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FUTURE OF KONKAN RAILWAY

Titagarh – The Emerging Rolling Stock Giant

Prithish Chowdhary

Delhi - Meerut Namo Bharat Corridor

Shalabh Goel

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MD National Capital Region Transport Corporation (NCRTC)

Delhi - Meerut Namo Bharat Corridor

A paradigm technological shift in Project execution, as well as towards efficient, sustainable, comfortable, and faster intercity travel

Shalabh Goel

The 82-km Delhi-Ghaziabad-Meerut Namo Bharat (RRTS) corridor, also known as the Namo Bharat Corridor, was inaugurated by Prime Minister Narendra Modi on February 22, 2026, marking the complete operationalization of India's first semi-high-speed regional rail, sitting between metro and mainline railway systems.

However, as **Managing Director NCRTC Shalabh Goel** – an ex IRSEE officer of IR who recently refused movement as a General Manager on IR, preferring absorbtion and to continue working for NCRTC which will be building new corridors around Delhi NCR after the commissioning of the 1st corridor - reveals in this piece, apart from introducing a faster and more comfortable suburban travel experience, the project has brought in a paradigm change in the cutting-edge techniques and technologies deployed for project planning and execution, which in fact are being noticed and adopted by multilateral agencies for their other projects as well.

By embedding digital tools into planning, design, procurement, implementation, and operations, NCRTC has created processes that promise to be efficient, transparent, and reliable, and worth emulating for future infrastructure and transport projects.

INTRODUCTION

From conception to operations, technology helped shape the development of India's first Namo Bharat corridor, not as an isolated layer, but as an integral part of project execution and system design. NCRTC embedded digital systems to support efficiency in the project implementation, cost effectiveness and reliability in operations, while ensuring transparency and accountability in the delivery of this transformative public infrastructure.

Namo Bharat and Meerut Metro trains traversing on the Viaduct

The Project Completion Cost for Delhi-Meerut Namo Bharat corridor is Rs 30,274 crore. Despite numerous challenges, including the restrictions brought in by the COVID-19 pandemic, the project has been successfully commissioned on time. The source of funding for the first corridor includes: Multilateral Funding- about $1 bn from ADB, $500mn from NDB & $500mn from AIIB; and Contribution from Government of India: 20%; from Delhi Govt: 3.22%; from UP Govt: 16.78%.

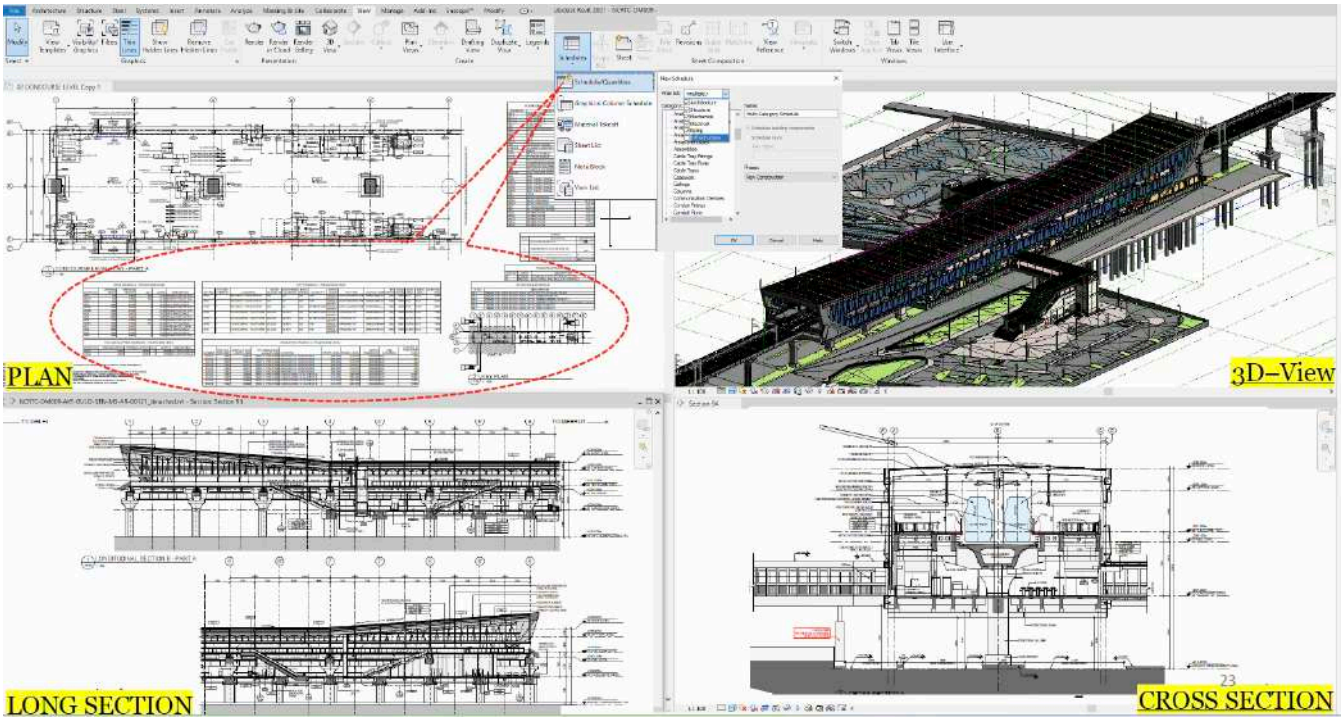
TECHNOLOGY BUILT IN FROM THE BEGINNING

The implementation of this corridor offers a clear case of how technology, when embedded from the beginning, can shape both outcomes and confidence in public systems. The foundation for this approach was laid at the planning and design stage itself.

NCRTC used **Building Information Modelling (BIM)** to bring together civil, structural, architectural and system-related designs into a single integrated digital model. BIM digitally constructs an accurate virtual representation of a building or infrastructure asset, which can be used for planning, design, construction, and later during operations.

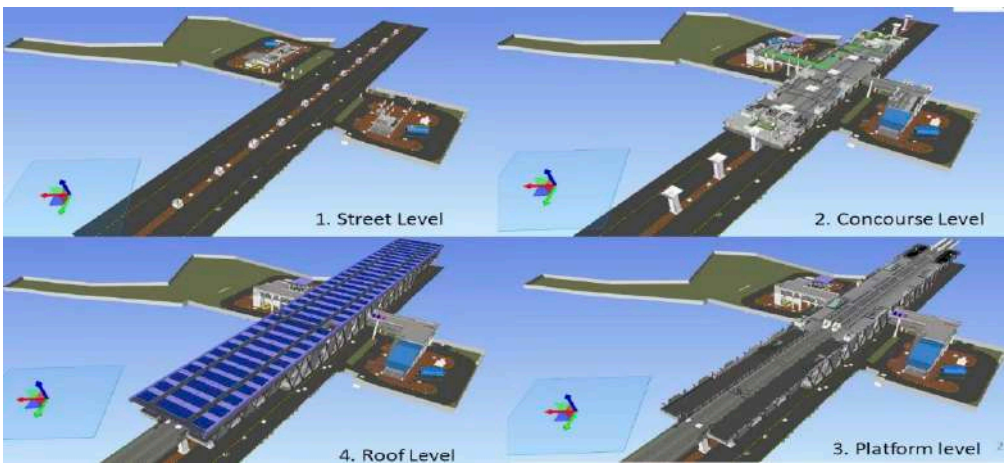
It allows planners to visualize and analyse topography, sunlight, shadow studies, and utility locations on a 3D model, assisting in feasibility studies. Any change to a component instantly updates all related 2D views generated, schedules, and sections, and if required, it can automatically generate 2D floor plans, sections, and elevations directly from the 3D model. Delhi-Ghaziabad-Meerut Namo Bharat corridor runs through a 82 km long stretch between the National Capital, Delhi and Meerut in Uttar Pradesh.

Apart from the different administrations of these states, NCRTC is engaged with different contractors, multi-lateral banks, civic bodies, and different agencies for the implementation of this project. The **Common Data Environment (CDE)** was used as a cloud-based platform for managing drawings, design changes and approvals. This platform allowed multiple stakeholders to work within a shared environment, improving coordination and reducing design conflicts. As the project moved into the implementation phase, execution and oversight were anchored in structured digital systems. A CDE functions as a single source of truth, ensuring that all stakeholders work with the latest, approved information. Its use during construction enabled seamless collaboration, reduced delays caused by manual follow-ups, and maintained an unbroken digital trail of decisions.



GFC drawing extraction from BIM

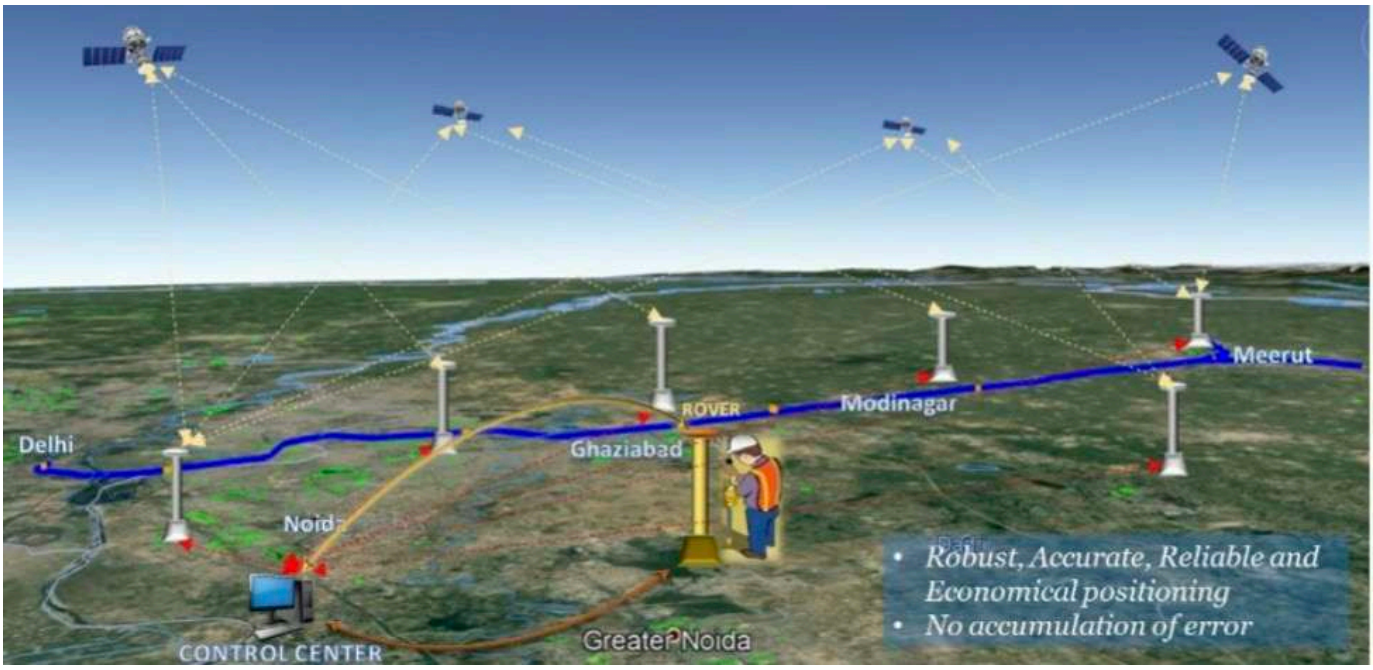
The use of Virtual Reality and Augmented Reality further enabled stakeholders to visualise the project and anticipate challenges before construction begins. During the early stages of planning and implementation, this virtual environment helped streamline execution by resolving issues seamlessly, ensuring responsible use of time, cost and resources.



Floor plates extracted from BIM

Supporting this precision-driven approach was the **Continuous Operating Reference Station (CORS) network.** CORS provides real-time, accurate coordinates of any point within the geographical limits of the network. The system provides repeatable, precise values of coordinates at all times, without any effect of weather. Linear infrastructure projects demand a high accuracy level of surveys so as to achieve the planned alignment. Given the design speed of 180 kmph & alignment either on viaducts or in tunnels leaves hardly any margin of tolerance in case of Namo Bharat structures. The requirement of meeting tight timelines necessitates simultaneous work on multiple sites.

Also, ballastless track slabs for Namo Bharat are required to be laid with an accuracy level of as low as less than 5 mm. This system works with inputs from multiple satellites & eliminates human error or accumulation of error even while working from part to whole, which serves the criticality of accuracy of surveys required. CORS network has been set up for the first time in the country for a rail-based project in Namo Bharat.



Continuous Operating Reference Station (CORS) network

PROCUREMENT

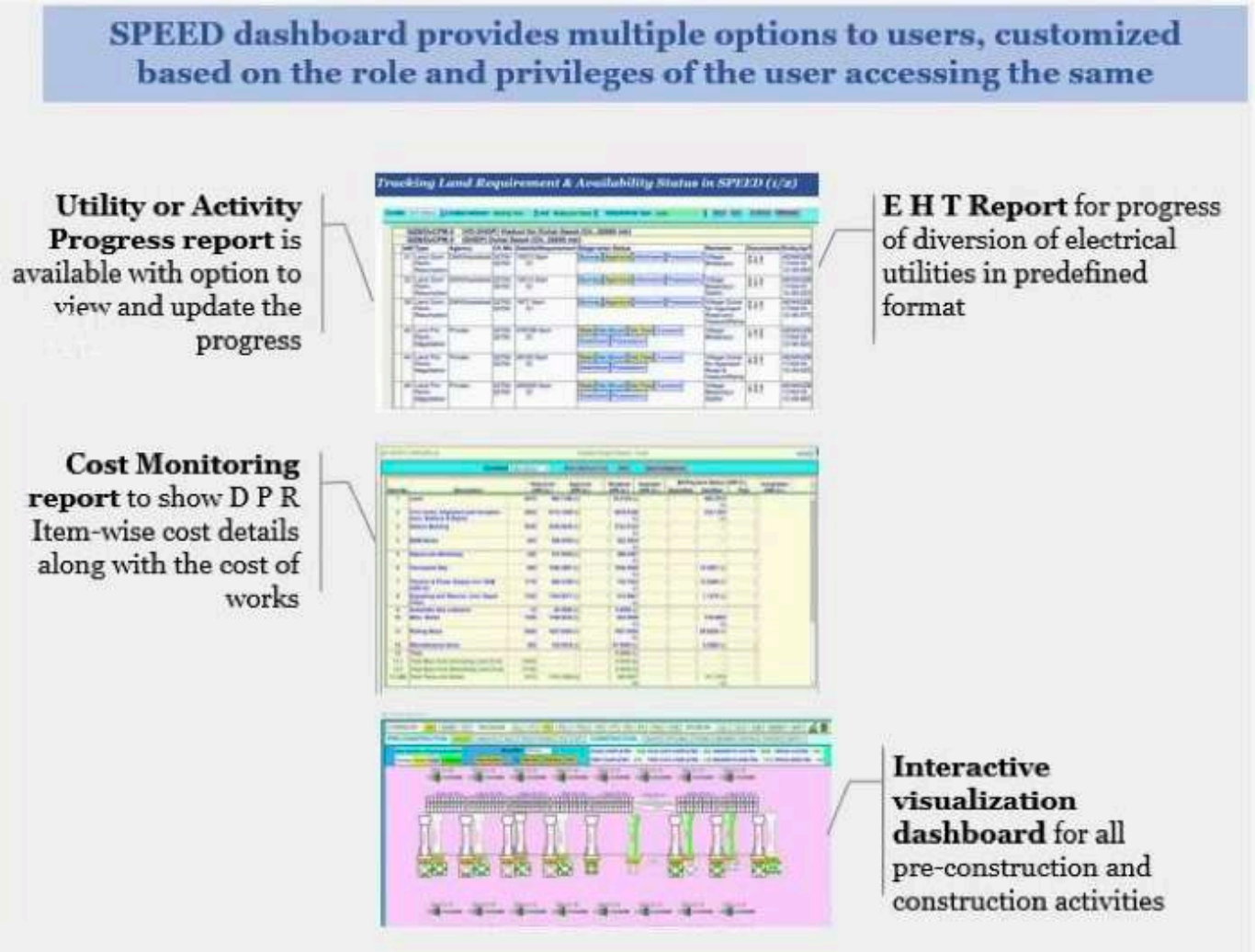
Procurement, one of the most sensitive domains of any large-scale infrastructure project, was structured around transparency from the outset. NCRTC carries out procurement through the **Central Public Procurement Portal (CPPP)**, a centralised digital platform that enables end-to-end online tendering. The portal ensures that every tender, amendment, and award is conducted in full public view, with documents digitally recorded and time-stamped. This creates a permanent and verifiable audit trail, reinforcing fairness, accountability, and public confidence in the management of resources.

The resilience of this digital procurement framework became particularly evident during the COVID-19 pandemic. It was perhaps the most unprecedented disruption faced during the project implementation phase of the Namo Bharat corridor. By December 2019, the world was sinking into panic over the looming threat, much of which was still unknown. A question also arose in front of NCRTC about how to proceed with the procurement of bids. At first, dates of the bids were extended, but as physical meetings became unviable, NCRTC decided to transition to **pre-bid meetings, traditionally conducted in person, to virtual platforms.**

This was well received by the industry, and representatives from across the globe, including those from Korea, France, Germany, China, and Turkey, participated in the first-ever pre-bid meeting conducted by NCRTC on a virtual platform. The success of this initiative could be assessed from the fact that queries from several other organizations were raised to learn from the experience of the pre-bid meetings on a virtual platform. NCRTC has, since then, made the pre-bid meetings on virtual platforms its norm. Despite the challenges of the period, contracts worth ₹10,966 crore across 39 bids were awarded, underscoring the organisation's ability to maintain efficiency and transparency even during such an unprecedented disruption.

PROJECT MONITORING

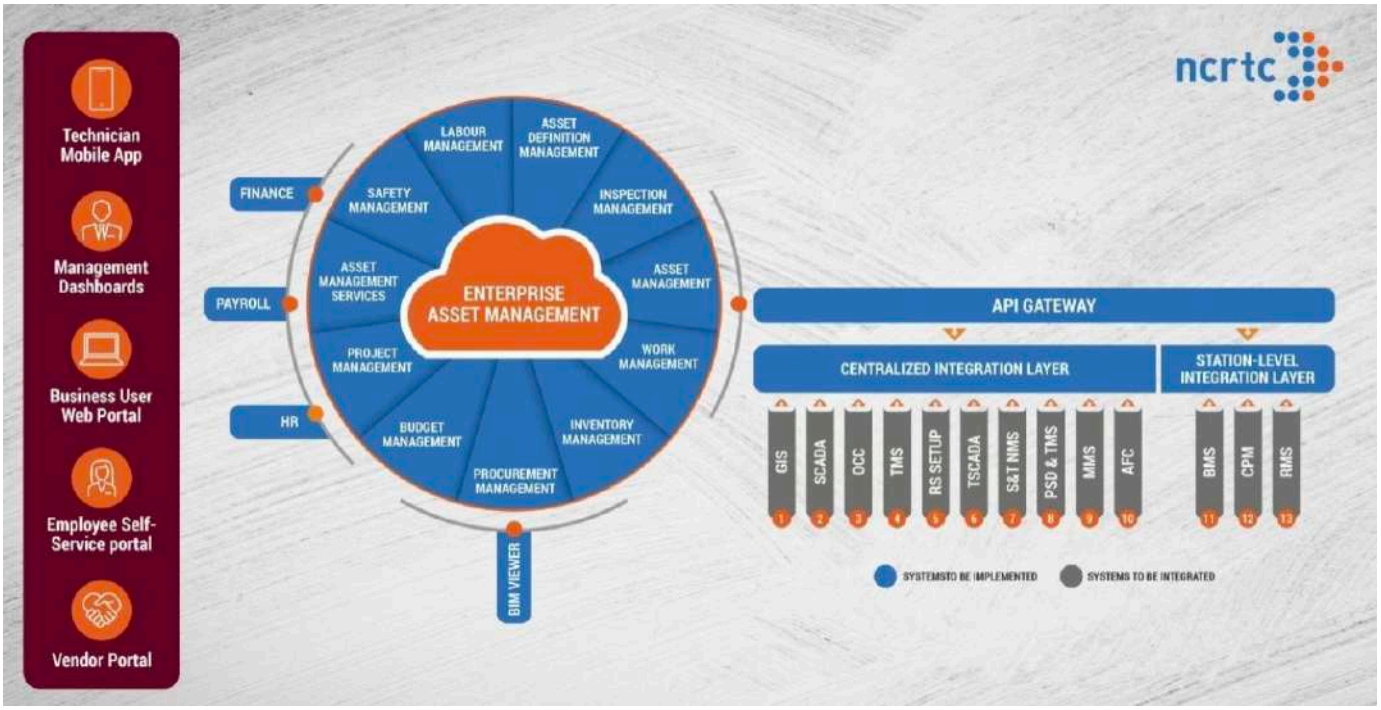
Project monitoring was further supported by **SPEED i.e. 'Systematic Program Evaluation for Efficient Delivery of Project',** an in-house solution developed by NCRTC. SPEED is a comprehensive project management and monitoring tool covering modules from pre-construction to construction progress, cost control, billing, and LOA generation. Designed specifically for large infrastructure projects, it proved particularly effective during the pandemic by enabling remote monitoring and structured oversight. Copyrighted by NCRTC, SPEED has received appreciation from industry peers, government departments, and international funding agencies such as the Asian Development Bank (ADB) and the New Development Bank (NDB), and continues to be used to support other infrastructure project owners in the country.



Systematic Program Evaluation for Efficient Delivery of Project

OPERATIONS ALSO GUIDED BY TECHNOLOGY

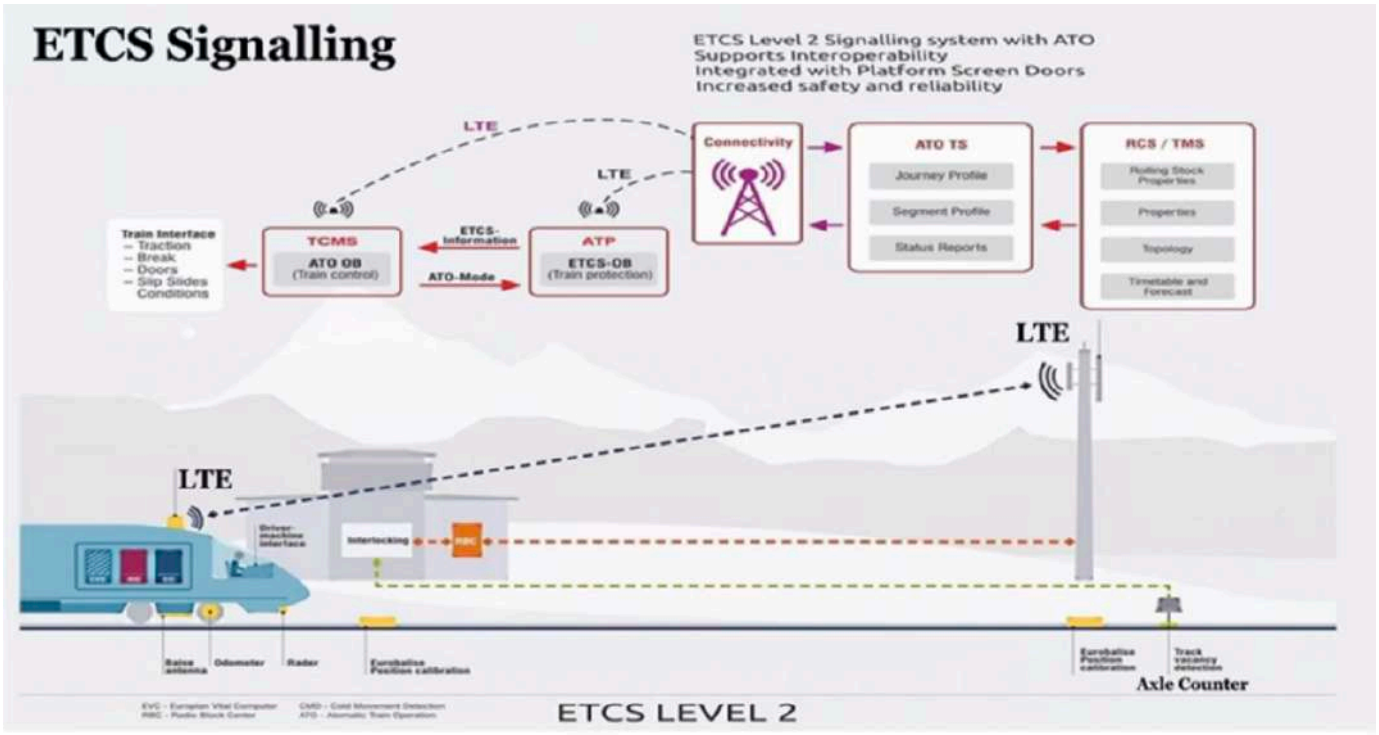
With the transition to operations, technology continues to play a central role in ensuring system reliability and sustained performance. Asset management is being carried out through **iDREAMS, the Integrated Real-Time Enterprise Asset Management System.** iDREAMS brings together real-time data from multiple platforms and subsystems, including BIM, GIS, IoT, OCC, SCADA, and BMS, to monitor asset health, predict maintenance requirements and prevent downtime. The Namo Bharat project consists of multiple sub-systems and assets. The correlation among these sub-systems is an essential component that should be considered while analysing the asset data. For example, any fault in the track is correlated to the rolling stock asset condition as well. Hence, an Enterprise-wide asset management system is capable of efficiently analysing the real-life asset conditions. This integrated approach supports informed decision-making and consistent operational performance across the corridor.



iDREAMS, the Integrated Real-Time Enterprise Asset Management System

SIGNALLING AHEAD OF THE CURVE

Apart from this, for the operations of Namo Bharat trains, NCRTC has deployed the European Train Control System (ETCS) Hybrid Level 3 over an LTE 4G communication network, a global first. This system combines the latest ETCS standards with advanced interlocking, Platform Screen Doors over packet 44. Even advance level of testing is in progress for the deployment of Automatic Train Operation.



European Train Control System (ETCS) Level 2 (Hybrid Level 3) over an LTE communication network

CONCLUSION

Across each stage of the Namo Bharat corridor's development, technology has functioned as an integral part of system design. By embedding digital tools into planning, design, procurement, implementation, and operations, NCRTC has created processes that are efficient, transparent, and reliable.

In the last few years, while implementing the first RRTS corridor, NCRTC has gained expertise and developed innovative solutions required for such large-scale infrastructure projects. Since the beginning of the project, NCRTC has been documenting in detail all our strategies, processes, and protocols. These would prove to be very helpful for the replication of similar projects across the country. NCRTC is keen on sharing the knowledge gained and expertise with other organizations for the implementation of such complex and large-scale transport infrastructure projects in the future.

NCRTC is, in fact, already working with Bangalore Metro and Haryana Rail Infrastructure Development Corporation (HRIDC) to support them in adopting and implementing our project monitoring technology tool SPEED. Asian Development Bank (ADB) and World Bank are also closely working with NCRTC to see how they can leverage NCRTC's innovation and expertise for other projects being funded by them in the country and across the globe.

In delivering India's first Namo Bharat corridor, NCRTC is not only advancing seamless regional mobility but also demonstrating how technology-led infrastructure can be executed and operated through systems that are precise, efficient, and reliable. The consistent application of digital technologies across the project implementation and operation phase reflects a clear principle: efficiency, transparency, and accountability are strongest when they are built together.

THE FUTURE

The expansion of Namo Bharat projects to other cities in India is a major step towards building a sustainable and efficient regional transport system across the major metropolitan regions in the country. The key impacts include sustainable and polycentric economic growth; job creation along the transit corridors; planned urban development; faster access to healthcare, education, employment, and leisure; reduction in congestion and carbon emissions through a shift from private vehicles to public transport. With a robust funding strategy and integrated planning, Namo Bharat has the potential to reshape regional mobility in India and contribute to sustained economic growth.

Two Views of the RRTS Terminal Station in Delhi