Esri invests nearly 30% of its revenue on R&D to ensure our users have access to latest technologies.
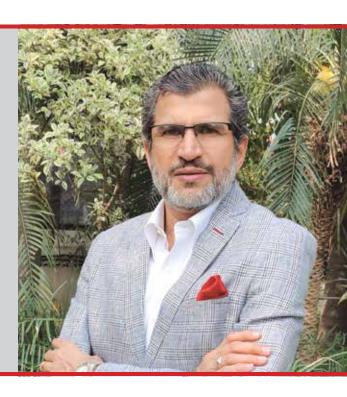
AGENDRA KUMAR
President, Esri India

As railways is driving its modernization vision, integration with sensors / IoT is being adopted at a rapid pace for a real / near-real time information.

Esri has been at the forefront of technology adoption. Esri platform is being widely used across various infrastructure programs. "Esri platform offers seamless integration with other business and IT/ERP systems resulting in greater techno-commercial benefits," states **Agendra Kumar, President, Esri India**. Excerpts from the interview…

Could you brief us on the scope and potential for Esri's solutions from the Indian government's massive modernization drive of the railway sector and constructing of metros?

The use of maps and mapping technology within the transport industry is growing significantly. Location is vital to many of the operations that railways / metro needs to carry out, hence, the use of GIS (Geographic Information System) is the optimal means for centralizing and coordinating these activities.

GIS maximizes information value by extracting location relationships enabling better decisions based on asset conditions, weather information, delay locations, service disruptions, and more.

Indian Railways is one of the biggest landowners in the country. With GIS maps, decision makers and stakeholders will know what assets they own, their current condition and understand environmental constraints. With an accurate GIS database of land and assets, users can derive effective plans for land management, asset mapping and maintenance, including encroachment and lease information management.

Safe, efficient operations depend on accurate, real-time information. GIS can help visualize events as they unfold, deliver greater insights to respond fast to any incident. This is essential incoordinating across divisions and contractors to ensure the most efficient use of time while ensuring the safety of maintenance crews and optimizing efficiency.

With an integrated enterprise GIS platform, the process of identifying most efficient intermodal and multimodal transportation means, improves significantly. Spatial analysis enables users to visualize available transportation networks and capacity to move goods efficiently from vessels to train and from train to truck, thus saving time and money.

As the investments into the intra-state and inter-state networks is growing with projects such as state metros, RRTS, MRTS, High speed rail corridors, the need for GIS is expected to uptake very significantly.

Brief us on the solutions Esri offers for different stages of infrastructure planning, design, construction, operation, maintenance, and repair of rail transport assets?

GIS is the foundational technology that supports the complete project lifecycle of any infrastructure program. Esri ArcGIS provides a complete geospatial infrastructure that enables strategic decision making and drives better planning, designing, engineering, construction, operations, and maintenance.

ArcGIS platform's 3D capabilities can be used in planning to generate digital twins that actually exist or will be developed – essentially allowing planners to integrate geodesign capabilities and model scenarios to visualise the future. 'Real life' depiction of how the railway network would look before and after developments can be created. A variety of spatial analysis such as proximity, coincidence, intersection, overlap, visibility, and accessibility can further help on these digital models. Even decisions related to optimize routing by including your own custom network data and restrictions for weight, turns, or cargo can be done. Advanced image visualization, exploitation, and geospatial analysis can be done on satellite imagery for land cover analyses and feature classification. AI / ML capabilities can be used to perform image classification, object detection, semantic segmentation, and instance segmentation. Using GIS-BIM integration, users can now combine the 3D models of the assets with the geospatial information, field auditing, data capture workflows, and detailed design information to achieve comprehensive awareness and understanding of the projects.

With the platform, the GIS capabilities can be extended across the enterprise and other ecosystem partners such as field staff and contractors to build a common operating picture of the operations. This brings better collaboration, coordination and sharing whether it is managing and monitoring day-to-day operations, construction, field surveys or responding to any emergency incidents. The real time data from variety of sources such as sensors deployed in the fleet, social media, RFIDs can be ingested for real-time tracking and decision making. This high-velocity, high-volume big data can be integrated with other data sources such as customer data, freight data, station data for variety of big data spatial analytics.

The field staff can be equipped with custom mobile apps using ArcGIS apps suite for field data management as well as for field staff process automation. The data collected in the field and operations data can be consolidated into

GIS Applications Are Transforming Infrastructure Management
Supporting Specialized Design and Engineering Workflows

various spatial Dashboards for visualization and reporting. With its hub capabilities, the spatial data and maps can be extended using visually appealing websites to drive citizen engagement and various community led initiatives. For larger facilities, indoor mapping capabilities can be used for smart building management, indoor routing and creating digital 2D or 3D floor-aware workplace maps.

Could you give us a recent project in India where Esri solutions have been used and its techno-commercial benefits?

Esri platform is being widely used across various infrastructure programs. We have been working with CRIS to enable an enterprise GIS platform for mapping all track and associated assets into a centralized GIS database. ArcGIS platform's inherent mobile GIS capabilities has enabled faster solutions deployment for field data collection. The ability to configure the solution as per business need provides significant ease of use, faster deployments resulting in greater ROI. Being an open platform, Esri platform offers seamless integration with other business and IT/ERP systems resulting in greater techno-commercial benefits. Other applications where GIS is being used are for tracking and assessment of rolling stocks, maintenance management system for wagons and RFID based asset management system.

Brief us on the future outlook in terms of adoption of emerging technologies and automation in the railways / metro sectors? Are there any new / upgrades in solutions on the pipeline?

Esri has been at the forefront of technology adoption. Esri invests nearly 30% of our revenue of R&D to ensure our users have access to latest technologies like AI/ML, data science, IoT, Cloud, BIM integration within GIS, mobility, VR/AR along with latest advancements in drone / UAV data integration.

> BIM – GIS integration is seeing a significant update for efficient planning and management for the new capital investments being planned like station redevelopment, track doubling.