

TRACKING THE TECH TRENDS OF TOMORROW

WHAT ARE THE TECHNOLOGIES THAT WILL TRANSFORM THE GEOSPATIAL INDUSTRY IN 2020 AND BEYOND? **GEORGE PERCIVALL** USES HIS CRYSTAL BALL – AND THE OGC’S TECH TRENDS WORK – TO PREDICT THE FUTURE

As an international standards organisation, the OGC needs to track current and future applications of technology in order to best anticipate and address potential issues where standardization can offer a solution. As OGC’s chief technology officer, I work with OGC members and the OGC architecture board to establish and update OGC’s technology strategy and coordinate it with OGC’s standards and innovation programmes.

A key part of this strategy is our ‘Tech Trends’ activity – published on OGC’s GitHub account and updated quarterly. This surveys and characterises trends across IT, including the science and technologies that support the collection, processing and understanding of geospatial information. This approach was developed based on a survey of technology forecasting methods, including the US National Research Council’s ‘persistent forecasting of disruptive technologies’.

All tech trends tracked by the activity are summarised in a regularly updated ‘mindmap’. To identify trends that warrant further investigation, a priority quad chart is also created. This displays an assessment of the trends considering two criteria: impact and horizon. Impact is either ‘sustaining’ or ‘disruptive’; horizon is either ‘next’ or ‘after next’.

OGC is already addressing some of the trends so these have a horizon of ‘now’. The trends for priority consideration are those that are both ‘disruptive’ and ‘next’.

The latest version of OGC’s Tech Trends (Q2 2019) focused on several emerging technologies. The highest priority are: data science and analytics; UAVs; edge and fog computing; Web of Data; Digital Twins, and modelling, simulation, and prediction. Of

secondary priority are: machine learning; blockchain/distributed ledgers; autonomous vehicle high definition maps; quantum computing; immersive geo: AR, VR, mixed reality; smallsats; indoor: position, models and navigation, and 5G cellular communications.

Information about each of these is available in the GitHub repository, but I’ll get into the higher priorities here.

Data science and analytics

The explosive availability of data about nearly every aspect of human activity, coupled with rapid advances in computing technologies, is transforming data science. Data science is in a golden age of data abundance and highly available computing resources. OGC is addressing this at the ‘Location Powers: Data Science Summit’ this month. The summit will discuss the development of intelligent systems using knowledge models

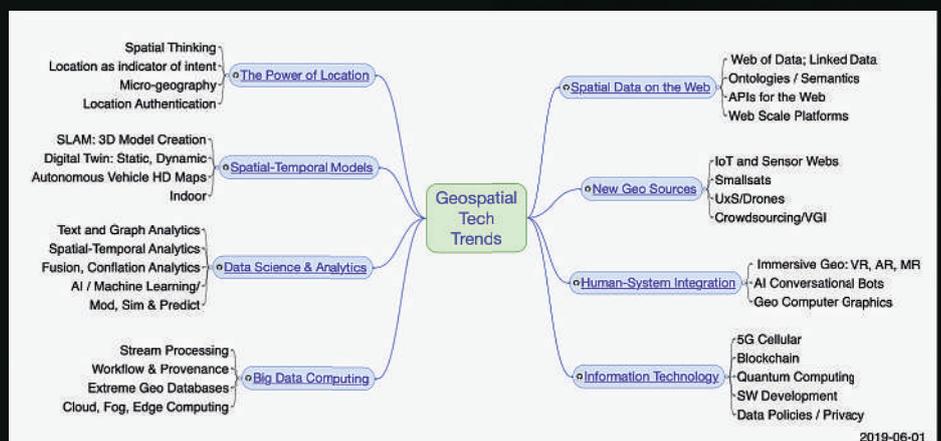
and their subsequent impact on our insight and understanding of the world, society and the diverse systems that comprise them. Output of the summit will include recommendations on how to advance geospatial data science in theory and practice.

UAVs

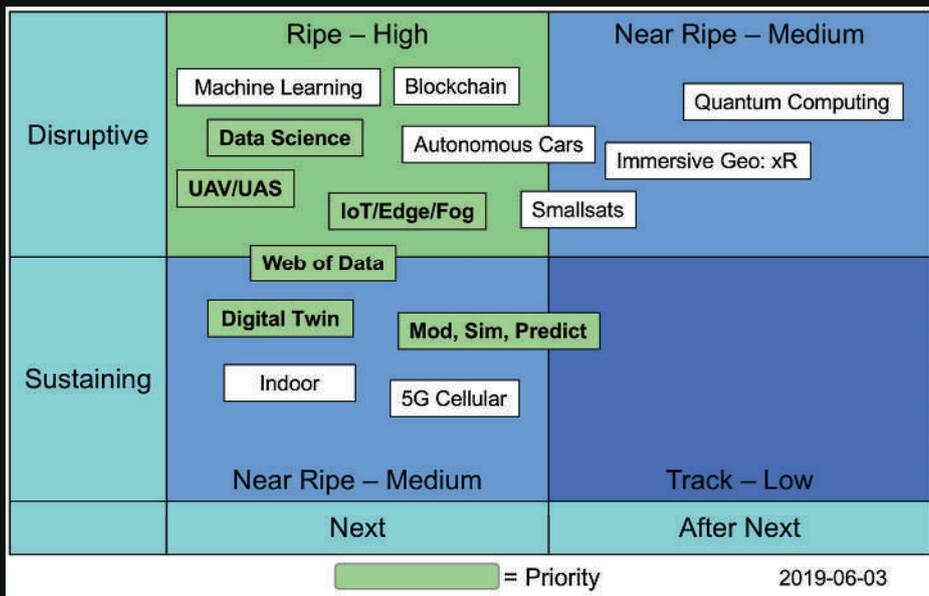
The intersection between UAVs and traditional aircraft is posing a host of problems for traditional air traffic control. The OGC UxS domain working group is very active in finding solutions to this – as well as other problems related to unstaffed vehicles across air, land and sea. OGC is working with other standards organisations, as well as applying OGC developments in aviation and sensing, to advance the value of UAVs.

Edge and fog computing

Almost everyone now understands what cloud computing is, does and offers, but equally disruptive to the ‘computing on demand’ marketplace is ‘fog’ computing. This is a system-level, horizontal architecture that distributes resources and services of computing, storage, control and networking anywhere along the continuum between the centralised ‘Cloud’ and the distributed



Part of the Tech Trends activity includes creating and updating a ‘mindmap’ of emerging trends



OGC Tech Trends as at June 2019

'Things'. OGC has produced a white paper, The Role of Geospatial in Edge-Fog-Cloud Computing. An OGC engineering report was an outcome from the 'Mixed Reality to the Edge Workshop' held at SOFWERX in April. The OGC anticipates several developments of computing advanced at 'the edge'.

The Web of Data

In the Web of Data, data published on the web is made discoverable, accessible, and interoperable using WWW best practices for data formats, data access, data identifiers, metadata, licensing and provenance. There was progress earlier this year on property graphs query languages standards, which points to the need for geospatial involvement. OGC's environmental linked features interoperability experiment (ELFIE) showed the power of OGC APIs to expose features in the context of rich domain-feature-model-based linked data while following W3C best practices. The second environmental linked features interoperability experiment (SELFIE) is currently in progress. OGC is coordinating with ISO/IEC on geospatial aspects of international standards for graph query languages.

Digital Twins

A Digital Twin is a virtual model of a process, product or service. Pairing virtual and physical worlds allows analysis and monitoring of systems to identify problems before they occur, prevent downtime, develop new opportunities and plan for the future. The concept combines IoT, cyber-physical systems, 3D modelling, simulation and AI, and lies at the heart of the 'fourth industrial revolution'. OGC's 3D Information Management domain working group is reviewing existing OGC standards and considering new work to support Digital Twin development.

Modelling, simulation and prediction

Predictive modelling is the process of creating and analysing a digital prototype of a physical model to predict its performance in the real world. This is a very exciting space

that sees the convergence of gaming and simulation, built environment modelling, and predictive earth system models. Models and simulation (M&S) can be used for analysis and/or training, and to further the vision of a common, comprehensive model of Earth. In scenarios such as disaster response, being able to process on-the-fly models and simulations ensures more timely action.

OGC maintains the CDB standard for managing and interacting with M&S data. The OGC Interactive Simulation and Gaming domain working group is leading assessment of other suitable OGC standards, as well as coordination between other working groups and experts.

The Tech Trends activity is just one way that OGC works tirelessly to remain at the cutting edge of location technology so that our standards continue to provide a useful, practical, and fertile foundation upon which innovation can grow.

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