AEC FORUM

GEOSPATIAL + BIM + DIGITAL TWIN

4-5 DECEMBER 2024, HICC HYDERABAD, INDIA

ADVANCING RESILIENT AND SUSTAINABLE INFRASTRUCTURE

CONFERENCE REPORT 2024

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CONTENT

Executive Summary

The AEC Forum 2024, held on December 4-5 in Hyderabad, India, was a landmark event dedicated to advancing resilient and sustainable infrastructure. Bringing together policymakers, industry leaders, and technology experts, the forum provided a platform to address India's critical infrastructure challenges and explore innovative solutions.

With the theme **"Advancing Resilient & Sustainable Infrastructure,"** the forum highlighted the urgent need for robust infrastructure systems that can withstand rapid urbanization and climate impacts. Discussions focused on the integration of cutting-edge technologies such as Geospatial, Building Information Modeling (BIM), and Digital Twin to drive efficiency, sustainability, and resilience across the infrastructure value chain. Alongside these technologies, the forum also spotlighted emerging innovations and their potential roles in transforming sector workflows, emphasizing the need for seamless integration to enhance project outcomes.

A significant pre-conference roundtable organized by the **National Highways Authority of India (NHAI)** brought together experts from NHAI, the Ministry of Road Transport & Highways, industry leaders, and solution providers.

This session addressed the challenges faced in road and highway construction and explored how digital and emerging technologies could effectively address these issues. The roundtable set the tone for the conference, highlighting practical approaches and fostering early collaboration among key stakeholders.

A series of thought-provoking sessions and workshops delved into key topics, including policy frameworks for Digital Twin adoption, strategies for modernizing highways and railways, and advanced solutions for water network Infrastructure. Experts shared actionable insights on leveraging technology to improve safety, optimize workflows, and foster innovation in infrastructure planning and execution.

The forum also celebrated excellence in the sector through the **AEC Forum Excellence Awards**. These awards recognized organizations for their commendable contributions to roads, highways, rail, metro, and water utility infrastructure, showcasing exemplary achievements and inspiring others in the industry.

The forum emphasized collaboration, creating opportunities for stakeholders to engage in meaningful dialogue, share best practices, and forge strategic partnerships.

As a catalyst for progress, the AEC Forum 2024 reinforced the importance of technology convergence, investment in digital transformation, and aligned policies to address the pressing demand of resilient infrastructure development. The outcomes of this event will guide future efforts to build a sustainable, efficient, and climate-resilient infrastructure framework for India.

Forum in Numbers

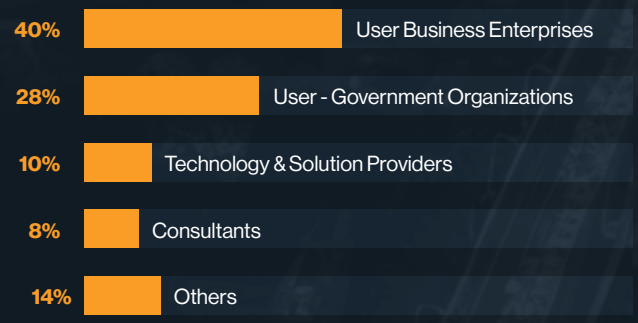
85 +	Speakers
350 +	Delegates
20 +	Sessions
100 +	Organizations
5 +	Countries

Key Objectives

- Establish the need for resilient and sustainable infrastructure and its importance in economic growth and nation building.
- Foster discussions on attracting investment for increasing digital adoption in infrastructure projects and technological advancements.
- Discuss the need for supportive regulatory frameworks and policies to enable the adoption of digital solutions.
- Address key challenges plaguing the roads and highways, railways and metro, and water infrastructure sectors.
- Explore strategies and frameworks to integrate geospatial, BIM, and Digital Twin technologies into infrastructure workflow and value-chain.
- Provide a platform for stakeholders related to infrastructure development to share best practices, case studies, and collaborate on digital solutions for infrastructure challenges.

Key Highlights

Delegate Profile



Speaker profile

PRE CONFERENCE / A COLLABORATIVE WORKSHOP

Advancing Highways Infrastructure with Geospatial, BIM, and Digital Twin Technologies

Hosted By

The pre-conference workshop on **"Advancing Highways Infrastructure with Geospatial, BIM, and Digital Twin Technologies"** was co-organized by the National Highways Authority of India (NHAI) with a focus on transforming India's highway sector through cutting-edge digital solutions. Held on 3rd December 2024 at HICC, Hyderabad, the workshop brought together industry experts and stakeholders to explore innovative technologies like Reality Capture, GIS, BIM, and Digital Twins. The session aimed to enhance understanding of these technologies' impact on improving planning, construction, and long-term management of highway infrastructure. Through real-world case studies and expert discussions, participants gained insights into the immense potential of these technologies to drive efficiency, sustainability, and resilience in highway projects.

Key highlights

- **Integration of Digital Tools:** Introduction to advanced tools like GIS, BIM, and Digital Twins to enhance decision-making, project delivery, and asset management.
- **Enhanced Data-Driven Decision-Making:** The role of geospatial data and digital technologies in improving planning, monitoring, and asset management.
- **Machine Control in Construction:** How machine control technologies are revolutionizing precision in grading, paving, and excavation.
- **Real-Time Project Updates:** Using BIM and digital twins to trigger automatic updates to schedules, improving time management.
- **Digital Twin for Lifecycle Management:** The use of Digital Twins to optimize asset maintenance, predict failures, and model environmental impact.
- **Practical Applications:** Real-world case studies showcasing the successful implementation of these technologies in highway projects.
- **Focus on Sustainability:** Leveraging predictive analytics and real-time data for more sustainable and resilient infrastructure.
- **Collaboration with Tech Companies:** NHAI's potential future collaborations with leading tech firms for the implementation of advanced solutions.
- **Cost and Time Optimization:** Streamlining workflows to reduce project timelines and costs while enhancing quality and efficiency.
- **Progressive BIM Models:** The importance of evolving BIM models that incorporate real-time changes during the project lifecycle.

OPENING SESSION

Need for Advancing Resilient & Sustainable Infrastructure


SANJAY KUMAR


DAVID TAN


CHRIS CHAMBERS


SMT. NIRMALA JAGGA REDDY


ERIC DESROCHE

Opening Remark: Sanjay Kumar, Founder & Chief Executive Officer, Geospatial World

In his opening address, Sanjay Kumar, Founder & CEO of Geospatial World, **highlighted the growing role of Geospatial technologies in infrastructure, particularly in design, construction, and operation** He discussed challenges like low digitalization and the need for resilient infrastructure amid climate change and disasters. Sanjay also mentioned India's leadership in the Coalition for Disaster Resilient Infrastructure and introduced a think tank focused on developing a digital twin strategy for India's infrastructure.

Keynote Address 1: David Tan, Assistant Chief Executive Officer, Jurong Town Corporation, Singapore

Shared insights into how Singapore's JTC is leveraging digital twin, geospatial technology, and AI to create resilient and sustainable infrastructure. **He emphasized the importance of a life cycle approach to infrastructure, integrating smart building systems, BIM, geospatial analysis, and predictive maintenance to optimize energy consumption, improve sustainability, and enable better governance.** Their Pongo Digital District, Singapore's first Green Mark Platinum district, showcases 60% energy savings with smart grids, AI optimization, and energy-efficient designs, exemplifying JTC's commitment to sustainable, resilient infrastructure.

Keynote Address 2: Chris Chambers, Deputy Director, Geospatial Commission, United Kingdom

Chris discussed about the National Underground Asset Register (NOA), By creating a digital, interactive map of underground pipes and cables, NOA improves data sharing between asset owners and excavation teams, potentially saving the UK economy £500 million annually. **Key takeaways include the importance of standardizing data across different asset owners, the need for security in data access, and the balance between accessibility and protection to prevent misuse.**

Guest Address: Smt. Nirmala Jagga Reddy, Chairman, Telangana Industrial Infrastructure Corporation, Telangana

Highlighted the initiatives spearheaded by the Telangana government to position Telangana as the leading state for industrial growth and investment in India. The Chief Minister's establishment of a subcommittee aims to address key issues, enhance economic status, and support employees in the state. **Shrimati Reddy also underscored the significance of environmental sustainability in industrial development, stressing that these efforts are crucial for preserving the planet and ensuring a sustainable future.**

Keynote Address 3: Eric DesRoche, Director Infrastructure Business Strategy, AEC Design, Autodesk

Eric DesRoche's keynote highlighted how the AEC industry, driven by growing infrastructure demands and sustainability goals, is increasingly integrating digital tools like BIM and GIS. AI plays a pivotal role in enhancing design, automation, and data analysis, offering new efficiencies in project lifecycles. **The key takeaway is that the future of BIM will drive greater efficiency, sustainability, and collaboration, ultimately transforming the way infrastructure projects are planned, designed, and executed.**

PLENARY SESSION 1

Convergence of Geospatial + BIM + Digital Twins: Information Enterprise for Sustainable and Resilient Infrastructure


ANANYA NARAIN


JOHN WHITEHEAD


MOHAMMAD NEMER


SUNIL MK


COL PANKAJ FOTEDAR

Moderator: Ananya Narain, Vice President Consulting, Geospatial World

Ananya, the session moderator, emphasized the need for a cohesive ecosystem combining government policies, private sector involvement, and technology. She highlighted adoption gaps in India and the push for a national digital twin policy, stressing the potential of these technologies to enhance infrastructure resilience and sustainability through collective action.

Panellist 1: John Whitehead, Vice President-Sales, APAC, Trimble

John provided a practical perspective on the financial challenges of adopting digital twin technology. He suggested shifting from capital expenditure (CAPEX) to operating expenditure (OPEX) to make it more accessible. He emphasized subscription-based models and scalable technology to address affordability issues for both large contractors and subcontractors, ensuring benefits throughout the project lifecycle.

Panellist 2: Sunil MK, Director, Business Development, Asia, Bentley Systems

Sunil discussed the government's role in driving technological adoption. He emphasized the importance of policies mandating BIM, funding technology adoption, and supporting training. He also shared insights on the potential of digital twin technologies for monitoring vehicles, especially in rail and transportation sectors.

Panellist 3: Mohammad Nemer, Managing Director, Merkator ME

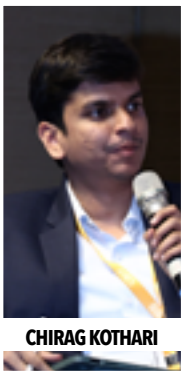
Mohammad Nemer discussed the role of digital twin solutions in the telecom sector, focusing on managing both physical infrastructure (e.g., cables) and logical networks (e.g., data services). He emphasized how digital twin technology helps optimize resource use, improve network planning, and boost energy efficiency. Nemer also highlighted challenges like data quality issues and organizational silos that impede full technology integration across departments.

Panellist 4: Col Pankaj Fotedar, Chief Executive Officer, GeoKno India

Col Pankaj emphasized the mind-set shifts needed for adopting new technologies in infrastructure. Pankaj stressed balancing development speed with long-term sustainability, advocating for investments in resilient infrastructure that lasts decades, rather than focusing on short-term savings.

PLENARY SESSION 2

Digital Twin Strategy for Indian Infrastructure: Policy Perspectives


CHIRAG KOTHARI


LT. GEN. GIRISH KUMAR


YASHASVI MUND


MARC GOLDMAN


DEBASISH ROY


KAILASH CHANDOLA

Moderator: Chirag Kothari, Assistant Professor, IIT Kanpur

Chirag emphasized sustainability and resilience in selecting projects for the GATI Shakti mission, urging consideration of long-term impacts. He questioned whether digital twin policies should be national or industry-specific, given sectoral differences, and asked how existing national strategies like the GATI Shakti Mission and National Geospatial Policy could integrate digital twin policies.

Panellist 1: Lt. Gen. (Rtd.) Girish Kumar, Advisor, Government of Haryana

Lt. Gen. Girish discussed how digital twins leverage geospatial data and suggested that a national digital twin strategy could either be standalone or an extension of the geospatial policy. He emphasized that sector-specific needs should guide the policy and stressed the importance of fully understanding digital twins before creating a policy framework.

Panellist 2: Yashasvi Mund, Deputy Secretary, Department for Promotion of Industry and Internal Trade, PM Gati Shakti

Smt. Yashasvi Mund stressed the importance of forward-looking planning in technology education. She pointed out the need to anticipate future technologies and prepare students accordingly, especially in fast-evolving sectors like geospatial technology, to ensure a skilled workforce for the growing demand.

Panellist 3: Marc Goldman, Director - Industry Solutions, Esri Inc.

Marc Goldman supported a two-step approach for digital twin policies: first, high-level national guidelines, followed by sector-specific frameworks. He pointed out the importance of clarity in the purpose of policies, emphasizing that unclear policies lead to resistance. He also noted that the National Geospatial Policy has fostered innovation and could serve as a model for digital twin policies.

Panellist 4: Debasish Roy, Assistant Vice President Middle East & India Operations, Pinnacle Infotech

Debashish Roy highlighted the role of digital twins in improving productivity and sustainability within the construction industry, which is a major contributor to India's GDP. He stressed the need for academia to train students on digital twin tools to address industry challenges, including low productivity and high carbon intensity in construction.

Panellist 5: Kailash Chandola, Co-Founder & CEO, Arth

Kailash echoed the need for academia to keep pace with technological advancements, particularly in the geospatial sector. He noted that many software tools are still sourced from abroad, and the lack of research and development within Indian academia is a critical gap. He called for a strategy to address this issue and ensure India can develop its own technological solutions.

PLENARY SESSION 3

Redefining Highways: Leveraging Digital Technologies for Design and Project Management


TITAS ROY


GAURAV SINGH


TIRTHANKAR MANDAL


VIVEK JAISWAL


AKHILESH SRIVASTAVA

Moderator: Titas Roy, Industry Manager – Infrastructure, Geospatial World

Opened the panel by emphasizing the importance of government-industry collaboration to drive technological integration in infrastructure projects. He also highlighted the need for a unified approach among stakeholders to create a seamless execution process in infrastructure development.

Panellist 1: Gaurav Singh, Chief Consultant – Technical, PINKERTON

Gaurav Singh argued that working together as a cohesive team, rather than in isolation, is crucial. Gaurav suggested adopting Opex-based business models to ease technology adoption in the private sector, reducing upfront capital expenditure. He highlighted how collaboration can help overcome project delays, which can significantly impact the nation's economy.

Panellist 2: Tirthankar Mandal, Vice President, Simplex Infrastructure

Tirthankar Mandal discussed the role of digital technologies in improving infrastructure project viability. He suggested using technology to analyse past data, terrain, and construction challenges before issuing tenders, helping identify potential issues early.

Panellist 3: Vivek Jaiswal, Chief General Manager, National Highways Authority of India

Vivek Jaiswal highlighted government efforts to integrate technology into roads and highways, including MoRTH and NHAI's inclusion of tech specs in hybrid contracts. This enables innovations like automated control systems and GIS mapping. He mentioned plans for drone taxis on highways, such as the Bangalore-Chennai Expressway, emphasizing the government's vision to enhance road safety, efficiency, and infrastructure growth.

Panellist 4: Akhilesh Srivastava, President, ITS India Forum

Akhilesh Srivastava emphasized the need for harmonized collaboration between the private sector and government to drive infrastructure progress. He argued that technology can bridge gaps, ensuring transparency and efficiency. Akhilesh stressed that Public-Private Partnerships (PPP) should focus on shared goals and risk management, with technology as a key enabler, leading to successful and sustainable project outcomes.

PLENARY SESSION 4

Digital Transformation in Railways: Enhancing Connectivity and Safety


K MANOHAR RAJA


SAURAV BANDHOPADHYAY


V. NAGA MALLESWARA RAO


P. RAVI SHANKAR


A SANJEEVA RAO


BRAHMAM GORUGANTU


ANKUR MITTAL

Moderator: K Manohar Raja, Principal Executive Director, RailTel

Introduced the session, highlighting the significant role of technology, especially AI, IoT, and geospatial technologies, in transforming railway operations. He emphasized the importance of adopting best practices and leveraging digital solutions to optimize railway services.

Panellist 1: Saurav Bandhopadhyay, Principal Chief Signal & Telecommunication Engineer, South Central Railway

Highlighted that the Indian government has launched policies like PM Gati Shakti, which mandate asset mapping using geospatial technologies and promote inter-departmental collaboration. He also mentioned that the NITI Aayog framework requires evaluation of projects above a certain cost, such as railway expansions, for their broader connectivity to industrial clusters.

Panellist 2: V. Naga Malleswara Rao, Chief Signalling & Telecom Engineer (Projects), Southern Railways

Shared insights into the importance of modern technologies like geospatial mapping and AI in fast-tracking railway projects. He stressed that technology is crucial for efficient life-cycle management, especially in track management. He mentioned seeing technologies like track monitoring equipment being used to gather data in real time, something that was not possible in the past.

Panellist 3: P. Ravi Shankar, Vice President & Head - Transit-Oriented Development, L&T Metro Rail (Hyderabad)

Ravi Shankar discussed the integration of IoT and predictive maintenance in Indian Railways, He highlighted the use of Tableau for analytics, improving decision-making and maintenance optimization. PRS also emphasized passenger convenience, noting the shift from manual token-based systems to digital ticketing.

Panellist 4: A Sanjeeva Rao, Director - Centre of Excellence – Kavach, Indian Railways

Sanjeeva Rao highlighted Kavach, an indigenously developed safety system, and its role in preventing train accidents. He also discussed the integration of geospatial technologies for better management of railway land and assets. Rao emphasized that AI-driven predictive maintenance, combined with systems like Kavach, is key to enhancing the safety and operational efficiency of Indian Railways.

Panellist 5: Brahmam Gorugantu, Co-Founder and CTO, NeoGeoInfo Technologies

Emphasized the need for a robust policy framework that encourages collaboration between government agencies and private players to speed up the adoption of geospatial technologies. He stressed that technology should be seamlessly integrated into workflows rather than treated as standalone projects, ensuring continuous updates and efficient data management.

Panellist 6: Ankur Mittal, Technology Consultant, Accenture

Challenge lies in adopting and integrating emerging technologies into everyday processes. People and process are often the missing pieces in this transformation, as technology alone is not enough. He pointed out that while the data generated by Indian Railways is vast and growing, there needs to be greater focus on workflow integration to ensure that the systems effectively address real-world operational challenges.

IN CONVERSATION WITH

Role of Technology Integration in Ensuring Seamless Water Infrastructure Networks

TITAS ROY

DR. D VASUDEVAN

VIKRANT JOSHI

Moderator: Titas Roy, Industry Manager-Infrastructure, Geospatial World

He emphasized the need for collaboration between government, municipalities, and the private sector in water projects, highlighting how AI, IoT, and GIS can enhance data sharing and decision-making for managing water resources and floods.

Panellist 1: Dr. D Vasudevan, Chief General Manager, Varanasi Smart City

Dr. Vasudevan highlighted the need for collaboration between government and private sectors in water infrastructure, pointing out inefficiencies like re-digging streets. He shared how geospatial data sharing in Varanasi improved coordination but noted that lack of institutional memory often causes delays. He stressed that collaboration, data sharing, and strong archival systems are essential for project success.

Panellist 2: Vikrant Joshi, Assistant Vice President – Water, Ceinsys Tech

Vikrant Joshi discussed using GIS for asset tracking, IoT for real-time monitoring, and AI for predictive analytics of water infrastructure. He highlighted Mumbai's flood zone management using remote sensing and 3D mapping, emphasizing that these technologies improve decision-making for daily operations and crisis management.

Deep Dive Sessions

Roads & Highways

Railways & Metros

Water Infrastructure

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Roads & Highways

SESSION 1

GIS and Spatial Analytics for Route Optimization & Efficient Network Planning

Moderator

Dr Rajasekhar Mamillapally
Assistant Professor, NICMAR University Hyderabad

Speakers

Prashant Patil
Superintending Engineer, Public Works Department, Mumbai

DR. NC Pal
Former Engineer-in-Chief (Design), Expert Advisor to PWD & OBCC, Government of Odisha

Guillaume Joubert
Senior Manager - Business Transportation Strategy, Autodesk

Silky Agrawal
Founder, Geocarte Radar Technology

Key Highlights

- **GIS in Route Optimization:** GIS uses spatial data to reduce construction time and costs, making projects more efficient.
- **Data-Driven Decision Making:** Spatial analytics improve road layouts, traffic flow, and sustainability, enabling better planning decisions.
- **Integration Challenges:** Combining GIS with traditional planning can be challenging, but successful implementations show its potential to improve outcomes.
- **Innovative Technologies:** Technologies like Drone + CORS, 5D BIM, and GPR enhance accuracy, precision, and efficiency in infrastructure projects.
- **Collaboration and Expertise:** Cross-disciplinary collaboration in civil engineering, BIM, GPR, and spatial analytics leads to more successful road and highway developments.

SESSION 2

Role of Advanced Surveying Tools & Techniques for Accelerating Construction of Highways

Moderator

PV Rajashekhar
Additional Surveyor General, Survey of India

Speakers

Vivek Jaiswal
Chief General Manager
National Highways Authority of India

K Sitaramanjaneyulu
Former Chief Scientist,
Central Road Research Insititute

Anand Sirohi, Director, Trimble

Amritash Sambodhi
BIM Manager (Digital Lead), TYPSA

M Raj Reddy
Director, National Academy of Construction

Key Highlights

This session highlighted the integration of advanced surveying tools and techniques like LiDAR, drones, and 3D scanning in highway construction, which impact projects in the following ways:

- **Enhanced Accuracy:** LiDAR, drones, and 3D scanning provide precise data, improving the overall quality of construction.
- **Reduced Construction Time:** These technologies minimize errors and rework, shortening project timelines.
- **Cost Savings:** Integrating LiDAR, drones, and 3D scanning reduces rework, manual labor, and costly delays.
- **Improved On-Site Safety:** These digital tools reduce labor-intensive tasks, enable precise planning, and lower worker risks.

SESSION 3

Integrated BIM and Geospatial Solutions for Sustainable Construction at High – Altitude

Moderator

Karthik Mani
General Manager, Louis Berger

Speakers

Chandrasekhar Sayankar
Senior Vice President – Business Development, Ceinsys Tech

Ayodhaya Prasad Thapliyal
Director, Geological Survey of India

Nishant Jangir
Project Manager, The BIM Engineers

Key Highlights

- **BIM and Geospatial Tools:** Integrating BIM with geospatial solutions enables precise planning and real-time visualization, addressing terrain and environmental challenges in high-altitude construction.
- **Overcoming Environmental Challenges:** BIM and geospatial mapping help mitigate extreme weather, tough terrain, and limited access, reducing delays and cost overruns.
- **Sustainability and Durability:** These technologies enable continuous monitoring and predictive maintenance, ensuring long-term durability and reducing costly failures in harsh conditions.
- **Collaborative Innovation:** Cross-disciplinary collaboration—combining geology, engineering, and digital modelling drives innovative efficient solutions for high-altitude infrastructure projects.

SESSION 4

Leveraging Integrated Reality Capture and Earth Observation Technologies for Lifecycle Management

Moderator

Chirag Kothari
Professor, IIT Kanpur

Speakers

Pradeep Agarwal
Joint General Manager, National Rural Infrastructure Development Authority (NRIDA)

Vibhav Mittal
Chief General Manager - Land Acquisition and Utility Shifting, National Highways Authority of India (NHAI)

Dr Gaurav Chawla
Founder, GKC Consultants

Prashant Alatgi
Partner, Prashant Advanced Surveys

Saran MS
Scientist in Charge, NATPAC Government of Kerala

Key Highlights

- **Enhanced Monitoring with Reality Capture:** LiDAR and photogrammetry enable precise data capture, critical for effective road and highway maintenance throughout their lifecycle.
- **Earth Observation for Asset Health Management:** Satellite imagery and earth observation tools provide real-time data for continuous infrastructure health monitoring, enabling predictive maintenance and early issue detection.
- **Cost Reduction through Predictive Maintenance:** Integrating reality capture and earth observation allows a shift from reactive to proactive maintenance, reducing lifecycle costs by preventing expensive repairs and extending infrastructure life.
- **Cross-Disciplinary Collaboration:** Collaboration across remote sensing, GIS, civil engineering, and project management ensures better planning, execution, and management of infrastructure projects using these technologies.

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Railways & Metros

SESSION 1

Digital Twin & AI for Railways Modernisation

Moderator

Tanveer Goyal
Chief Editor & Director
Business Development
Rail Analysis

Speakers

Kasturi Srinivas
Senior Account Manager
Enterprise, Bentley Systems

Yogita Jagtap
General Manager – Projects, Monarch Surveyors & Engineering Consultants

Ravi Kancherla
Associate Technical Director, Arcadis

Key Highlights

- **Real-Time Monitoring and Predictive Maintenance:** Digital twins enable continuous monitoring and predictive maintenance, reducing downtimes, optimizing asset lifespan, and lowering maintenance costs.
- **AI-Driven Optimization:** AI analyses digital twin data to identify trends, improve decision-making, enhance efficiency, optimize scheduling, and prevent failures, ensuring smooth operations.
- **Improved Connectivity and Safety:** Integrating digital twins with AI and IoT enhances coordination, predicts risks (like track wear and signal failures), and minimizes accidents, ensuring safer railway operations.
- **Real-World Examples:** Case studies, such as Network Rail in the UK, show how AI and digital twins improve asset management, increase efficiency, and reduce delays.

SESSION 2

Leveraging Advanced Geospatial Solutions for Underground Metro and Railways Construction

Keynote 1

Manisha Singh
Chief Architect, Delhi Metro Rail Corporation

Keynote 2

Konda Harsha
Head of New Initiatives, Arth

Moderator

Sudhir Misra, Professor, IIT Kanpur

Speakers

Ravi Shankar T
Chief Tunnel Manager, Larsen & Toubro

Arun Kumar, CEng MICE, MIET
General Manager -Transportation
Aarvee Associates

Viraj Voditel
Chief Executive Officer & Founder
Techture

Key Highlights

- **Geospatial Solutions for Underground Infrastructure:** Advanced geospatial tools like LiDAR and photogrammetry are critical in mapping underground environments, enhancing both the safety and efficiency of metro and railway construction projects.
- **Real-Time Risk Management:** The integration of real-time geospatial data enables effective risk management, especially in densely populated urban areas, ensuring safer and more efficient construction operations.
- **BIM and Geospatial Integration:** Combining BIM with geospatial data streamlines planning, design, and execution processes, improving coordination and reducing errors in underground metro and rail projects.

SESSION 3

Advanced Technology and AI for Infrastructure

Moderator

Kailash Chandola
Co-Founder & CEO, Arth

Speaker

Chakrapani R.V.
Founder & Managing Director
Aarvee Associates

Ajitesh Korupolu
Founder & CEO, ASBL

Col Pankaj Fotedar
Chief Executive Officer, GeoKno India

Sekh Samim
Deputy Chief Architect
Delhi Metro Rail Corporation

Key Highlights

- **AI-Driven Optimization:** AI automates processes, improves design precision, and optimizes timelines, enabling proactive decisions that reduce risks and boost efficiency.
- **Tech Integration for Sustainability:** Combining AI, BIM, and geospatial solutions creates efficient, sustainable infrastructure that tackles environmental, economic, and operational challenges.
- **Data-Driven Decisions:** Using data throughout a project improves resource use, asset management, and long-term performance, ensuring infrastructure longevity.
- **Tech and Tradition Collaboration:** Integrating emerging technologies with traditional methods ensures efficiency while preserving the reliability of proven practices, leading to better outcomes.

SESSION 4

Intelligent Transportation Systems (ITS) and Advanced Sensors Technologies Enhancing Rail Safety and Asset Management

Keynote 1

GVL Satya Kumar
Managing Director, Centre for Railway Information Systems (CRIS)

Keynote 2:

Lalit Mansukhani, Principle Executive Director, Indian Railways

Moderator:

Akhilesh Srivastava, President, ITS India Forum

Speakers:

Guillaume Joubert, Senior Manager-Business Transportation Strategy, Autodesk

Vikrant Nashine, Global Delivery Head, Tech Mahindra

Girish Narang, Assistant General Manager (Designs), TPF Engineering Consultancy

Neeraj Bapna, Deputy Chief Engineer, South Central Railway

Mangal Dev, Head Green Energy Mobility, South Asia , Hitachi Rail India

Key Highlights

- **Optimized Asset Management with ITS:** ITS uses data analytics and real-time monitoring to enhance resource utilization, reduce downtime, and extend infrastructure lifespan.
- **Predictive Maintenance with Sensors:** IoT-enabled sensors monitor rail systems, enabling predictive maintenance and minimizing unplanned outages by detecting issues early.
- **Improved Passenger Safety:** ITS and sensors provide real-time alerts on train speed, track conditions, and signals, enhancing safety and reducing risks from human error.
- **AI and Big Data for Optimization:** AI and machine learning analyze operational data to improve network performance, optimize scheduling, and enhance safety protocols.
- **Integration with Digital Twins and BIM:** Combining ITS, sensors, Digital Twins, and BIM offers real-time visualizations and data for better decision-making and resource allocation.

Water Infrastructure

SESSION 1

Geospatial Innovations in Optimizing Water Supply Networks and Management

Moderator

Titas Roy, Industry Manager - Infrastructure, Geospatial World

Speakers

Dharmendra Gill, Engineer – in - Chief – Jal Shakti Vibhag, Government of Himachal Pradesh

Mallikarjun Rao, GIS Lead, HMWSSB & Executive Director GIS Hub, DTCP Government of Telangana

Bijendra Singh, Senior General Manager-Infrastructure Business Unit Tata Consulting Engineers Limited

Vara Prasad Lingam
Lead GIS, Stantec

Key Highlights

- **Optimized Network Management through GIS:** GIS provides accurate mapping and spatial analysis, allowing for more effective monitoring, management, and planning of water distribution networks, improving operational efficiency.
- **Advanced Leak Detection with Spatial Analytics:** By leveraging spatial analytics, real-time leak detection systems can significantly reduce water loss, ensuring a more sustainable and efficient distribution network.
- **Real-time Monitoring via IoT and GIS Integration:** IoT and GIS integration enables continuous monitoring, helping utilities address issues quickly, optimize resources, and manage assets better.
- **Disaster Preparedness and Risk Mapping:** Geospatial tools support disaster resilience planning, using spatial data to model and respond to floods or droughts, minimizing risk and improving infrastructure reliability.

SESSION 2

Integrated BIM and Hydraulic Engineering Design in Water Network Planning and Management

Moderator

Titas Roy, Industry Manager - Infrastructure, Geospatial World

Speakers

Ajey Belsare, AECO Industry Strategy Manager, Autodesk

Sudeshna Biswas, Head – Hydraulics and Hydrology, Larsen and Toubro

Miguel Soares, Senior Product Manager, iTwin, Bentley Systems

Dr. IVM Kishan, Manager, Megha Engineering & Infrastructure Ltd.

Sahil Dass, Managing Partner, Dates Metron

Key Highlights

- **BIM for Enhanced Water Network Design:** BIM enables precise 3D modelling and visualization, enhancing planning and design by providing detailed insights into system layout and performance.
- **Integration of Hydraulic Tools with BIM:** Combining hydraulic tools with BIM optimizes water flow, system efficiency, and performance monitoring, ensuring peak operation.
- **Promoting Sustainability through Advanced Design:** BIM and hydraulic engineering enable sustainable water management by optimizing resource use, reducing waste, and boosting resilience to environmental challenges.
- **Improved Collaboration and Efficiency:** The integration of BIM with hydraulic design fosters better collaboration among engineers, planners, and stakeholders, reducing errors, improving project timelines, and ensuring more effective resource management.

SESSION 3

Harnessing GeoAI for Efficient Asset Management of Water Networks

Moderator

Titas Roy
Industry Manager - Infrastructure
Geospatial World

Speakers

Dr. N Ramsundram, Consultant, ECO First
Kasiviswanadham Ponnapalli, Founder, GeoVidya
Kranthi Kiran, Engagement Partner/ Enterprise GIS Practice Head LTI MindTree

Key Highlights

- **GeoAI for Predictive Maintenance:** GeoAI combines geospatial data and AI algorithms to predict asset failure, enabling proactive maintenance and minimizing unplanned disruptions in water networks.
- **Data-Driven Asset Management:** AI-driven solutions analyse asset data to forecast maintenance needs, optimize schedules, and extend asset lifespan.
- **Resource Optimization and Cost Efficiency:** GeoAI optimizes resource allocation, reduces costs, and enhances network performance by offering data-driven insights for smarter decision-making.
- **Improved Network Efficiency:** The integration of GeoAI enhances the overall efficiency of water distribution systems by identifying weaknesses, optimizing flow, and streamlining asset performance management.

Testimonials

"It was a good interactive session where I got the opportunity to share my thoughts and ideas. Other Experts also shared their ideas and informed about the recent developments in the Transportations Industry through digitalization. I must thank the AEC Forum for organising such a conference through which the transportation industry and our society got benefited. I wish, The AEC Forum would like to organise such more conference in India and abroad."

Tirthankar Mandal, Vice President, Simplex Infrastructure

"The AEC Forum 2024 was an exceptional experience. It provided a unique platform to engage with experts and thought leaders across the industry, fostering collaboration and innovation. The sessions were insightful, the discussions impactful, and the networking opportunities unparalleled. I look forward to participating in future editions and contributing to the continued momentum of this remarkable event."

Saran M S, Scientist in Charge GIS/WTD Division, NATPAC Government of Kerala

"As I head the Digital Transformation initiatives in AEC Industry for Pinnacle Infotech in India and the Middle East, I am very proud to be the part of the initiatives of AEC Forum. It aligns with the two most important initiatives our country is seeing – Building world class infrastructure and AtmaNirbhar."

Debasish Roy, Assistant Vice President Middle East & India Operations, Pinnacle Infotech

"Happy to be a part of the AEC Forum 2024, sharing and learning from a diverse set of experts in infrastructure. The accent on digital and emerging technologies as part of various themes, is a silver lining to this vibrant forum."

P Ravishankar, Vice President & Head - Transit-Oriented Development, L&T Metro Rail (Hyderabad)

"It was an honour to be invited as a Guest Speaker at the AEC Forum 2024, organized by Geo-Spatial World. The event was flawlessly executed, reflecting meticulous planning and outstanding professionalism. The seamless coordination and attention to detail made my participation an enriching experience."

Dr. D. Vasudevan, Chief General Manager, Varanasi Smart City Ltd.

Findings Conclusion and Way Forward

The AEC Forum 2024 highlighted transformative technologies and strategies across critical infrastructure domains like Roads & Highways, Railways & Metros, and Water Infrastructure. Experts from diverse industries showcased how advanced tools like GIS, BIM, Digital Twin, 4IR and emerging technologies are reshaping infrastructure development, promoting sustainability & resilience and ensuring operational efficiency. Below are the findings, way forward, and conclusion from the Forum.

Findings

Roads & Highways

- **GIS and Spatial Analytics:** GIS facilitates route optimization and efficient network planning, reducing costs, improving traffic flow, and addressing environmental concerns.
- **Advanced Surveying Tools:** Technologies like drones, LiDAR, and 3D scanning enhance accuracy, shorten construction timelines, and improve on-site safety.
- **BIM Integration:** Combining BIM with geospatial tools enables detailed planning and predictive maintenance, especially for challenging high-altitude projects.
- **Lifecycle Management:** Reality capture and earth observation tools support proactive maintenance, reducing costs and extending infrastructure lifespan.

Railways & Metros

- **Digital Twin & AI:** These technologies enable real-time monitoring, predictive maintenance, and enhanced safety. AI-driven analytics optimize asset management and scheduling.
- **Geospatial and BIM Solutions:** Critical for underground metro projects, these tools improve risk management, safety, and project efficiency.
- **Intelligent Transportation Systems (ITS):** Advanced sensors and IoT-enabled monitoring systems support predictive maintenance, enhance safety, and ensure asset longevity.

Water Infrastructure

- **GIS for Water Management:** Real-time mapping and IoT integration improve water supply networks, enabling advanced leak detection and disaster preparedness.
- **BIM and Hydraulic Engineering:** Combining hydraulic tools with BIM supports sustainable water resource management and optimizes system performance.
- **GeoAI for Asset Management:** GeoAI leverages AI and geospatial data for predictive maintenance, resource optimization, and cost efficiency in water distribution systems.

Way Forward

Embracing Integrated Technologies

- **Collaborative Systems:** Combining GIS, BIM, Digital Twin, IoT, and 4IR Tech can provide a unified view of projects, ensuring precision, sustainability, and efficiency.
- **Focus on Interoperability:** Developing platforms that integrate diverse tools will facilitate seamless data exchange across stakeholders, improving decision-making and project outcomes.

Promoting Sustainability

- **Green Infrastructure:** Technologies like digital twins, 5D BIM, and AI can ensure eco-friendly designs, resource optimization, and reduced environmental footprints.
- **Lifecycle Thinking:** Adopting a lifecycle approach for infrastructure management—from planning to maintenance—will enhance asset durability and long-term cost efficiency.

Building Resilience

- **Disaster Preparedness:** Incorporating geospatial and real-time data analytics in infrastructure planning ensures better responses to natural disasters like floods, landslides, or droughts.
- **Predictive Maintenance:** A proactive approach, driven by AI and advanced sensors, will reduce unexpected failures and operational downtime.

Enhancing Human Capital

- **Upskilling Workforce:** Training engineers, planners, and decision-makers in cutting-edge technologies like BIM, GIS, and AI is essential.
- **Cross-Disciplinary Collaboration:** Encouraging collaboration between civil engineering, data science, and environmental sciences will foster innovative solutions.

Policy and Investment

- **Strategic Funding**: Governments and private sectors must prioritize investments in advanced technologies to unlock long-term economic and societal benefits.
- **Regulatory Frameworks:** Developing standards and guidelines for technology adoption will streamline implementation and encourage innovation.

Conclusion

The AEC Forum 2024 underscored the transformative potential of emerging technologies in shaping resilient, sustainable, and efficient infrastructure. Tools like GIS, BIM, Digital Twin and 4IR are not merely options but necessities in addressing modern challenges—from urbanization to climate change. By integrating these technologies into planning, construction, and maintenance processes, infrastructure projects can achieve unprecedented levels of efficiency, safety, and sustainability.

The way forward involves embracing a collaborative, forward-thinking approach where technology and traditional methods complement each other. Policymakers, industry leaders, and technologists must unite to ensure that infrastructure development not only meets present needs but also anticipates future challenges. The Forum's insights pave the way for a new era of innovation that can transform how societies build, manage, and sustain their critical infrastructure systems.

AEC Forum Awards

The AEC Forum Excellence Awards recognize visionary individuals and pioneering organizations driving innovation, breaking barriers, and delivering transformative solutions to pressing challenges in the architecture, engineering, and construction sector. These awards celebrate outstanding achievements that leave a lasting impact on society, highlighting exemplary contributions that set new benchmarks of excellence and innovation.

Application in High Speed Rail Infrastructure

Arth

Application in Rail Safety & Operation

Centre of Excellence – Kavach, IRISET/RDSO

Recognition for Excellence in Technology Application

National Highways Authority of India

Application in Railway Infrastructure

Monarch Surveyors & Engineering Consultants

Application in Highway Infrastructure

L&T, Transport Infrastructure IC

Application in Bridge Infrastructure

Louis Berger – A WSP Company

Media Coverage

2024 Participating Organizations

Government

- Andhra Pradesh Capital Region Development Authority
- Bangalore Metro Rail Corporation Limited
- Centre for Railway Information Systems (CRIS)
- CRRI (Central Road Research Institute)
- Delhi Metro Rail Corporation
- Department for Promotion of Industry and Internal Trade
- Departemnt of Space
- Department of Science & Technology
- Greater Hyderabad Municipal Corporation
- Government of Haryana
- Government of Telangana
- Government of J&K
- Hyderabad Metro Rail Limited
- HMWSSB
- Housing & Urban Development, Telangana
- Himachal Pradesh Jal Shakti Vibhag
- Indian Railways
- Jurong Town Corporation
- Japan Aerospace Exploration Agency - JAXA
- KSCSTE - National Transportation Planning and Research Centre (NATPAC)
- NAAC
- National Academy of Construction
- National Rural Infrastructure Development Agency (NRIDA)
- National Highways Authority of India (NHAI)
- Panchayat Raj Engineering Department
- Public Works Department, Maharashtra
- Public Works Department, Odisha
- R&B Department, User - Government Of Telangana
- RailTel
- RLDA
- South Central Railway
- Southern Railways
- UK Geospatial Commission
- Varanasi Smart City Ltd

Business Enterprise

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- Trimble Inc
- Typsa India Pvt. Ltd.
- Vijna Consulting Engineers Pvt. Ltd.
- Worley India Pvt Ltd

Others

- IIT Kanpur
- IIT Kharagpur
- Indian Railways Institute Of Signal Engineering and Telecommunications (IRISET)
- ITS India Forum
- MIT Manipal
- Shri Shivaji Maratha Society's college of Architecture
- Sri Venkateshwara College of Architecture
- NICMAR University
- Sri Venkateshwara College of Architecture
- Rail Analysist
- All India Freelance Journalist Association

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Geospatial World extend heartfelt thanks to all our sponsors and partners for their invaluable support in making the AEC Forum a tremendous success. Your collaboration and commitment to driving innovation in the architecture, engineering, and construction sector have been instrumental in creating a dynamic and impactful event. We truly appreciate your continued support and look forward to building stronger partnerships in the future.

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