Perspectives on the nature of geospatial information

1. Introduction

In the first issue of this year, our editor-in-chief wrote an inspiring Editorial about the 20 years’ history of this journal. That forms a nice background to this Special Issue, in that he gave a very good overview of the journal’s aims and scope, and an interesting summary of geospatial information science, as well as some challenges for the future. During this 20th anniversary year, we will be producing two Special Issues to mark this auspicious occasion. It is a great pleasure that I am writing this guest editorial for the first of these two Special 20th Anniversary Issues for our journal on the subject of “Perspectives on the nature of geospatial information”. Since the introduction of remote sensing in the 1960s, of GIS in the 1970s, followed by GPS, and geospatial information technology, such technologies now permeate in all aspects of people’s daily lives. The advent of smartphones, social media, the cloud computing, big data, the Internet of Things, artificial intelligence (AI), robotics and automation, virtual reality, and several others have enabled many location-based services and other geospatial services to be used in construction, industry, commerce, agriculture, defense and security, disaster management, agriculture as well as many other application areas. The theme of this Special Issue, “Perspectives on the nature of geospatial information” was especially selected to show the wide range of different perspectives, approaches to, and applications of geospatial information. In this issue, we have included major contributions of the leading geospatial information science practitioners and organizations that have shaped this dynamic field. There are 13 papers in it, with authors coming from 13 countries, showing the truly international nature of this journal. We have some excellent review papers on policy, at the global and national levels, as well as overview/status papers with various perspectives on the nature of geospatial information. These include technical, educational, commercial, industrial, security, scientific perspectives on the nature of geospatial information, as well as on geospatial standards issues, in addition to some application examples. The papers also cover many different parts of the world.

2. Policy perspectives

In the first group of papers on policy perspectives, we have four excellent overview papers: two global ones from the United Nations and from the Group on Earth Observation (GEO), and then one giving the situation in Australia and one from Europe. We start with the paper entitled: “Sustainable development and geospatial information: a strategic framework for integrating a global policy agenda into national geospatial capabilities”. This paper was prepared by the Global Geospatial Information Management group, in the United Nations Statistics Division, Department of Economic and Social Affairs. The two authors are both active in the influential organization – UN-GGIM (United Nations Committee of Experts on Global Geospatial Information Management). In their paper, they highlight the vital and integrative role of geospatial information and related enabling architectures such as National Spatial Data Infrastructures. They reason that the role of geospatial information in contributing to sustainable development has not adequately been described by either the sustainable development policy practice or by the geospatial professional community. The global geospatial community now has a unique opportunity to integrate and connect geospatial information into the global development agenda in a more holistic and sustainable manner, specifically in contributing their data resources toward measuring and monitoring the 17 Sustainable Development Goals. In their paper, they introduce and discuss a new strategic framework for linking a global policy to national geospatial capabilities. This paper is then followed by the one from GEO, which pays similar attention to the Sustainable Development Goals, but more from an Earth Observation (EO) perspective. It highlight how GEO would contribute to ensure the actual use of EO in support of the 2030 Agenda for Sustainable Development, and how the Global EO System of Systems meets requirements for efficient investments in science and technology and a good return on investment. The third paper in this section on policy perspectives is one from Europe, with the title: “A brief overview of the current status of European spatial data infrastructures (SDIs) – relevant development and perspectives for Bulgaria”. This paper presents a concise overview of the status of the national SDIs of the European Union (EU) member states combined with some Bulgarian peculiarities. Some major challenges within the progress of the EU SDIs establishing, which is regulated by the European directive INSPIRE (Infrastructure for Spatial Information in Europe) toward establishment of a spatial data infrastructure for environmental policies and activities, are marked out. A comparative analysis of the main indicators for metadata, data-sets, and data services provided by EU member states is discussed, with special attention given to the Bulgarian progress. Recent achievements on accelerating the process of implementing the recommendations of the INSPIRE Directive in Bulgaria are outlined. The
final paper on the policy perspectives of geospatial information comes from Australia. Their contribution is entitled: “The Australian approach to geospatial capabilities: positioning, earth observation, infrastructure and analytics: issues, trends and perspectives”. In this thought-provoking contribution, the authors present the Australian situation, and provide their perspectives on the evolution of a future Spatial Knowledge Infrastructure emerging from today’s traditional Geospatial Data Infrastructures, together with an interesting discussion of the growing importance of geospatial analytics for transforming whole supply chains.

3. Standards

Standards are a very important issue in geospatial information, so we are very fortunate to have a good contribution by Luis Bermudez from the Open Geospatial Consortium (OGC) from the USA. The OGC contribution to this Special Issue is entitled: “New frontiers on open standards for geo-spatial science”.

As the American Society of Photogrammetry and Remote Sensing notes in its ASPRS Accuracy Standards for Digital Geospatial Data: “currently, there is no consistent and appropriate accuracy standard that applies specifically to new technologies for digital geospatial data”. In this OGC paper, the author shows how the process of sharing of data has become easier than ever with the advancement of cloud computing and software tools. However, big challenges remain such as: efficient handling of big geospatial data, support and sharing of crowd sourced/citizen science data, integration with semantic heterogeneity, and inclusion of agile processes for continuous improvement of geospatial technology. This paper discusses the new frontiers regarding these challenges and the related work performed by the OGC.

4. Scientific perspectives

Here, we have two quite different papers for you. The first one is by Academician Professor Deren Li and his colleagues from Wuhan University, China. It is a truly visionary paper on the future of geospatial information, entitled: “Earth Observation Brain (EOB): An intelligent earth observation system”. This is a real look into the near future of Earth observation, and the many related technologies such as GNSS, image processing, and many other technologies. It will be interesting to see how long it takes to fully realize this “EOB”. The second paper in this section is from the University of Maryland in the USA. This research group has worked for many years on global land cover mapping, and has provided here a review paper on: “Improving global land cover characterization through data fusion”.

5. Commercial perspective

The paper on the commercial perspective of geospatial information is from a Chinese company, called Twenty First Century Aerospace Technology Company. This Chinese company with its headquarters in Singapore, and with offices internationally, is one of a new breed of geospatially oriented Earth Observation business solution providers. In their paper, they present a new geospatial model for their TripleSat satellite constellation, and show some of the new capabilities of geospatial information to serve a variety of user needs.

6. An industry perspective

Here, we have a very thorough view of how one of the world’s leading geospatial companies views the geospatial industry. Their paper, entitled: “The Future of Geospatial Intelligence” gives the reader much valuable information, and plenty to think about.

7. Educational perspective

Here, we have a position paper on the role of education and training requirements for the geospatial information industry from the ISPRS’s Technical Commission VI on: “Education, Technology Transfer and Capacity Development”. This paper is entitled: “Geoinformatics education and outreach: Looking forward”. In it, they discuss many of the key issues involved, provide details of ISPRSs educational activities, explain some of the lessons learnt, and provide many valuable insights into future directions for stimulating education in our field of geospatial information science. We also have one interesting paper on educational aspects related to geospatial information in Southern Africa, and the issues and needs of urban planners there.

8. Application aspects

In this section on the applications of geospatial information, we have selected just two of the myriad of applications we could have selected (many other applications have been mentioned briefly in some of the earlier papers in this issue). These are: a paper entitled: “Coastal zone management in India: present status and future trends” which shows how, at the national, regional, and local level, geospatial information is vital for coastal protection, resource management, shipping, fisheries, and global climate change studies such as sea-level rise and natural disaster mitigation. The second example selected gives a comprehensive review of remote sensing applications for oil palm studies, an important commodity in several Tropical countries such as Indonesia and Malaysia. It is a commodity with particular influence on economy and employment, but also on environment and land use planning.

In conclusion, I hope you will all enjoy reading these papers, showing the many different perspectives of geospatial information. As all the papers of our journal are OPEN ACCESS, please feel free to download them and circulate to your networks in whichever perspective of geospatial information of interest. We welcome your feedback on any of the topics covered in this issue.

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