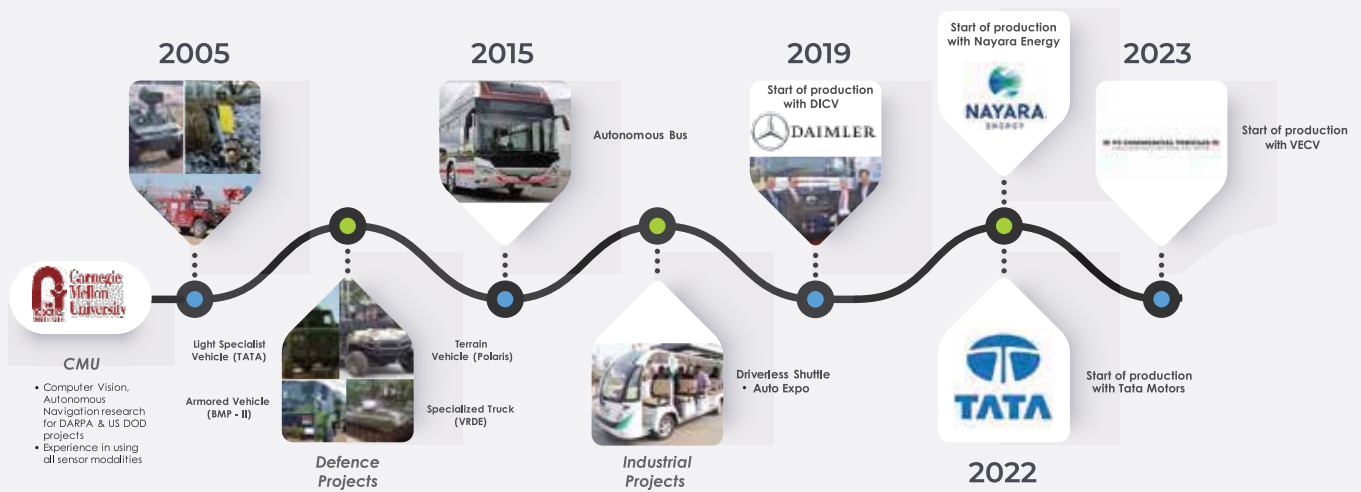




# Smart Mobility for Commercial Vehicle

# NOVUS HI-TECH ROBOTICS



**250+**  
Employees

6 Billion Kms India specific  
edge cases used to train Models

**100+**  
CV/ML &  
embedded system experts

7481132 distraction events detected

**100+**  
Patents

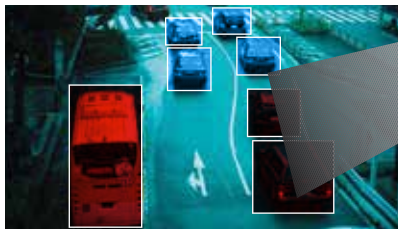
142127 Fatigue interventions (12 Months)



# ADAS with Autonomous Vehicle Approach

Experience the future of autonomous vehicles with our state-of-the-art ADAS Powered by NovusFlow™, our industry-agnostic technology platform for integrated intelligence and mobility value delivery. NovusFlow™ seamlessly integrates Novus Aware, an intelligent camera-based system that monitors and analyzes in-cabin activities, and Novus Pilot™, an intelligent camera-based system that monitors and analyzes outward activities.

NovusFlow™ leverage advanced technologies, including computer vision, Edge AI, ML, embedded system and cloud analytics ,that helps to implement predictive diagnostics in Vehicles and orchestrate actions to automate driver engagement and to revolutionize the driving experience.



NOVUS

**PILOT**

External Enviroment  
Monitoring



**NOVUS FLOW™**  
FUTURE. NOW.

NOVUS

**AWARE**

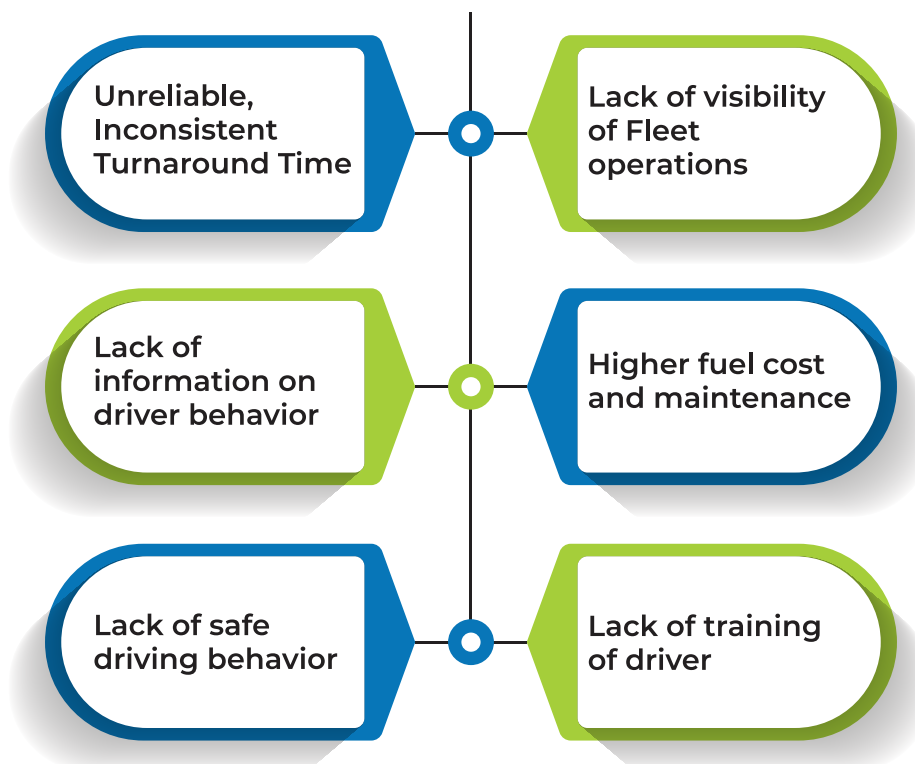
Attention & Behavior  
Monitoring



## Opportunities & Challenges

OEMs and manufacturers in the automotive industry & fleet operators are investing a lot to develop robust DMS platforms and applications built on passive and active monitoring systems. Existing vehicle systems do not provide sufficient data to understand the driver's exhaustion level and orientation to safe or aggressive driving, and fuel economy.

Accurate prediction of driver behavior is difficult since there is no linkage between the vehicle's prognostics and telematics systems with passive safety systems that enable vision-based driver monitoring resulting in.





# Our Readiness

At Novus HiTech ,We have Developed ML-based analytics for diagnostic,prescriptive, predictive, causal, and inferential analytics using our own Novus Deepsense™ , a Computer vision platform that help to find patterns. Correlating data obtained from driver monitoring systems with predictive diagnostics of vehicles helps us orchestrate actions for better engagement, thus enriching the driving experience.

We have complete Connected Vehicle Solution covering **L0 to L5 levels of automation**

## L0-L2

### Driver Monitoring System

#### Novus Aware - In Cabin Monitoring System

- Driver Identification
- Driver Drowsiness
- In attention
- Occupancy Detection
- Seat Belt Detection
- Driver distraction Detection
- Unattended Child Detection
- Object Detection
- Occupant Monitoring
- Gaze detection
- Vital Monitoring
- Alcohol Analyser
- Cabin Intrusion detection system

#### Novus Pilot – External Perception System

- Forward Collision Warning (FCW)
- Lane Departure Warning (LDW)
- Lane Change Assist (LCA)
- Vulnerable Road Users (VRU)
- Pedestrian Collision Warning
- Traffic sign recognition
- Traffic light recognition
- Cross Traffic Alert
- Park Assist
- Automatic emergency braking Integration

#### Intergration with 3<sup>rd</sup> party devices

- Surround view
- E- Mirror
- Rear Collision warning
- Blind spot warning
- Tyre Pressure Monitoring
- Fuel Sensor
- E-Lock
- 2-way Voice Communication
- AIS -140 Devices

## L3+

- Highway automated driving
- Traffic jam Pilot
- Automated Valet Parking
- Highway Pilot





## Differentiators

### Technology

A hybrid approach for correlation of vision & telematics data

### Detection Reliability

6 billion Kms of Test Data on Indian Conditions  
Indian ethnicities, Animals on roads, 2W-3W

### Flexibility

Customisable as per OEM & Fleet operators' requirement

OBU/TCU device agnostic application

Detection with any camera

In-vehicle system control for navigation, multimedia, vehicle function etc

### Uniqueness

Edge analytics for DMS-On board real time analysis

### Advanced DeepSense™ algorithms

Integrated solution for DMS with vehicle data correlation

## Benefits to OEM

- Improved Safety Ratings
- Cost Saving
- Brand Reputation and Trust
- Increased Customer Satisfaction
- Reduced Accidents
- Regulatory Compliance
- Reduce time to market

## Benefits to Fleet Operators

- Driver Analytics
- Driver Profiling & Scoring
- Safe Driving Behavior
- Advanced Diagnostics & Maintenance
- Reduced Accidents
- Live Tracking & Geofencing
- Single Window for tracking
- Fuel Efficiency
- Coach Driver
- Vehicle telematics
- Equipment Monitoring
- AI Powered Site Visibility



## **Novus Aware™**

Our AI powered In Cabin Monitoring Systems uses sensors, such as in-car cameras, computer vision, and Edge artificial intelligence to bring insight into the driver's state and behavior. It utilizes advanced technologies to monitor driver behavior, detect drowsiness or distraction, and promote safe driving practices. With real-time facial recognition and eye-tracking capabilities, our systems provide valuable insights into driver attention and alertness levels.

**Stay confident and secure on the road with our advanced monitoring solutions.**

### **Computer Vision, Edge AI Technologies:**

At our core, we embrace the power of computer vision and edge AI technologies to enhance our In Cabin Monitoring Systems. Through advanced algorithms and machine learning models, our systems continuously analyze driver data, identifying patterns and anomalies. This enables early detection of potential risks and provides timely warnings, ensuring proactive safety measures.

### **Advanced Analytics:**

The System incorporate advanced analytics capabilities to extract valuable information from driver data. By processing data from various sensors and cameras, our systems offer detailed reports on driver behavior, fatigue levels, and distraction patterns. This comprehensive analysis enables informed decision-making and promotes continuous improvement.

### **Enhancing Safety and Performance:**

The System aim to enhance safety and performance on the road. By monitoring driver behavior, providing real-time alerts, and promoting safe driving practices, our systems contribute to a secure and efficient driving environment. Experience the peace of mind that comes with our advanced solutions.





### **The safety features of Future :**

Our AI-based DMS technology enables a wide variety of features for improved road safety and driver convenience. Powered by Industry 5.0 Emotion AI to capture nuanced emotions, reactions, and facial expressions in real time.

#### **Driver identification:**

Identifies the driver to adjust the features of the vehicle and secure that the vehicle is driven by certified drivers.

#### **Distraction, drowsiness and attention:**

Tracks the driver's eye, head, and face movements to detect distraction and identify even the earliest signs of fatigue – making sure that focus stays on the road ahead.

#### **Dangerous behavior:**

Detects behavior that can be distracting, like eating, drinking, smoking or mobile phone use.

#### **Vital Monitoring:**

The System incorporates vital monitoring capabilities by integrating sensors to monitor heart rate, blood pressure, and other vital signs.

#### **Object detection:**

Identifies objects present in the vehicle and how the driver is interacting with them.

#### **Activity detection:**

Detects the activities the driver is engaged in – including whether they are focused on driving or not.



**Facial expression analysis :**

Emotion AI analyzes the driver's facial expressions to understand their mood, emotions, and behaviors.

**Health status:**

Helps identify the driver's health status by analyzing the their body posture and eye, head, and face movements.

**Harsh Braking Detection:**

Safety is our utmost priority. Our Driver Monitoring Systems include advanced algorithms to detect harsh braking events, enabling immediate feedback and coaching to improve driving behavior. By promoting smoother and safer braking, we ensure enhanced road safety and reduced risk of accidents.



### **Camera Integrated Breath Analyzer:**

At Novus Hi-Tech, we are committed to making roads safer for everyone. Our Camera Integrated Breath Analyzer, a cutting-edge technology integrated into our Advanced Driver Assistance Systems (ADAS), is a game-changer in promoting responsible driving and preventing accidents caused by impaired driving.

### **Key Features:**

#### **Real-time Breath Analysis:**

Our Camera Integrated Breath Analyser utilizes advanced sensors and AI algorithms to analyze a driver's breath for alcohol levels in real-time. This proactive approach provides immediate feedback to the driver and alerts them if their alcohol concentration exceeds the legal limit, promoting responsible decision-making.

#### **Seamless Integration with ADAS:**

Our Breath Analyser seamlessly integrates with our ADAS platform, leveraging the power of advanced technologies such as computer vision and machine learning. By combining the breath analysis data with other ADAS functionalities, we create a comprehensive safety system that enhances driver awareness and prevents accidents.

#### **Visual and Audible Alerts:**

In case of alcohol detection above the legal limit, our Camera Integrated Breath Analyser triggers visual and audible alerts to grab the driver's attention. These warnings serve as a reminder to refrain from driving and ensure the safety of both the driver and others on the road.



### Data Logging and Reporting:

Our system captures and logs the breath analysis data, providing valuable insights for further analysis. This information can be used for monitoring driver behavior, identifying patterns, and implementing appropriate measures to promote safer driving habits within organizations and communities.

### Benefits:







**E-mirror** system Enhancing Visibility and Safety with Blind Spot Detection Warning  
Experience the Future of Driving with Hi-tech E-Mirror Systems: where innovation meets safety and performance. Our state-of-the-art E-Mirror systems featuring advanced mirror technology and the use of materials like poly carbonate leverage AI and ML technologies, along with advanced analytics, to revolutionize the driving experience.

#### **Advanced Mirror Technology:**

Our E-Mirror systems go beyond traditional mirrors, incorporating advanced mirror technology to provide unparalleled visibility and convenience. With electrochromic or OLED displays, our mirrors offer real-time video feeds from the cameras, ensuring a crisp and detailed view for the driver. We can also incorporate features like auto-adjustment, anti-glare capabilities, and customizable settings. Experience crystal-clear images and optimized visibility for a safer and more enjoyable drive.

#### **Mirror Materials:**

The choice of materials is crucial for robust and lightweight mirror housings. Hi-tech Robotic utilizes high-quality material including poly carbonate, a thermoplastic material renowned for its durability and impact resistance.

#### **AI and ML Technologies:**

Through advanced analytics, our mirrors adapt to changing driving conditions, intelligently adjusting brightness and image clarity.



### Advanced Analytics:

Our E-Mirror systems incorporate advanced analytics capabilities to provide valuable insights. This proactive approach promotes safety, preventing accidents and enabling a secure driving environment.

Mirrors enhance  
or replace the  
traditional rear &  
sideview mirrors

The intelligent  
Compute Platform  
always delivers  
the right view

### Key Highlights

Driving safety is  
greatly enhanced by  
features like blind  
spot warning & lane  
change assist

The modular  
system enables  
integration in  
different  
commercial vehicle  
segments

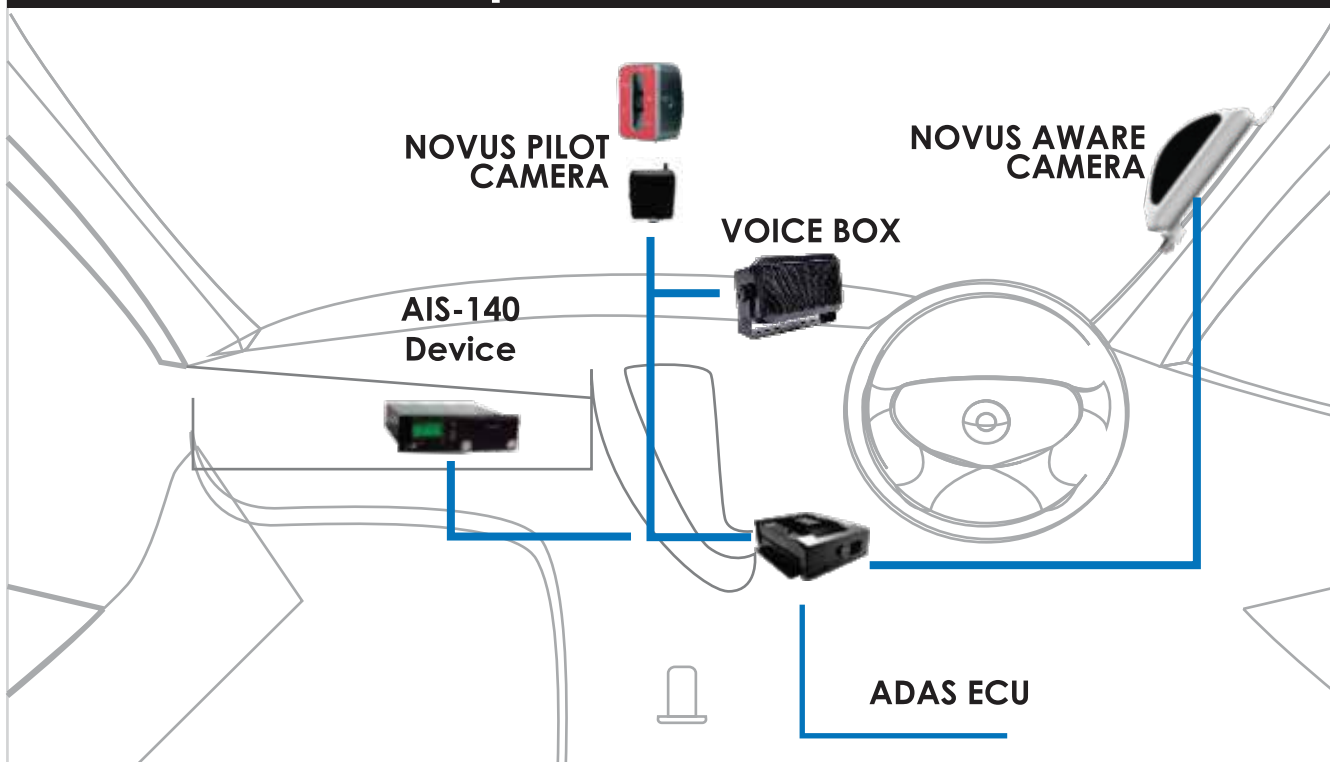
# USE CASE



- :: Driver Authentication
- :: Driver Fatigue
- :: Driver Drowsiness
- :: Driver Distraction
- :: Phone usage while driving

- :: Seat Belt Detection
- :: Collision Warning
- :: Accident Reconstruction
- :: 2-Way Voice Communication
- :: Drinking while driving

## In-Vehicle Setup





# NOTE

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