The Internet of Things: Are We at the Fringes of a Paradigm Shift in Geomatics?

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SUMMARY

The Internet of Things (IoT, proposed pronunciation iota) is an emerging technology which was introduced as a complimentary solution to the Internet some 15 years ago. The difference between the Internet and IoT lies in the sources of data on which the networks rely. While the Internet is predominantly fed by data provided by humans, the data sources for IoT are signals from sensors attached to things or objects around us. Nowadays, the number and types of objects being equipped with sensors is growing rapidly. Modern cars, mobile phones, and many other instruments or objects are have sensors that produce a steady flow of data on the objects' internal status. Such add-ons to modern objects are very useful for both manufacturers and users of objects. The former use the data to develop better products, while the latter use the data for optimal management of their fleet of assets. Location is one of the most fundamental attributes of any object. Therefore, it is obvious that sensors must also be georeferenced. This georeferencing should also be applied to moving objects, meaning that that sensor needs to generate location data. In this presentation, we explore possible options to include the Internet of Things as a strategy/technology for geosciences of the future, that is, to build models of reality in real time. The demand for real-time maps (RTMs) is growing in many fields of human activity. Prominent areas in which RTMs are extremely useful are emergency response, disaster mitigation, and monitoring and assessment of rapidly developing events, both natural and anthropogenic. However, more "static" objects such as land parcels, transportation routes, buildings, and topographic features can also be represented with help of RTM. It is not difficult to imagine many economic and other types of benefits that the RTM representation of the real world could bring. Presently, real-time mapping already exists, at least in a relatively narrow sense and one that is far distant from the IoT strategy. For example, real-time logistic management requires maps showing the updated positions of assets for effective management. Still, the idea of IoT offers much more than that, because it would also allow for sensors to communicate independently from a central command post, as is the case with the current solution of logistic management. The Internet of Things has already been the subject of two European studies, specifically the IoT–Architecture (IoT-A) and IoT–Initiative (IoT-I) projects, as well as the Cluster of European Research projects on IoT (IERC). As far as the authors are aware, however, no geomaticians are participating in these projects. In our view such participation is desirable, and we suggest that interested colleagues would consider joining research efforts within these programs. This would bring to the field of Geomatics a fresh wave of new thinking about our discipline. We also propose that a working group under the Commission 3 of FIG will be formed which would study possible applications of IoT for the spatial data and information management.