



# Esri India has a strong focus on capacity building for GIS skilled resources.

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- **Agendra Kumar**  
President, Esri India

Esri is a global market leader in geographic information system (GIS) software, offering the most powerful mapping and spatial analytics technology. Today, Esri software is deployed in more than 350,000 organizations globally (more than 5,000 organizations in India) including the world's largest cities, most national governments, and 75 percent of Fortune 500 companies. Esri engineers the most advanced solutions for digital transformation, the Internet of Things (IoT), and location analytics to inform the most authoritative maps in the world. **Agendra Kumar, President, Esri India** shares his views on the scope and potential for geospatial technologies and how it has been transforming the AEC industry. Excerpts from the industry...

Please brief us on the evolution and the impact of GIS in general, especially on architecture, engineering and construction (AEC) industry?

GIS has evolved into a ubiquitous technology that is at the heart of all major digital transformation initiatives. Whether its health, agriculture, water, smart cities, utilities, gas distribution, banking, insurance, infrastructure development, manufacturing, logistics, retail, modern e-commerce or consumer apps for transportation or food delivery, GIS is the enabling technology for management, analysis and decision support system. GIS has been the most crucial technology globally helping agencies worldwide to plan, respond, and recover from coronavirus disease 2019 (Covid-19) pandemic. In India itself, we have worked with more than 60 government organizations to help them establish GIS-based dashboards to map and manage the Covid-19 pandemic.

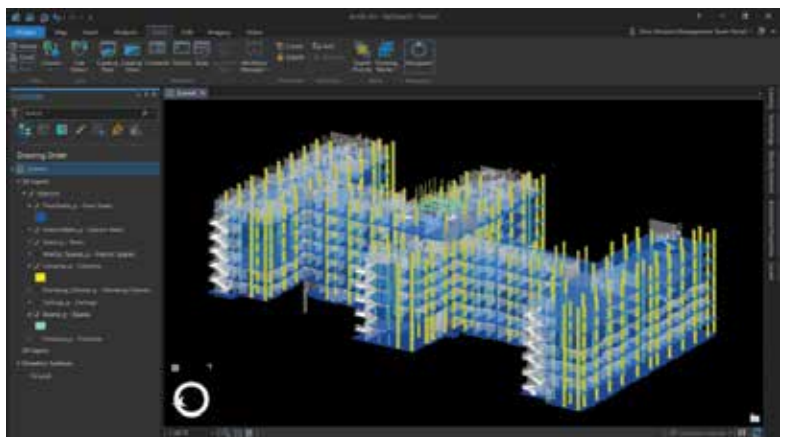
Similarly, in the AEC industry, we are seeing greater adoption of geospatial technologies across the entire project lifecycle resulting in better planning, designing, engineering, construction, operations, and maintenance. Remote sensing and image analytics is being used extensively for site suitability and pre-project planning. Drone-

based surveys and GIS based apps are being used more commonly than ever before for faster data collection, ground truthing and other project workflows like construction planning and monitoring. Geo-design with 2D, 3D visualization and analysis is being used to model digital-twins that consider the natural and built environments from the very first stages of planning and designing. The integration of CAD and BIM workflows with geospatial visualisation and spatial analysis is enabling a holistic perspective of the surrounding environment for informed design decisions. The GIS integration and automation with IoT and big data analytics are delivering higher operational efficiencies.

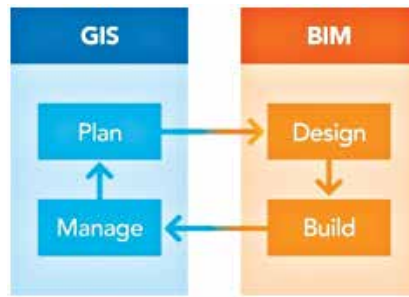
Could you also throw some light on the current trends of BIM-GIS integration in the AEC industry? What is Esri's contribution here?

GIS and BIM evolved as information technologies serving distinctly separate parts of the life cycle of organizations that operate and build infrastructure and communities. There has been a growing need to improve the exchange of information between BIM and GIS systems across the project lifecycle. The major drivers for BIM-GIS integration are:

Esri – Autodesk partnership has helped in building a robust BIM-GIS offering for the AEC market.



The University of Kentucky uses rigorous drawing validation to make sure that the right data are in the BIM data to support full lifecycle O&M.



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- Provisioning design and construction teams with geospatial information for context that provides an understanding of initial conditions to help achieve reliable outcomes more efficiently and quickly.
- Using design and construction data in geospatial workflows for more accurate and more efficient planning, operations, performance evaluation, maintenance, and emergency response.
- Providing situational awareness within projects or systems of assets to achieve common understanding and communication of status at any point in design, construction, or operations.

Esri – Autodesk partnership has helped in building a robust BIM-GIS offering for the AEC market. Working with Autodesk and others, we are building workflows that allow users to reliably access, update, and use standardized BIM data in spatial context throughout the life cycle of assets. Based on customer feedback, we are working towards making it easier for GIS professionals to question, visualize, and connect BIM data in familiar GIS experiences. Similarly, we are working on delivering better access for architects and engineers to GIS data from within industry-standard design and construction tools. Esri users can now combine geospatial information, field auditing, data capture workflows, and detailed design information to achieve comprehensive awareness and understanding of the projects.

GIS and BIM data flows throughout the

operational and construction life cycle of assets.

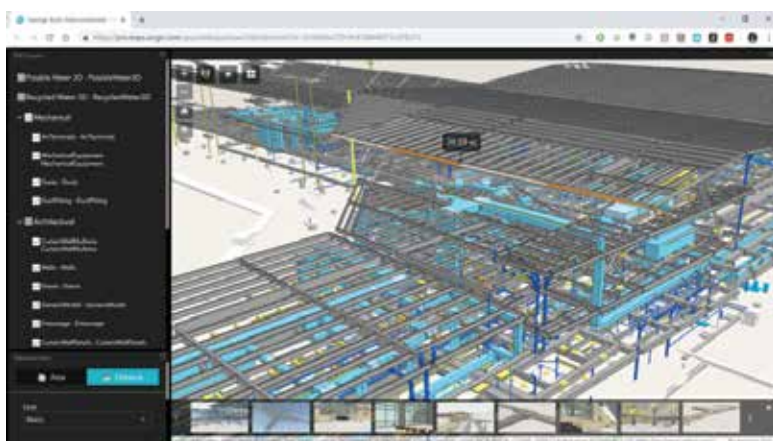
**How do you assess the potential and scope for geospatial mapping in India and what do you think the major growth drivers?**

As per the Indian Geospatial Economy (IGE) Report 2018, the Indian Geospatial Economy was valued at INR 20,629 crore (\$3.07 Billion) and the domestic Indian geospatial market was valued at Rs 7,679 crore and is growing at 13.8% CAGR. The GIS industry is poised for a significant growth in India. All the major mission programs – smart cities, AMRUT, city gas distribution, infrastructure, R-APDRP, national hydrology project and clean ganega mission mandate the use of GIS. In addition, GIS adoption is growing significantly in other sectors like health, agriculture, and commercial segments such as banking, finance, telecom, retail, and manufacturing. The start-up ecosystem developing GIS-based solutions is also expanding at a very rapid pace. In addition, the recent opening up on the space sector for private participation will give the much-awaited boost to the overall geospatial economy in India.

**There is a growing demand for environmentally sensitive construction, specifically creation of Smart Cities. How does your solutions help here?**

Integrating the concepts of Geo-design in the planning process is essential for building a sustainable city. Geo-design can help in designing cities that can make use of renewable energy sources like solar or wind (in port cities) and support waste to energy utilization, recycled water utilization, etc. GIS can help in designing buildings with minimum shadow and maximum light exposure (a key component of green buildings), suitable waste disposal sites to avoid contamination and enable recycling.

The planners can use 2D and 3D GIS technology to generate digital twins essentially allowing them to visualise the future. Smart 2D and 3D solutions such as ArcGIS GeoPlanner, EsriCityEngine, ArcGIS Pro and ArcGIS Urban can produce a 'real life' depiction of how a city will look before and after urban developments, such as light rail infrastructure or higher residential buildings. The technology can also display the impacts of these developments on parameters like carbon



**WAB-Houston-** Data shared from George HW Bush Houston International Airport (shown here in Web AppBuilder) demonstrates that if BIM data are standardized, typically through drawing validation tools, then it can be consistently brought into GIS.

footprints and water usage. Numerous scenarios can be modelled to see what will happen if certain development paths were taken or not taken – which helps in decision-making and choose the most optimum path forward.

**What are the major challenges for adoption of such solutions? Do you expect any kind of policy reforms / codes or specs for the faster adoption of GIS on a widespread level?**

Most infrastructure projects are capital intensive with multi-year time-span and involvement of different agencies at the various stages. It is important to define a GIS vision and roadmap that is implemented right from the initial planning phases and carried forward through all the phases of the project as well as down-stream. We are already seeing GIS being extensively used across all major infrastructure projects, but the utilization is still limited to larger projects and needs to be further scaled. The availability of GIS via various deployment models like on premise, SaaS, and hybrid will further help its deployment.

With GIS being a central decision making and management system integrating project workflows across other systems like BIM, ERP, BI/CRM and project management tools, the overall gains from operational efficiency, transparency, and collaboration can be multi-fold.

**How do you look at the issue of non-availability of highly skilled & trained workforce in this area?**

The availability of a skilled GIS workforce is a challenge which must be addressed in an urgent manner.

At the academic level apart from specialization in GIS, we also need to look at making GIS a mandatory skill across disciplines. There is a need for higher focus on the application of technologies and imparting practical experience to the students before they complete their higher education degrees. The knowledge of GIS will come handy for students whether they join the public sector or the private sector.

At the industry level, agencies such as Survey of India, NIUA (National Institute of Urban Affairs), IAHE (Indian Academy of Highway Engineers) are driving the capacity building initiatives in their respective sectors or for specific programs. Many education institutes also need to take a lead in capacity building of a trained workforce in GIS.

Esri India has a focus on capacity building for GIS skilled resources. We have signed up MoUs with colleges such as Punjab Engineering College (PEC) and IIT-BHU, to not only support various government programs like Smart Cities, Digital India, Clean Ganga, etc. but we also work towards capacity building for the geospatial technology. We have recently extended the Learn ArcGIS program



to students to provide them free access to Esri GIS technology and learning resources. In addition, our programs like mApp Your Way, GACI (GIS Academia Council of India), and GeoInnovation are also aimed towards enabling the overall GIS ecosystem with GIS skills, technology, solutions, and know-how.

**With the advent of IoT, Big Data Analytics, AI etc, how do you envision the future trends? And what contributory role your R&D is playing?**

As the technology ecosystem continues to evolve, so is GIS. Today GIS integrates all the major technology trends like IoT, Big data, AI /ML, cloud computing and data science. This will further create a leap forward in innovative and cutting-edge GIS solutions which will solve the key challenges faced by our world today.

We are strongly committed to GIS research and development. Globally, Esri reinvests more than 30 percent of annual revenue in R&D. This allows us to rapidly address the changing and emerging needs of our user community.

Some of our current research areas include AI and machine learning, 3D visualization, data science, big data analytics, real-time data and the Internet of Things (IoT), scripting and automation, web and mobile development, and enterprise collaboration. In addition, we continually enhance our software's functionality in key areas like mapping, spatial analysis, network modelling, and geo-design. Our evolutionary approach to product innovation lets users access the latest enhancements while also maintaining their existing systems and capabilities. We continue to design software packages that are open and interoperable. By adhering to industry standards, our technology can integrate seamlessly with many other systems.

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