Modernizing India's Roads with Intozi's AI Video Analytics:

A Case Study of National Highway Authority of India (NHAI)

Intozi

Introduction

India's expanding highway network is witnessing a massive rise in vehicular traffic, necessitating smarter, safer, and more responsive infrastructure. To address this, the **National Highways Authority of India (NHAI)** rolled out guidelines in 2021 and 2023 to mandate the integration of intelligent transportation systems (ITS) such as **Automatic Traffic Management Systems (ATMS)** across national highways.

In alignment with these policies, Intozi Technologies has deployed advanced AI-driven solutions—**VIDS, VSDS, VIDES, and VASD**—across various NHAI projects to monitor, manage, and enforce safety with unparalleled precision. These deployments ensure real-time incident detection, speed monitoring, and violation enforcement, drastically reducing response time and enhancing commuter safety.

Problem Statement

Highway safety and operational efficiency have long been hindered by a lack of real-time visibility, delayed incident response, and manual traffic enforcement practices. Key challenges faced on national highways included:
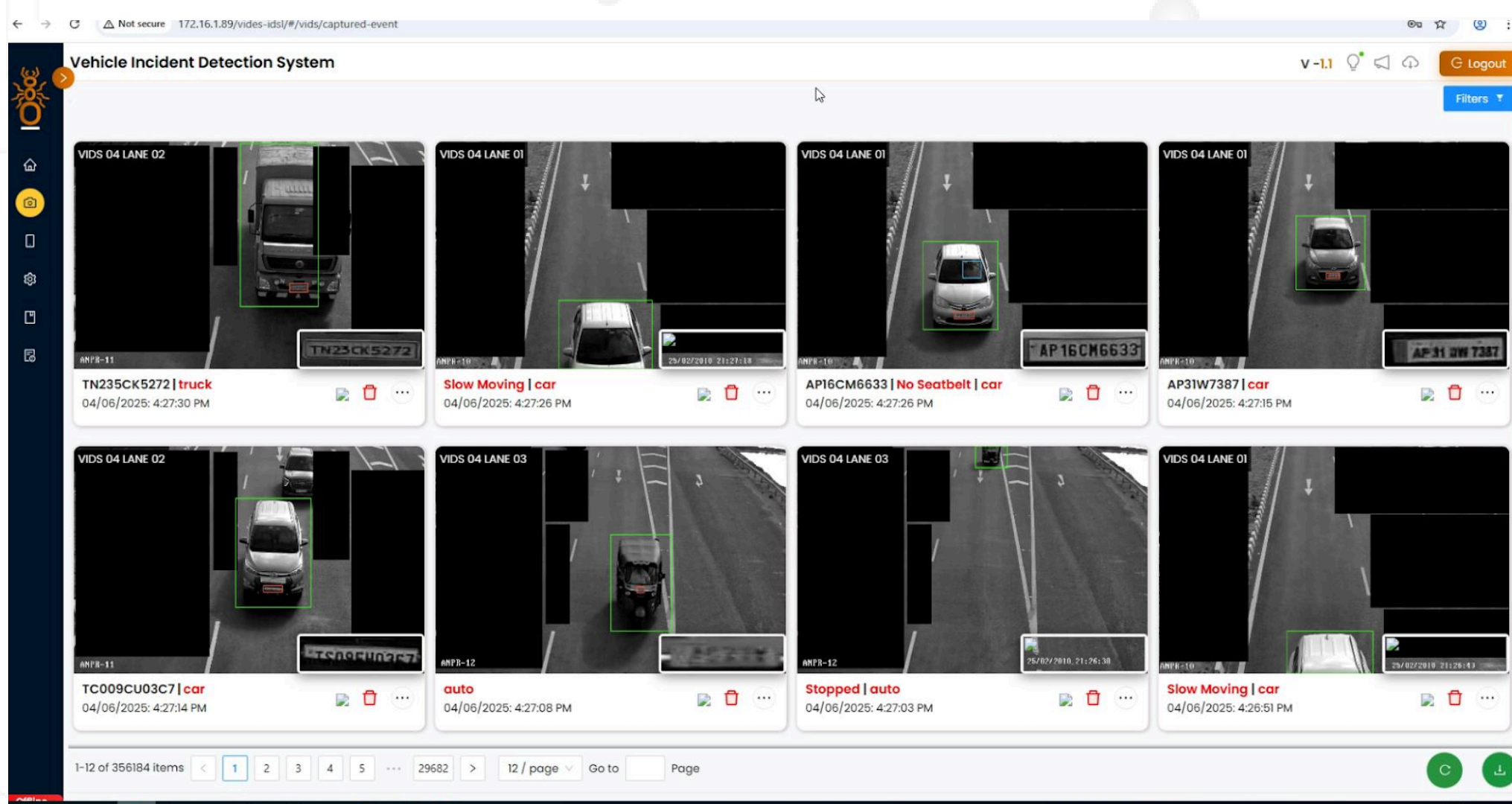
1. **High Accident Rates:** Due to overspeeding, wrong-way driving, and vehicle breakdowns going undetected for long durations.

2. **Delayed Emergency Response:** Incidents such as crashes, stalled vehicles, and poor visibility often reached control centers too late.

3. **Manual Enforcement Limitations:** Non-compliance with traffic laws (e.g., no helmet, no seat belt, over-speeding) was hard to monitor manually across large stretches.

4. **Lack of Integrated Data:** Disconnected systems and the absence of automated analytics made it difficult to coordinate enforcement or track trends.

5. **Low Driver Awareness:** No active warning systems were available to caution drivers in real-time about their dangerous behavior or surrounding risks.

Solution provided by Intozi

To address these highway-specific challenges, Intozi implemented a suite of intelligent, guideline-compliant video analytics systems, deployed as per NHAI 2021 and 2023 requirements.
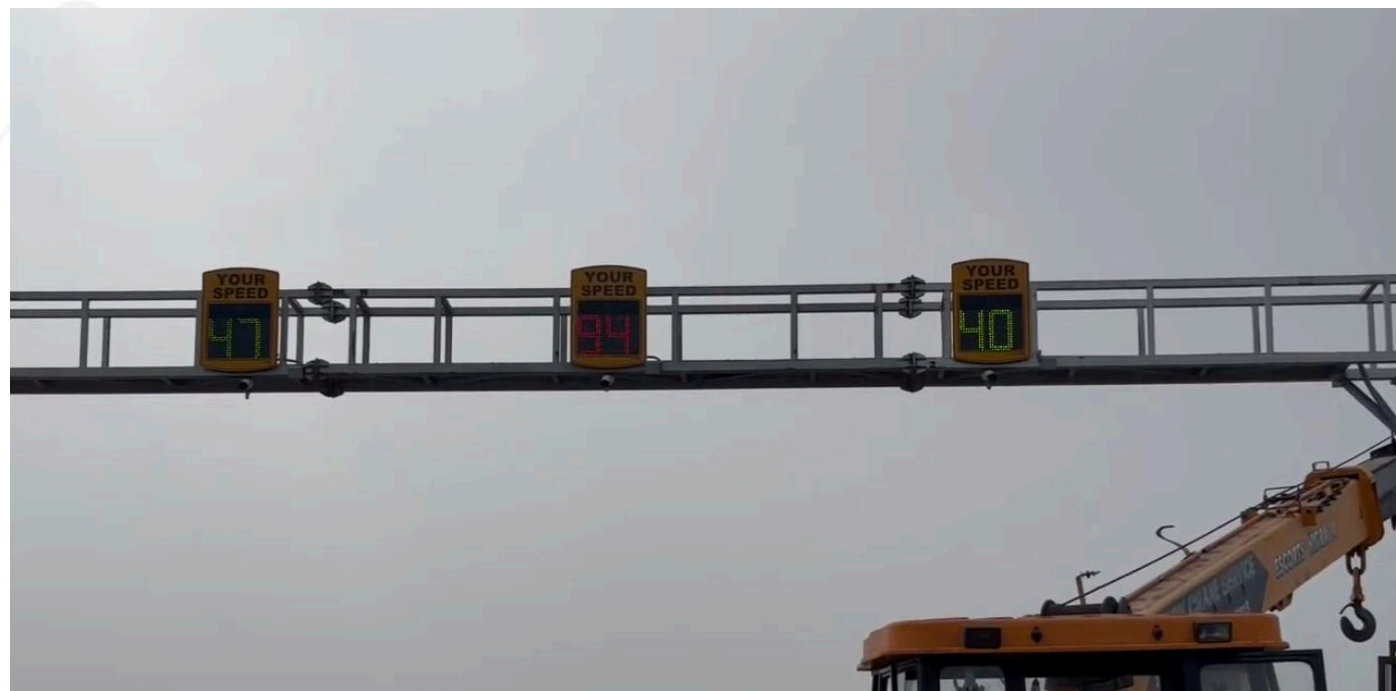
■ Vehicle Speed Detection System (VSDS)

- Radar-based speed detection with accuracy up to 270 kmph, integrated with ANPR and vehicle classification.
- Simultaneously detects multiple vehicle speeds (up to 256 vehicles) in free-flow conditions.
- Displays real-time over-speed alerts to drivers via dynamic roadside displays, promoting compliance.
- Generates automated reports with violation logs, video clips, and high-resolution images for e-Challan integration.
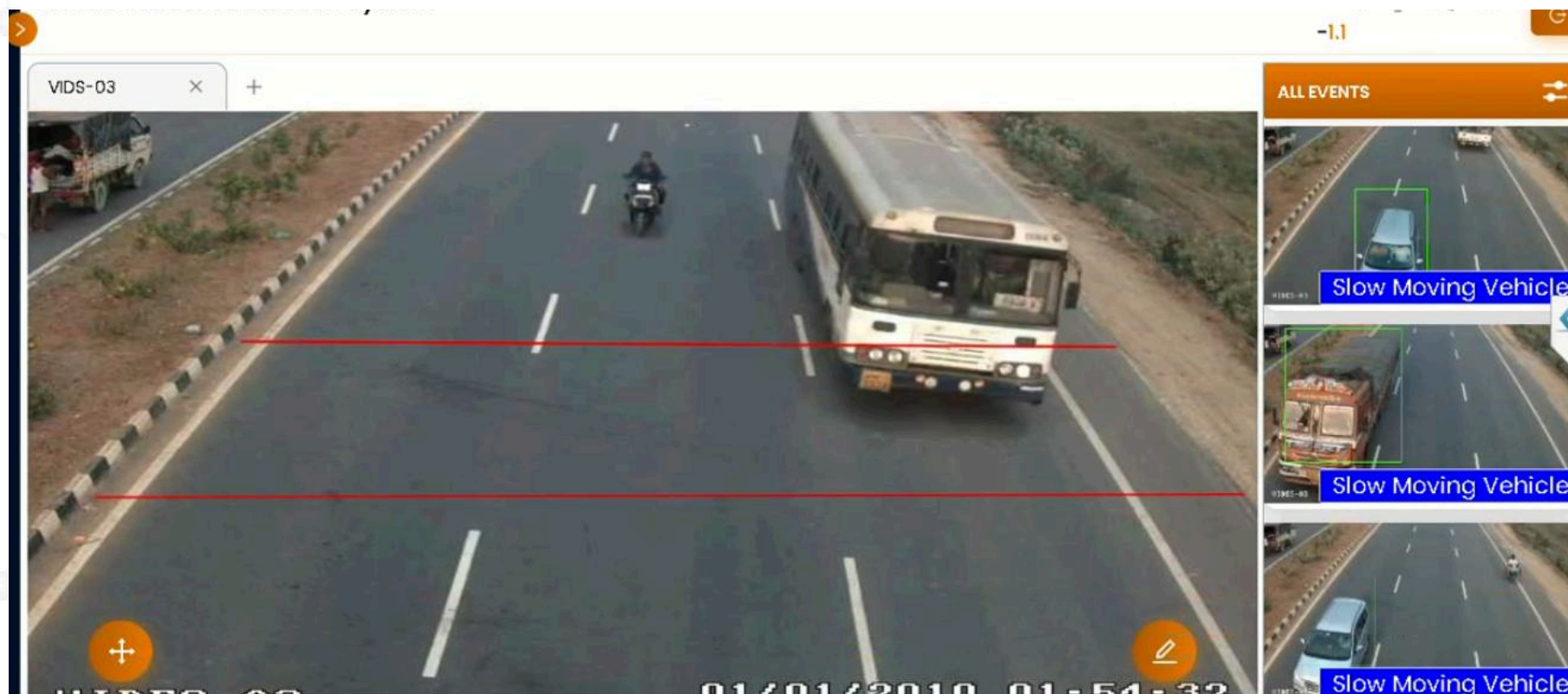
■ Vehicle Actuated Speed Display System (VASD)

- Radar-based real-time speed alert system deployed on highways for proactive speed compliance.
- Warns drivers crossing predefined speed thresholds with dynamic visual alerts.
- Operates effectively across lighting and weather conditions (day/night/fog/smog).
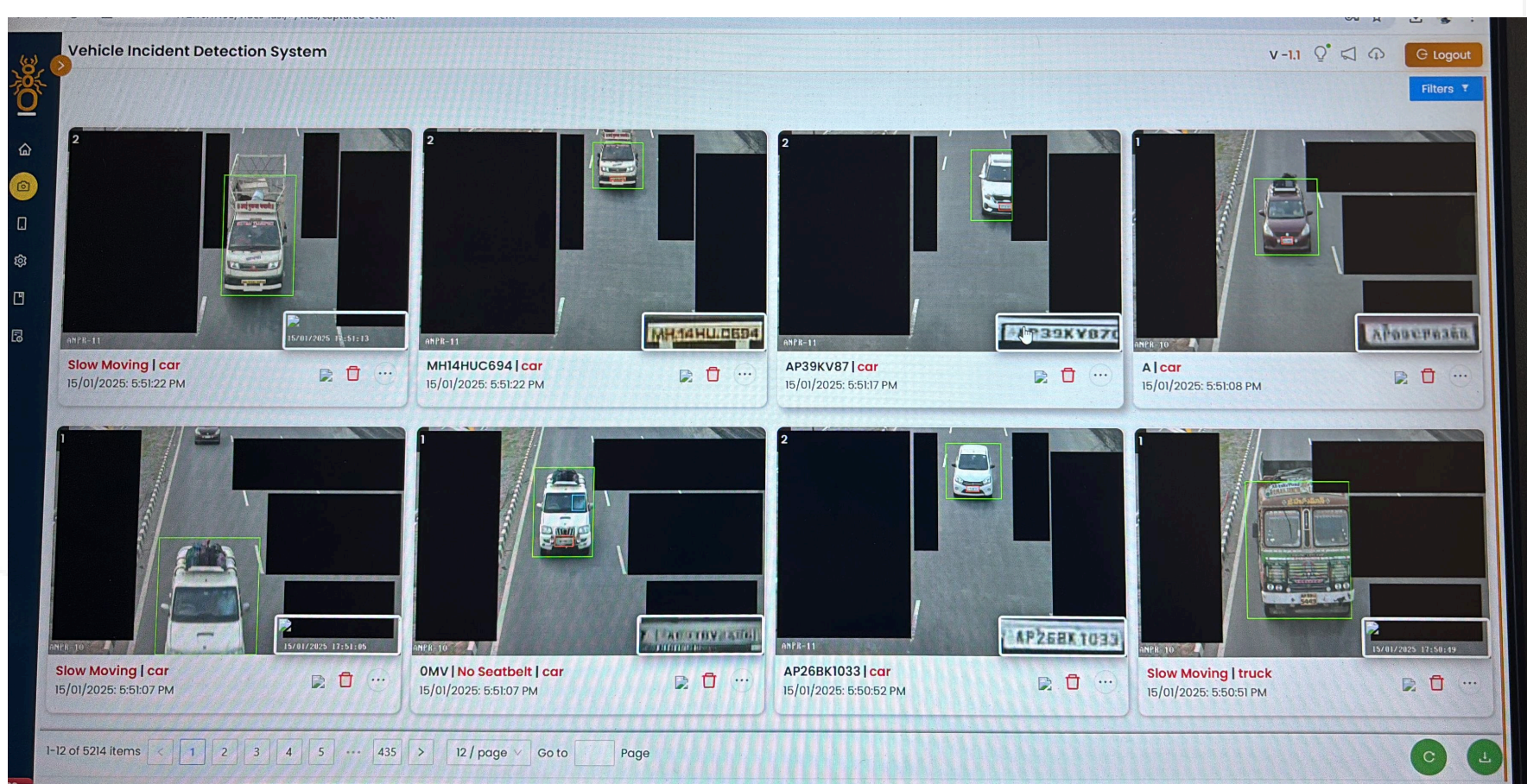- Improves driver behavior by creating a deterrent without enforcing fines directly.

■ Video Incident Detection & Enforcement System (VIDES)

- Detects a wide range of incidents: accidents, wrong direction, pedestrians on the road, animal intrusion, poor visibility, etc.
- Supports enforcement of no seatbelt, no helmet, triple riding, banned vehicles, and over-speeding via ANPR and edge computing.
- Centralized incident management at ATMS Control Room for validation, escalation, and reporting.
- Seamless integration with VAHAN portal, Rajmarg Yatra API, and e-Challan system for automated penalty issuance.
- Smart storage architecture maintains evidence for 180+ days for legal and administrative use.

■ Video Incident Detection System (VIDS)

- AI-powered system that detects critical incidents: wrong-way driving, stopped/slow vehicles, fallen objects, and low visibility.
- Live alerts are transmitted to command and control rooms with incident images and video evidence.
- Real-time visualization and alarm system via operator console ensures immediate attention and escalation.
- Enables automated incident classification and crowd/pedestrian density alerts in risk zones.

Project Deployment Overview Across NHAI Corridors

A comprehensive view of Intozi's analytics integration across multiple NHAI corridors.

Site / Pkg / Location	Stretch (in km)	OEM	SI	MSI	SOW
GHV KOTA_DVE-(Dwarka Expressway)	31	Intozi	AryaOmni	GHV (INdiA) Private Limited, Kota	NHAI - 2021 ANPR, VSDS, VIDS, VMS
Renugunta to Naidu	57	Intozi	AryaOmni	IDSL	NHAI - 2021 VSDS, VIDS, VMS
AP Package 01-Visakhapattanam to Raipur	31	Intozi	AryaOmni	H.G. INFRA ENGINEERING LTD	NHAI - 2021 ANPR, VSDS, VIDS
Hasan to Sakhileshpura	31	Intozi	AryaOmni	RAJKAMAL - Hassan	VIDS & ATCC
Sinnar-Shirdi Road Project, 4320 Sinnar-Shirdi-422104 Maharashtra IN	36	Intozi	AryaOmni	Montecarlo Limited	VIDS Software
IRB TOT 13 ATMS	82	Intozi	AryaOmni	IRB	NHAI - 2023 VIDES, VSDS, TMCS, VMS, E-Challan
NH 130, Package 08 Visakhapattanam to Raipur	26	Intozi	AryaOmni	Bekem Infra Projects Pvt. Ltd	NHAI - 2023 VIDES, VSDS, TMCS, VMS, E-Challan
Package-04 & Package-05 Khmmam to Devarapalli	56	Intozi	AryaOmni	Bekem Infra Projects Pvt. Ltd	NHAI - 2023 VIDES, VSDS, TMCS, VMS, E-Challan
Package-03 Khmmam to Devarapalli	42	Intozi	AryaOmni	KMV Projects Ltd	NHAI - 2023 VIDES, VSDS, TMCS, VMS, E-Challan

Project Deployment Overview Across NHAI Corridors

A comprehensive view of Intozi's analytics integration across multiple NHAI corridors.

Site / Pkg / Location	Stretch (in km)	OEM	SI	MSI	SOW
Tot 12	320	Intozi	Tecsidel India Pvt. Ltd	IRB	NHAI - 2021 ANPR, VSDS, VIDS, VMS
UER 2	75	Intozi	Tecsidel India Pvt. Ltd	BRR	
Patna Gaya		Intozi	Tecsidel India Pvt. Ltd	JSP Projects Ltd	NHAI - 2021 VIDS

Impact of Deploying Intozi's Solution

■ **Improved Road Safety**

Early detection of accidents, wrong-way driving, and hazardous conditions has reduced accident response time and improved emergency interventions.

■ **Automated Enforcement at Scale**

Enforcement of traffic rules like seatbelt, helmet, over-speeding, and lane discipline has become automated, reliable, and scalable—reducing human dependency.

■ **Real-Time Alerting and Incident Visibility**

Operators receive live alerts and video feeds of incidents, allowing faster validation and appropriate action from the ATMS control room.

■ **Data-Driven Traffic Management**

Continuous data from vehicle classification, traffic density, and violation logs enables NHAI and enforcement bodies to plan, prioritize, and prevent.

■ **Improved Driver Awareness**

VASD speed displays proactively alert speeding drivers, reducing overspeeding tendencies without enforcement pressure.

CONTACT DETAILS

Intozi Tech Pvt. Ltd.

📍 Unit no-165, Tower B1, Spaze I-Tech Park, Sohna Road, Sec 49, Gurgaon, Haryana-122018

in Intozi   ✉ info@intozi.io   🌐 www.intozi.io

Intozi

See Beyond, Analyze Within