

Drones For Predictive Asset Management in Rail Systems

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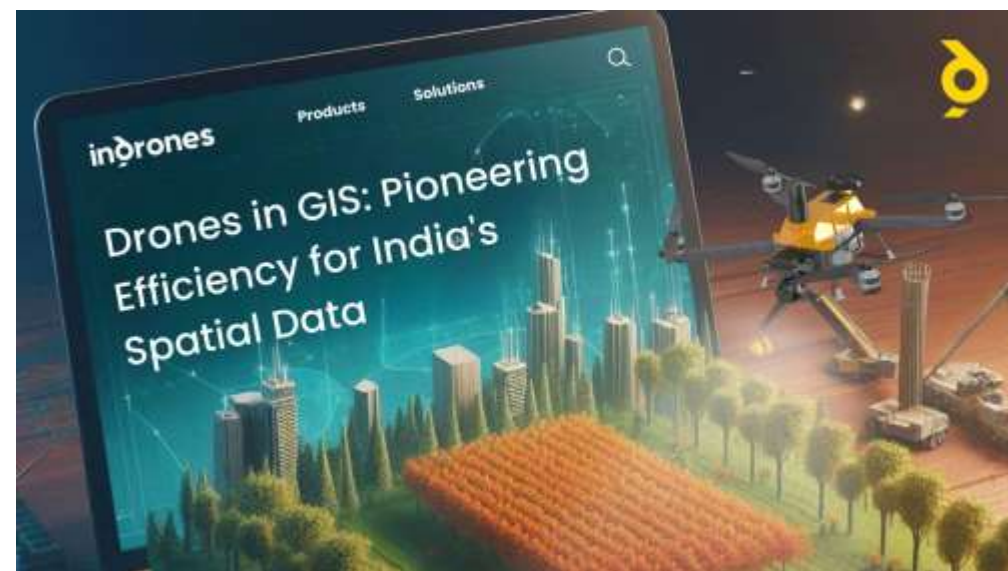
Applications of Drones in Indian Railway Infrastructure

- 1) To monitor ongoing development of railway tracks
- 2) For security and surveillance
- 3) For cleaning purpose
- 4) To detect defects in rail components (structure and surface)
 - Cracks
 - Wear and Tear
 - Spalling
 - Fastener failures
 - Corrosion
 - Shelling and Flaking



Manipulating Rail Geospatial data

- Monitoring performances
- Enable the automation of defect detection processes
- Reducing dependency on human inspectors
- Minimizing inspection times



Leveraging AI algorithms to analyze sensor data

Comprehensive and continuous monitoring of railway network-

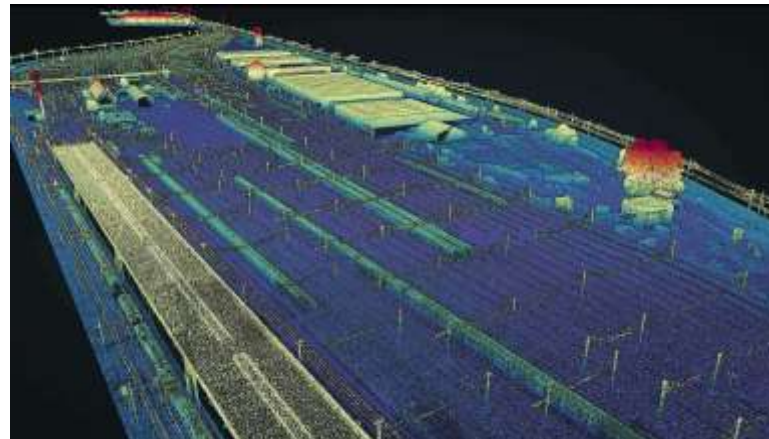
- Maintenance and Inspection
- Traffic Planning and Management
- Safety and Security
- Transport Policy
- Passenger Mobility
- Revenue Management



Anomalies in railway infrastructure

Early signs of deterioration and forecasting potential failures-

- Schedule repairs,
- Optimize resource allocation, and
- Avoid service disruptions



Simulating Operational Scenarios

- Maintenance costs,
- Improved asset lifespan, and
- Enhanced passenger safety



Forecasting component failures

Importance of schedule interventions before issues disrupt service requires-

- **Automation Processing**
- **Scalability**
- **Accuracy**
- **Adaptability**
- **Efficiency**



Benefits of Predictive Maintenance for Railways

- Reducing Downtime and Increasing Operational Efficiency
- Cost Savings: Predictive vs. Reactive or Scheduled Maintenance
- Enhancing Safety and Reliability of Rail Operations
- Extended Equipment Life
- Improved Planning and Scheduling


Decision-making and Collaborative Planning


- **Railway Collaborative Decision Making (R-CDM)** concept is being designed to enhance the efficiency, predictability and resilience of railway operations. By fostering real-time data sharing among key individual stakeholders such as Railway Undertakings (RUs), terminals, ports, and shunting yards – R-CDM enables better resource utilization and improved operational planning.
- **Infrastructure Managers**
- **Railway Undertakings & Shunting Operators**
- **Terminal operators**
- **Intermodal operators**

Railway Asset management Framework

- Core decision and activities
- Enabling mechanisms
- Reviewing mechanisms

Ministry of Electronics & Information Technology
Department of India




 Digital India
Power To Empower

The Indian Railways Deploy UAV Drones for Security Enhancement at Railway Stations

A drone-based surveillance system 'Ninjas' introduced at Railways to enhance security and safety at railway stations, tracks and workshops

It provides real-time tracking, video streaming & automatic fail safe mode

The drones will enhance monitoring of the railway assets and ensure additional safety for passengers



Case study

Press Release: Press Information Bureau

1) **Mumbai Division of Central Railway** has recently procured two Ninja UAVs-

- better security
- surveillance in Railway areas like station premises, Railway track sections, yards, workshops, etc.
- Nine (09) drones have been procured by RPF

2) India-based UAV startup **Weintel Labs** delivered a **surveillance drone** to the **Dhanbad Division of Indian Railways (IR)**.

Case study- Train Coach Cleaning

- Cleaning initiative was first rolled out at **Kamakhya Railway Station in Assam.**
- Cleaning of rooftops of train coaches and elevated station structures.
- Traditionally, these cleaning tasks were labour-intensive and posed significant safety risks to workers.
- With drones in play, Indian Railways is now able to carry out these tasks more effectively and without endangering human lives.



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KAMAKHAYA JN.





THANK YOU -Nancy Singh



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Enhancing Safety and Efficiency in Train Operations: Indian Railways to deploy drone cameras in all its zones & divisions, which will help rail officials in project monitoring and maintenance of tracks & other rail infrastructure.

pib.nic.in/newsite/PrintR...

