[KE-02-030] The Geospatial Industry

Abstract

This entry describes the breadth and size of the geospatial industry, the value associated with this sector, and the major players based on the membership of the World Geospatial Industry Council and recent compilations of industry leaders published by GIM International and Geospatial World, and the likely path forward.

Keywords: coordinating organizations

Author & citation

Wilson, J. P. (2025). The Geospatial Industry. The Geographic Information Science and Technology Body of Knowledge (Issue 2, 2025 Edition), John P. Wilson (Ed.).
DOI: 10.22224/gistbok/2025.2.9

Explanation

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1. Introduction

The geospatial industry is a subset of the larger geospatial community, with a specific focus on the private sector. This differentiates it from other segments, such as government agencies, nonprofits and academic institutions, whose missions and operational models are often quite different.

The private sector’s role within the geospatial community is both commentary and catalytic. Seen this way, the geospatial industry serves as a critical enabler: providing tools, services, and workforce expertise not only to “traditional” geospatial organizations but also to a growing range of sectors that integrate geospatial capabilities into broader workflows. In essence, the geospatial industry helps bring the power of geography to virtually all parts of the global economy.

2. The Breadth and Size of the Geospatial Industry Sector in 2024

The geospatial industry has grown tremendously during the past five decades with the rise of cloud computing, big data, data science, ubiquitous broadband, and open standards (Wilson, 2024). These drivers have delivered new technologies and collaborations and today, spatial computing, reality capture, and digital twin technologies are revolutionizing productivity and supporting new value-based and profit-sharing models based on business-

to-business (B2B) platforms and new market opportunities (Geospatial World, 2024a).

The early narratives around geospatial information focused on maps as computers, geographic information systems (GIS), spatial data infrastructures, Digital Earth, and the prospect that GIS could serve as a nervous system for the planet.

Many of the abovementioned concepts are still relevant, but the discussion has shifted to applications, such as environmental monitoring, assessment and conservation, forestry and land management, health, demographics and statistics, transportation planning and management, building and facility management, public safety and national security, and preparing for and responding to disasters.

The abovementioned applications point to a rapidly changing environment in which portals, open data, engagement, enterprise GIS, collaboration, story maps, and the cloud and ubiquitous broadband play prominent roles. The advances nowadays focus on scripting and workflows, predictive modeling, real-time analysis, GeoAI, and replicability, and the growth of the geospatial industry sector speaks to the multitude of ways in which geospatial insight may add value to human activities, and the rapidly evolving ways in which geospatial data can be gathered, organized, and used to serve specific needs.

The key business categories listed in Geospatial World's 2024 Geospatial Industry Market GIS and Spatial Analytics, Earth Observation, GNSS and Positioning, Sensors and Scanners, Frontier Technologies, Infrastructure Analytics and Modeling, Solutions and System Integrators, Service Providers, and Consulting offer a structured and comprehensive framework (see Table 3). They reflect how the private sector conceptualizes the industry and cast the geospatial sector in tangible technologies and services.

3. The Value Associated with the Geospatial Industry Sector

A series of reports authored by the Boston Consulting Group (2012), Oxera (2013), AlphaBeta (2016), and the United Kingdom’s Geospatial Commission (2023) has measured the value associated with the geospatial sector during the past 15 years.

The first of the abovementioned reports by the Boston Consulting Group, for example, focused on the 500,000 high-wage jobs and the $73 billion (USD) in revenues that the U.S. geospatial sector generated in 2011 along with the efficiency gains delivered by geospatial services throughout the remainder of the U.S. economy. The latter drove $1.6 trillion (USD) in revenue and $1.4 trillion (USD) in cost savings in 2011. The geospatial services were used by 5.3 million U.S. workers each day, and the direct value of geospatial services for U.S. consumers was estimated at $37 billion (USD) annually, reflecting the many ways in which geospatial applications and location-enabled devices were central to our daily lives.

The second report by Oxera (2013) split the benefits into direct, consumer, and wider economic effects and the third report by AlphaBeta (2016) focused attention on the various ways in which consumers, businesses, and society benefit from location-based information. Their estimates of economic value mirrored those in the first report and spoke of the ubiquitous but uneven presence of the generation of these benefits across the globe.

The final report by the UK’s Geospatial Commission (2023) also tackled the value of the

geospatial sector, noting how geospatial data generates economic (i.e., the market value of the data and income generated through its use), social (i.e., the societal benefits generated when data is used to improve people's lives) and environmental (i.e., the benefits to the environment when location data is used in decision-making) benefits, and the power and value of location data increases as it is reused.

Finally, a report produced by Geospatial World Consulting in 2024 valued the global geospatial market at $531 billion (USD) and that this would reach $1.06 trillion (USD) in 2030 based on a compound annual growth rate (CAGR) of 10.2% between 2025 and 2030 (Geospatial World, 2024a). The U.S. geospatial market, which includes a diverse range of applications, from geographic information systems and remote sensing to satellite imagery and location-based services, was valued at $133 billion (USD) in 2023. The United States geospatial sector, as we will see below, is unique due to its robust infrastructure that encompasses extensive data collection and processing capabilities along with a well-established network of service providers and technology developers. The wider U.S. geospatial economy, encompassing all related activities and services, was estimated at $185 billion (USD) in 2023 and given this backdrop, the next section describes some of the major players in the U.S. and across the globe.

4. The Major Players

The World Geospatial Industry Council (WGIC) was established on August 1, 2018, at the 8th session of the UN Global Geospatial Information Management (UN-GGIM) in New York and their membership tallied 14 patron, 4 corporate, and 40 associate members on January 1st, 2025 (Table1). The council's taglines – geospatial in everything and geospatial for everyone – speak to the large and varied roles geospatial plays in both society and the economy, and their work to support and grow the geospatial industry is driven by six committees focused on data; diversity, equity and inclusion; industry-academic collaboration; partnerships and industry engagement; policy development and advocacy; and project funding and sustainability. Ten of its members – Autodesk, Bentley Systems, Esri, Fugro, Hexagon AB, Planet Labs, RIEGL, TomTom, Trimble, and Woolpert – operate globally and can be counted among the most prominent geospatial software, services, and data providers in the world.

Table 1. The World Geospatial Industry Council Members, as of January 1, 2025.

Patron Members			
Autodesk	Bentley Systems	Cyient	Esri
Fugro	Hexagon AB	IIC Technologies	MDA Space
Oracle	SPACE42	TomTom	USPACE Technology Group
Trimble	Woolpert		
Corporate Members			
European Space Imaging	GHGSat	RIEGL	Terra GIS
Associate Members			
AerialZeus	Asterra	Bad Elf	ClearBlue Infrastructure Solutions
ConsultingWhere	DataDEV	DeepSpatial	Diamondback Land Surveying
EKM Global	Esri India	ETCH	Geo Owl

Patron Members			
GeoTechVision	GeoSAS Consulting	GeoSolutions	INOVAANTAGE
ITS Geo Solutions	Kompass BMS	Makepath	MBS: A Sealaska Company
Mena3D	Nara Space	NavVis	Picterra
PlanBlue	Planet Labs	Pointly	ReOrbit
SatVu	Satlantis	Scepter	Schneider Digital
Si Analytics	Soham Software Services	Space Aye	Spatial Vision
TechGX	TopoDOT	Vexcel Imaging	

Table 2 lists the companies that support GIM International, which was established in 1990 and serves as an independent online information source for the global geomatics industry. The 37 companies included in Table 2 span gold, silver and bronze levels based on their support for this magazine that delivers news, articles, employment opportunities, company profiles, education opportunities, and an event calendar. This list includes just 7 of the 58 members of the WGIC and tilts towards new entrants building business opportunities around reality capture, robotics, sensor and digital twin technologies, as illustrated by Emesent, Feima Robotics, Local Eyes, and NV5 Geospatial, among others.

Table 2. The GIM International Premium Company Members in 2025.

Gold Members			
Amuse Oneself	Blue Marble Geographics	Evo Logics	Hexagon
NV5 Geospatial	Planet Labs	EIEGL	
Silver Members			
CHCNAV	Emesent	Feima Robotics	GEXCEL
Hi-Target	IGI	INTEC	Lidaretto
Pythagoras	SBG Systems	STEC	Trimble
Trimble Applanix	Vexcel	YellowScan	Zoller-Fröhlich
Bronze Members			
3DT Scanfly	BlueSky	Geo Matching	GIM International
Green Valley International	Harxon Corporation	Hydro-Tech	Inertial Labs
Local Eyes	Pentax	PozStar	SinoGNSS
SOMAG AG Jena	Unicore Communications		

The 348 companies listed in Table 3 were gathered from the 2024 Geospatial Industry Market Map authored by Geospatial World (2024b). This list includes 10 out of 14 and 14 out of 58 companies listed in the first two tables, respectively and as such, it shows both the global reach and breadth of the geospatial sector nowadays.

The global reach is evident from the corporate offices of the various companies listed in Table 3. These offices span 32 countries and the top 5 countries – the U.S. (167), India (24), Germany (18), the U.K. (18), and Canada (15) – host the head offices of 242 companies (70%). There is at least one corporate office located in every major region – Africa (1), Asia (44), Europe and the U.K. (99), North America (182), Oceania (6), South America (8), and

the Middle East (8) – but this distribution is heavily skewed towards North America, Europe, the U.K., and Asia. Nearly half the corporate offices (48%) have their headquarters in the U.S., led by California (52), Virginia (17), New York (15), Colorado (11), and Florida, Massachusetts and Texas (9 each). These distributions indicate where decisions are likely made and the most impactful geospatial job opportunities are found.

The breadth of the geospatial sector is captured by the nine business categories and numerous subcategories used to describe company roles in the 2024 Geospatial Industry Market Map. Five of the categories – GIS and spatial analytics, Earth observation, GNSS and positioning, sensors and scanners, and service providers – speak to companies that develop geospatial technologies and provide geospatial services, whereas the other four categories – frontier technologies, infrastructure analytics and modeling, solutions and system integrators, and consulting – speak to companies that support or do geospatial work as part of a much larger and diverse suite of technologies and services.

The next 9 subsections describe the contributions made by selected companies in each of these categories.

4.1 GIS and Spatial Analytics

The 66 companies in this category support GIS, location intelligence, spatial analytics, and map content. Nearly one-half of the companies in this category (29, 43.9%) offer technologies, services and solutions in one or more of the other categories as well.

e-GEOS is an Italian EO company with more than 300 employees that operates through EO centers in Matera, Italy and Neustrelitz, Germany. The company offers a range of products and services based on optical and radar satellites, as well as aerial surveys, providing near-real-time monitoring and large-area mapping capabilities for the emergency management, maritime surveillance, agriculture, forestry, cadastre, environmental protection, and the oil and gas sectors, and is also included in the Service Providers category in Table 3.

Esri is the global market leader in GIS software, location intelligence, and mapping and was featured in all four of the GIS and Spatial Analytics subcategories listed in Table 3. Founded in 1969, it is best known for its ArcGIS product line that nowadays includes enterprise- and web-based systems, services and applications and its user conference in the San Diego Convention Center which draws 18,000 users every year. Esri has 42 offices worldwide, including 17 research and development (R&D) centers, and 5,500 employees. Esri's technology and tools are used by hundreds of thousands of organizations, including half of the Fortune 500 companies, most national governments, 20,000 cities and local governments, all 50 U.S. states and 7,000 universities. Esri is a large company with a broad reach and as such, it appears in the Earth Observation (Satellite – Downstream / VAS), GNSS and Positioning (Indoor Positioning), and the Frontier Technologies (Immersive Technologies, Digital Twin, Metaverse) categories in Table 3.

HERE Technologies is a Dutch multinational group that specializes in mapping technologies, location data, and related automotive services for individuals and companies. They build, deploy and scale location solutions that can be used for routing applications, the creation of custom maps, the visualization of location datasets, and more. A global company, with 6,400 employees in 52 countries.

Hexagon is a Swedish multinational group and global leader in sensor and software

technologies. Their products span 7 groups – agriculture, asset lifecycle intelligence, autonomy and positioning, geosystems, manufacturing intelligence, mining, safety, infrastructure and geospatial – with the overarching aim to improve productivity, quality, safety and sustainability in vital industries. This company has 24,500 employees spread across 50 countries. It is also included in the Earth Observation (Drones & UAVs, Aircraft), GNSS and Positioning (Indoor Positioning, Navigation, Augmentation Systems), Sensors and Scanners, Frontier Technologies (Automation and Robotics, Digital Twin and Metaverse), Infrastructure Analytics and Modeling, and Solutions and System Integration (Engineering, Automotive) categories in Table 3.

Lightbox is an American company that provides trusted data and location intelligence tools to approximately 30,000 commercial real estate (CRE) customers. Their client base includes brokers, developers, investors, lenders, insurers, technologists, environmental advisors, appraisers and businesses that depend on geospatial information to navigate complex decisions, minimize risk, and boost productivity. Lightbox is also included in the Frontier Technologies (Internet-of-Things) category in Table 3.

Precisely is an American software company specializing in data integrity tools, and also providing big data, high-speed sorting, extract, transform and load (ETL), data integration, data quality, data enrichment, and location intelligence capabilities. The company has 3,000 employees spread across 11 offices in eight countries and currently works with 12,000 customers in 100 countries, including 93 of the Fortune 100 companies.

Safegraph, based in Denver, CO, is a small company with 115 employees that gathers location data from mobile devices and sells data products about points of interest (i.e., places) and the movements of people that their customers use to power innovative third-party applications, platforms, and analytics.

TomTom is a Dutch multinational company that develops and creates location technology and consumer electronics, including maps, navigation and traffic solutions. Founded in 1991, TomTom released its first generation of satellite navigation devices in 2004 and today, they support 3,600 employees in 22 offices spread across Europe, Asia, the Americas, and Oceania.

4.2 Earth Observation

The 76 companies in this category support Earth observation using drones and unoccupied aerial systems (UAVs), aircraft, and both upstream and downstream satellite value-added services. Approximately one-third of the companies in this category (24, 31.6%) offer technologies, services and solutions in one or more of the other categories as well.

Airbus Defense and Space, based in Taufkirchen, Germany, is a division of the European aerospace corporation, Airbus SE. Airbus Defense and Space supports four business lines focused on military aircraft, space systems, connected Intelligence, and UAVs. Airbus SE, including its Defense and Space division, has a large global footprint, with around 150,000 employees and 180 offices across the globe. Airbus Defense and Space is also included in the Frontier Technologies (Automation and Robotics) category in Table 3.

DJI Technology is a Chinese multinational company that builds commercial UAVs (drones) for aerial photography and videography. DJI is the world's leading drone maker, and the company has 14,000 employees spread across 17 international offices.

Maxar Technologies is American space technology company specializing in geospatial intelligence, EO, and on-orbit servicing satellites, satellite products, and related services. Maxar has 2,600 employees spread across 16 offices in the U.S. and five international offices in New Delhi, India, Tokyo, Japan, Singapore, Linköping, Sweden, and London, UK, whose work helps organizations explore space, connect humanity, and protect our planet and its people.

Pixxel is an Indian space technology company that is building a constellation of hyperspectral Earth imaging satellites and the analytical tools to mine insights from those data. The constellation will use a sun-synchronous orbit to provide global coverage every 24 hours, with the aim of detecting, monitoring and predicting global phenomena. The company has 280 employees and currently has offices in El Segundo, CA as well as Bangaluru, India. Pixxel is also included in the Service Providers category in Table 3.

Planet Labs is an American Earth imaging company that aims to image the entirety of the Earth daily to monitor changes and pinpoint trends. Their services include single order tasking (for on-demand, high-resolution imagery), aircraft-based detection (i.e., AI-powered solutions that deliver daily, global detection), the Planet Insights Platform which provides an all-in-one multidimensional platform for Earth, and broad area management which harnesses the power of Earth insights to look more holistically at daily monitoring with the goal of making global change visible, accessible and actionable. Planet with more than 1,000 employees spread across the headquarters in San Francisco, CA and five offices in Berlin, Germany, Arlington, VA, Haarlem, The Netherlands, Ljubljana, Slovenia, and Graz, Austria, has built and successfully deployed 450 satellites and currently operates >200 in orbit and collects >3.5 million km2 of imagery daily.

Riegl is an Austrian company that provides airborne, mobile, terrestrial, industrial and UAV-based laser scanning solutions for applications in surveying. Riegl has produced LiDAR systems commercially for over 40 years and today, the company focuses on pulsed time-of-flight laser radar technology in multiple wavelengths with approximately 250 employees worldwide. Riegl is also included in the Sensors and Scanners and the Frontier Technologies (Automation and Robotics) categories in Table 3.

Vexcel Imaging is an Austrian company that provides industry-leading mapping systems, a dedicated fleet of fixed-wing aircraft, and the largest, most accurate aerial imagery and geospatial data program on the planet. Their work today makes extensive use of UltraCam aerial cameras and hybrid camera-LiDAR systems and serves large numbers of applications with varying accuracy requirements. The company has 200 employees and offices in Denver, CO as well as Graz, Austria. Vexcel Imaging is also included in the GIS and Spatial Analytics (Map Content) category in Table 3.

4.3 GNSS and Positioning

The 59 companies in this category support indoor positioning, terrestrial positioning, navigation and timing (PNT) using beacons and enhanced long-range radio navigation systems (eLORAN), PNT satellites, navigation systems, and augmentation systems that provide correction systems and services. Approximately one-third of the companies in this category (18, 30.5%) offer technologies, services and solutions in one or more of the other categories as well.

SpacePNT is a Swiss low cost GNSS receiver maker for the fast-growing Space satellite

market, delivering decimeter-level positioning and nanosecond timing accuracy for single satellites and LEO constellations and the highest signal reception sensitivity for Moon missions, all in real-time through its unique radiation-tolerant PNT technology. Established in 2020, SpacePNT is a small but growing company with 11 employees.

Tersus GNSS is an Australian company that provides high-precision GNSS Real-time Kinematic (RTK) solutions for UAVs that offer centimeter-level positioning accuracy and flexible interfaces for a variety of applications including UAVs, surveying, mapping, construction engineering, and precision agriculture. The company has around 100 employees with offices in the U.S. and China as well as Australia.

Topcon Positioning Systems is a Japanese company that provides positioning technology for surveyors, civil engineers, construction contractors, equipment owners and operators. Topcon has nearly 5,000 employees with offices in Africa, Australia, Asia, Europe, and North America. Their work focuses on infrastructure and agriculture, and their products include Topnet Live, which provides a global GNSS correction service for surveyors and construction teams whose projects use satellite positioning. Topcon Positioning Systems is also included in the Sensors and Scanners, Frontier Technologies (Automation and Robotics, Digital Twin), and the Infrastructure Analytics and Modeling (BIM, Geotechnical) categories in Table 3.

Trimble is an American hardware, software, and technology services company with 12,700 employees and 152 fulfillment centers, manufacturing, services, R&D centers, and related facilities in 34 countries. Their hardware products include GNSS receivers, scanners, total stations, laser rangefinders, UAVs, inertial navigation systems and their software processing tools include SketchUp, which is used extensively in architecture, construction, interior design, landscape architecture, and urban planning applications. Trimble is also included in the GIS and Spatial Analytics (Map Content), Earth Observation (Drones and UAVs, Aircraft), Sensors and Scanners, Frontier Technologies (Automation and Robotics, Digital Twin), and the Infrastructure Analytics and Modeling (BIM, CAD, Geotechnical) categories in Table 3.

What3Words is a British company that has built a proprietary geocoding system designed to identify any location on the surface of Earth with a resolution of approximately 3 m. This is accomplished by dividing the world into a grid of 57 trillion 3-by-3-m squares, each of which has a three-word address. This company was founded in 2013 and today, has 150 employees. What3Words is also included in the GIS and Spatial Analytics (Map Content) category in Table 3.

4.4 Sensors and Scanners

The 23 companies in this category build and support a diverse range of sensors and scanners, including Light Detection and Ranging (LiDAR), Radar and Ground Penetrating Radar (GPR), that capture spatially referenced data. Approximately one-half of the companies listed in this category (12, 52.2%) offer technologies, services and solutions in one or more of the other categories as well.

FARO Technologies is an American company with 1,400 employees that designs and builds 3D measurement, imaging and realization technology that is used widely in manufacturing, AEC, and public safety. FARO Technologies is also included in the Frontier Technologies (Automation and Robotics, Digital Twin), and the Infrastructure Analytics and Modeling (BIM) categories in Table 3.

IDS GeoRadar is an Italian company with 190 employees that design and build GPR and interferometric radar products and software solutions for a variety of geophysical, mining, civil engineering, and security applications that need to see the unseeable easily, safely and accurately.

Inertial Labs is an American company with 150 employees that designs and builds cutting-edge Inertial Measurement Units (IMUs), GPS-Aided Inertial Navigation Systems (INSs), and Attitude & Heading Reference Systems (AHRSs) for inertial sensing, assured position navigation and timing, GNSS tracking, LiDAR scanning, alternative navigation, visual navigation, and programmable navigation solutions. Inertial Labs is also included in the GNSS and Positioning (Augmentation Systems) category in Table 3.

Pix4D is a Swiss software company with 275 employees and offices in Lausanne, Berlin, Bucharest, Denver, Shanghai, Madrid and Tokyo, that specializes in terrestrial and drone photogrammetry mapping software. Their Pix4D product line is used extensively in surveying & mapping, AEC, precision agriculture, energy, utilities & infrastructure, and forensics & public safety. Pix4D is also included in the GIS and Spatial Analytics (Spatial Analytics), Earth Observation (Drones and UAVs), and the Infrastructure Analytics and Modeling (BIM) categories in Table 3.

Voxelmaps is an American company with 90 employees that aspires to build the world's most accurate 4D volumetric model of the Earth using the latest LiDAR and HD imaging sensors, fused with a wide variety of other rich content. Their products, which power autonomous vehicles and the latest AI models rely on Multi-Resolution, Voxel Occupancy Grids (MRVOGs). Voxelmaps is also included in the GIS and Spatial Analytics (Map Content) category in Table 3.

4.5 Frontier Technologies

The 73 companies in this category support emerging and state-of-the-art technologies, including artificial intelligence (AI), the cloud, blockchain, the Internet-of-Things (IoT), immersive technologies, automation and robotics, digital twins, and the metaverse which complement and add value to work in the geospatial sector. Approximately one-half of the companies listed in this broad category (37, 50.7%) offer technologies, services and solutions in one or more of the other categories as well.

Accenture is a global professional services company with 774,000 employees spread across 200 cities and 120 countries that provides expertise and guidance to help organizations solve complex problems and achieve their goals. Their areas of expertise include consulting, technology, operations, digital engineering and manufacturing, AI and analytics, cybersecurity and cloud, and geospatial data and solutions feature prominently in the solutions they build for clients. Accenture is also included in the GIS and Spatial Analytics (Location Intelligence) category in Table 3.

Cropin is an Indian software company with 225 employees and offices in India and the Netherlands that has built an AI cloud platform for agriculture to help stakeholders make informed decisions that enhance farming efficiency, productivity, and sustainability through digital technologies and predictive intelligence. Cropin is also included in the GIS and Spatial Analytics (Location Intelligence) category in Table 3.

Microsoft is an American multinational technology conglomerate with 228,000 employees

and 217 offices worldwide. They are perhaps best known for their hardware and the Windows operating system that was first released in 1985. They have just celebrated their 50th anniversary and some of their more recent products - Bing Maps and Microsoft Fabric released in 2005 and 2023, respectively – have strong connections to GIS and spatial analytics. Microsoft Fabric, for example, provides a unified, end-to-end analytics platform that provides a single environment for data professionals and businesses to collaborate on data projects, encompassing data ingestion, storage, processing, and analysis. ArcGIS GeoAnalytics for Microsoft Fabric will be added soon so users can gather geospatial insights where their data lives. Microsoft is also included in the GIS and Spatial Analytics (Map Content), Earth Observation (Satellites / Downstream / VAS), and the Systems Solutions and Integrators (Business Intelligence) categories in Table 3.

Nvidia is an American multinational technology company with 29,600 employees and 67 offices worldwide that builds GPUs which, in turn, drive advances in AI, high-performance computing, gaming, creative design, autonomous vehicles, and robotics. Nvidia is an industry leader in advanced computing and their work in AI, immersive technologies, and digital twins, and is transforming some of the world's largest industries and profoundly impacting society.

Oracle is an American multinational computer technology company with 160,000 employees and 191 offices worldwide. They are one of the world’s premier cloud computing vendors and their signature products include Oracle Cloud Infrastructure, which provides an automated, secure platform for migrating enterprise workloads and building new cloud native apps, and Oracle Cloud Applications, which provides a complete suite of cloud applications delivering consistent processes and data across your business. The latter incorporates Oracle Spatial which allows users to manage geospatial data, perform analysis, and visualize their work via interactive maps. Oracle is also included in the GIS and Spatial Analytics (GIS, Location Intelligence, Spatial Analytics), Infrastructure Analytics and Modeling (BIM, CAD), and the Solutions and System Integrators (Business Intelligence) categories in Table 3.

Shamla Tech Solutions is an Indian software company with around 4,000 employees and offices in France, India, Malaysia, South Korea, UAE, and the U.S. that delivers immersive customer experiences and smart interactions using one or more of the frontier technologies (i.e., AI, blockchain, and Web3.0 development) referenced in Table 3.

4.6 Infrastructure Analytics and Modeling

The 37 companies in this category provide infrastructure analytics and modeling technologies and services focused on building information models (BIMs), computer-aided design (CAD) and a broad sweep of geotechnical needs. Approximately 40% of the companies listed in this category (14, 37.8%) offer technologies, services and solutions in one or more of the other categories as well.

Autodesk is an American-based technology, software, and services company with 14,100 employees and 27 offices worldwide. The company’s software and services span AEC (i.e., AutoCAD, Revit, Civil 3D, AutoCAD LT, and BIM Collaborative Pro), Product Design & Manufacturing (i.e., professional CAD/CAM tools built on top of Inventor and AutoCAD), and Media & Entertainment content creation tools (i.e., 3ds Max and Maya). Autodesk and Esri offer tools for integrating BIM and GIS workflows, with the Autodesk Connector for ArcGIS

and Esri's ArcGIS for AutoCAD allowing users to access and edit ArcGIS data within Autodesk software and vice-versa. Autodesk is also included in the Frontier Technologies (AI, Digital Twin) category in Table 3.

Bentley Systems is an American-based infrastructure engineering software company with 5,200 employees and offices in more than 50 countries. They provide products and solutions to advance infrastructure intelligence in cities and the energy, mining, transportation, and water sectors. Bentley Systems integrates geospatial data and technology into its infrastructure engineering software, focusing on creating digital twins and enhancing infrastructure design, construction, and operations through partnerships with companies like Cesium (which was acquired by Bentley Systems in 2024) and Google. Bentley Systems is also included in the Frontier Technologies (Digital Twin) category in Table 3.

Two of the largest and most successful companies in this category – Hexagon and Trimble – were introduced as part of earlier categories.

4.7 Solutions and Systems Integrators

The 47 companies in this category provide solutions and system integrations across the engineering, business intelligence, automotive, and telecommunications sectors. Approximately one-third of the companies listed in this category (16, 34%) offer technologies, services and solutions across one or more of the other categories as well.

NTT Data is a Japanese information technology service and consulting company with 193,500 employees and offices in 50 countries. The company connects with geospatial via its work with the AW3D global high-resolution 3D map service and its ongoing work to leverage satellite data and spatial analytics for disaster management, environmental conservation, and urban development. The AW3D is a high-resolution, global digital 3D map, developed by a public-private partnership between JAXA, NTT Data, and the Remote Sensing Technology Center of Japan. This product provides a digital representation of the Earth's surface, simulating terrain, ground undulations, and the heights of trees and buildings at a 5 m resolution and a 0.5 m resolution in selected urban areas.

SCCON Geospatial is a Brazilian company that uses geospatial technologies to dynamically generate precise, updated change detection alerts and automatic reports using daily Planet images to support decision-making in the environment, agriculture, forestry, energy, and public safety sectors. The company has 110 employees, and their platform currently serves 80,000 registered and active users working in various levels of government, natural resource management, and insurance.

Siemens is a German multinational technology conglomerate with 320,000 employees and offices in 190 countries. Their work uses geospatial data and analytics in various ways. In one case, their Smart Infrastructure solutions, particularly in power grid planning and management, use Esri's GIS software and data with Siemens' PSS®SINCAL power system analysis software to create a holistic digital twin for better planning and operations, and in another case, the process of data collection for Siemens Mobility is built around a mobile mapping system provided by Trimble that can be installed on trains, trolleys and cars. Siemens is also included in the Frontier Technologies (Digital Twin) category in Table 3.

4.8 Service Providers

The 47 companies in this category provide a diverse range of geospatial services to their public, private, and not-for-profit sector clients. Approximately 20% of the companies listed in this broad category (8, 17.0%) offer technologies, services and solutions in one or more of the other categories as well.

Fugro is a large Dutch company that uses the power of geospatial data to unlock the secrets of the surface, subsurface, natural, and built environments on Earth to build safer and more liveable communities with their partners and clients around the world. The company has 11,000 employees spread across offices in 51 countries and specializes in the delivery of services and solutions where nature is protected, and people can thrive.

Sogelink, formerly known as Geodan, is a Dutch company providing software, services and solutions focused on mapping and data analysis, crisis management and incident response, sustainable energy and climate change solutions, and smart city development. The company has >600 employees spread across six countries in Europe.

Tech Mahindra is an Indian company which operates in >90 countries. Their services range from consulting, enterprise resource planning, and computational systems to digital supply chain, infrastructure management, integrated engineering solutions, business processes, performance engineering, experience design, network, telecom product engineering, business excellence, and testing. Nearly all the Tech Mahindra products and services are focused on leveraging next-generation technologies like 5G, Metaverse, Blockchain, Quantum Computing, Cybersecurity, Artificial Intelligence, Data Analytics, and the Internet of Things (IoT) to enable end-to-end digital transformation.

Woolpert is an American company with >2,700 employees and 60 offices on five continents. The company seeks to move the world forward through forward thinking and by doing so, aspires to become one of the premier architecture, engineering, geospatial (AEG) and strategic consulting firms in the world. Their work spans multiple sectors to effectively serve public, private, and government clients worldwide

4.9 Consulting

The eight unique companies in this category provide a broad suite of consulting services to their clients. Three of the companies – **Deloitte**, **Ernst & Young**, and **Price, Waterhouse and Cooper** with corporate offices in London, UK – can be counted among the big four global accounting firms that provide audit and assurance, consulting, tax, and related services to clients worldwide. Much of their work seeks to grow opportunities for their clients and many of their projects incorporate geospatial technology, services, and data.

The fourth company called out in this category, **Geospatial World**, is a force multiplier for advancing geospatial knowledge for the sustainability of everything through its events, consulting, and communications divisions. Based in Noida, India, their contributions support knowledge sharing, strategic collaborations, market intelligence to give clients a competitive edge, influential policy advocacy, business foresight and market development, and global community building.

5. The Path Forward

The path forward looks bright given the strong growth most analysts forecast for the geospatial sector coupled with the rise of cloud computing, the ubiquitous broadband and automation in the digital era.

The abovementioned drivers will facilitate and accelerate the emergence and adoption of geospatial knowledge infrastructures in the coming decades and this, along with further automation and digitization, will change the character of geospatial work. The examples used in this entry illustrate the breadth and diversity of the geospatial services and moving forward, geospatial professionals will likely be embedded in large technology teams that support new value-based and profit-sharing models based on B2B platforms and new market opportunities that support the development and adoption of autonomous vehicles and things like precision agriculture, smart grids, and smart cities that we have talked about for the past decade or more without being able to deliver such outcomes at scale.

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