



GEOSPATIAL TECHNOLOGY

1.1 In general terms, a Spatial Data Infrastructure (SDI) may be defined as 'a framework of policies, institutional arrangements, technologies, data, and people that enable the effective sharing and use of geographic information' [Bernard et al, 2005].





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2.1 Galileo is Europe's Global Navigation Satellite System (GNSS), providing improved positioning and timing information with significant positive implications for many European services and users.





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3.1 According to Kritzing et al. (2018), a "digital twin" has to provide bidirectional data flows between the physical object and a digital object in a fully integrated way. "Digital model" or a "Digital Shadow" refers respectively to no exchange or only an automated one-way data flow between the physical object and a digital object.





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4.1 A Geographic Information System (GIS) is a system designed to capture, store, manipulate, analyse, manage, and present all types of geographical data. The keyword of this technology is Geography – this means that some portion of the data is spatial. In other words, data that is in some way referenced to locations on the earth.





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5.1 A range of both public and private services require users or devices to demonstrate their location to have access or for the service to work properly. As a keeper of records, a regular blockchain tells the users 'what' transaction has happened. If proof of location is associated with a blockchain, it is empowered to reveal 'where' that transaction has happened.





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6.1 A gazetteer is a register of features of a country, region, continent, etc. containing information on their geographical position (EN ISO, 2019). Gazetteers play an important role in public services and geospatial data analysis. Users of location-based services often consult a gazetteer to look-up the location of administrative units, streets, addresses, etc. This is known as geocoding. Conversely, finding a description of a location on the basis of a given set of geographic coordinates is called reverse geocoding.





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7.1 The geospatial technology ecosystem is a multifaceted entity with multiple interactive components. The GeoBuiz-18 report, a study by Geospatial Media and Communication, broadly segments the geospatial technology ecosystem into four categories, namely, GNSS and Positioning, GIS and Spatial Analytics, Earth Observation and 3D Scanning.

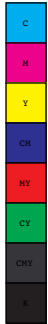




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8.1 As engineering and architecture projects get larger, they need more information about their spatial context. With the adoption of Building Information Modeling (BIM) standards by governments around the world, the use of GIS to provide spatial context is starting to be embedded as a key component of BIM project delivery. GIS users need more information about how to interface GIS with new and emerging 3D domains that impact BIM projects, including classic BIM applications as well as new technologies such as the Internet of things (IoT), augmented reality (AR), and virtual reality (VR).





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9.1 Location-based services (LBS) use the real-time location from a device to provide personalised information, entertainment or security. There are several mechanisms inside a typical mobile device that can provide location information. The most common are GNSS (ex: GPS), RFID, Wi-Fi and cellular.





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10.1 Over the past 10 to 15 years, progressive developments in the use of ICT and data in government have been accompanied by similar developments in the collection, sharing, and exploitation of geospatial data. GIS systems allowed early manipulation and visualization of location information. Developments in the spatial data infrastructure led to national and international initiatives, such as INSPIRE. And e-government services with location functions have led to more sophisticated "location intelligence" capabilities as part of the digital government revolution.





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11.1 GeoAI is a sub-discipline of Artificial intelligence that uses machine learning to extract knowledge from spatial data. Some common techniques used in this domain are: 1) object classification (assign a label to a given image/ geographical feature) ex: Find illegal swimming pools 2) pixel classification (assign a label to each pixel), ex: Land Cover classification 3) object detection (Find objects and their locations), ex: detecting and counting vehicles.





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12.1 The UN-GGIM Future Trends report (Third Edition, 2020) identified 5 key drivers and 31 related trends in the geospatial sector such as intelligent mobility, diversity at work, pressure on government institutions and cybersecurity.



