cartographer's pen to paper was lost, it did mean that data surveyed in the field could be available as maps to the customer within 24 hours. A decade later, Google Maps arrived – the most significant advance in mapping for centuries. Suddenly, maps existed for the entire globe and were freely available to everyone at the click of a mouse button. It became easy to integrate these maps, and the associated aerial photography and satellite images, with your own website, adding your own data and tools.

This period of change was driven by the rise of Geographical Information Systems (GIS), the digital infrastructure used to capture, create, store, analyse and visualise spatial data. Tracing its routes back to Computer-Aided Design (CAD) and Landscape Architecture software in the 1960s, GIS and the data it created and analysed became increasingly sophisticated through the 1980s and beyond. This caused a revolution in the way that location data was used by government and industry, and brought maps and sat-nav to your smartphone. The University of Edinburgh was in the vanguard of GIS teaching and research, developing the world's first Master's degree in GIS in 1985. To date, this programme has brought more than 1,000 skilled professionals to a burgeoning geospatial industry that is now worth in excess of £6 billion to the UK economy. This industry is represented by the Association for Geographic Information in Scotland (AGI-Scotland), which brings together geographers and computer scientists, environmental scientists and engineers, surveyors and lecturers, running events including an accessible seminar programme.



A GIS 'heat map' visualisation showing the density of Edinburgh's listed buildings. © Tom Armitage, 2021

Today, the use of GIS and related digital technologies continues to push the boundaries of what is possible with spatial data. The latest systems are designed to handle vast quantities of data, such as the global volunteer-contributed

Open Street Map dataset, with over seven billion data points and over four million changes being made every day. They can process detailed three-dimensional (3D) models of glaciers or buildings. They can handle complex real-time data needed to guide driverless cars, and ensure that commonplace activities such as planning, refuse collection, mobile phone network provision and river monitoring are carried out as efficiently as possible. New cartographic and data visualisation techniques have been adopted to take advantage of this

influx of information, highlighting the quantity of data as can be seen in the map of listed buildings in Edinburgh, or allowing interactivity such as animated changes over time or to explore, rotate and zoom a 3D model such as the flooding model of Inch Park in Edinburgh (www.geos.ed.ac.uk/~bmgi/InchPark) which we developed for our students.

While technology races on apace, Ordnance Survey still does produce paper maps. Importantly, several historic map collections are being digitised, with the National Library of Scotland being an international leader in this regard. While viewing a wonderful map online may not give quite the same experience as seeing it in person, the digital version is more accessible and will have been examined by many more people than could ever hope to see the original paper copy. Also, once these paper maps become 'data' we can much more easily assess differences and changes, overlay additional information and compare and contrast them to the present day. The online Gazetteer for Scotland (www.scottish-places.info) shows how the National Library's historical maps can be integrated and compared using simple but effective tools.

GIS has brought a further benefit. In the past, few were lucky enough to call themselves professional geographers. Today, this has changed – young people with interests in maps and computers have a clear career path into an industry which is growing and well paid. Mapping has a future, a strong and vital future, and never have maps been more exciting!



The Gazetteer for Scotland: visit www.scottish-places.info/towns/townmap155.html and click on the big '+' on the right-hand side.