सड़क परिवहन
एवं राजमार्ग मंत्रालय
MINISTRY OF
ROAD TRANSPORT
AND HIGHWAYS
सत्यमेव जयते

International Workshop on the Global Navigation Satellite System (GNSS) based Electronic Toll Collection in India

Road Infrastructure / MultiLane Free Flow

Panelists for Toll Charger Session

1. Prof. Geetam Tiwari, IIT Delhi
2. Sh. Akhilesh Srivastava, Road Safety Ambassador, IRF and Founder, ITS India
3. Dr. Zafar Khan, Joint CEO, Highway Concessions One Private Limited
4. Sh. N Shankar Naryanan, Head-IT, IRB
5. Sh. Manish Saini, VP- Strabag
6. Sh. Sandeep Pawar, MD, Kent India
7. Sh. Debasish Debsihdar, Senior VP, Jio

Toll Charger Engine

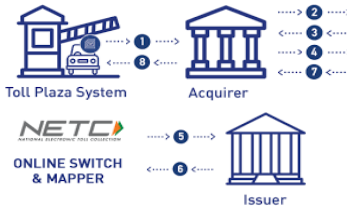
1. **Map Matching by pings from OBU**
2. **Distance Calculation**
3. **Toll Calculation against Virtual ID, Toll Parameter and Vehicle Class**

Toll Charge

Payment System similar to existing FASTag

Time & Location **stamp** with **Encrypted Virtual ID**

OBU **Registration** at Issuer Entity through consent & after due checking of OBU/ Retrofitted OBU



The system **will** follow 01 Vehicle - 01 OBU Policy. For any change in OBU Issuer, the Vehicle Owner has to first decouple with existing Issuer Entity.

FASTAG TO GNSS ETC SYSTEM TRANSITION – Road Infrastructure & MLFF

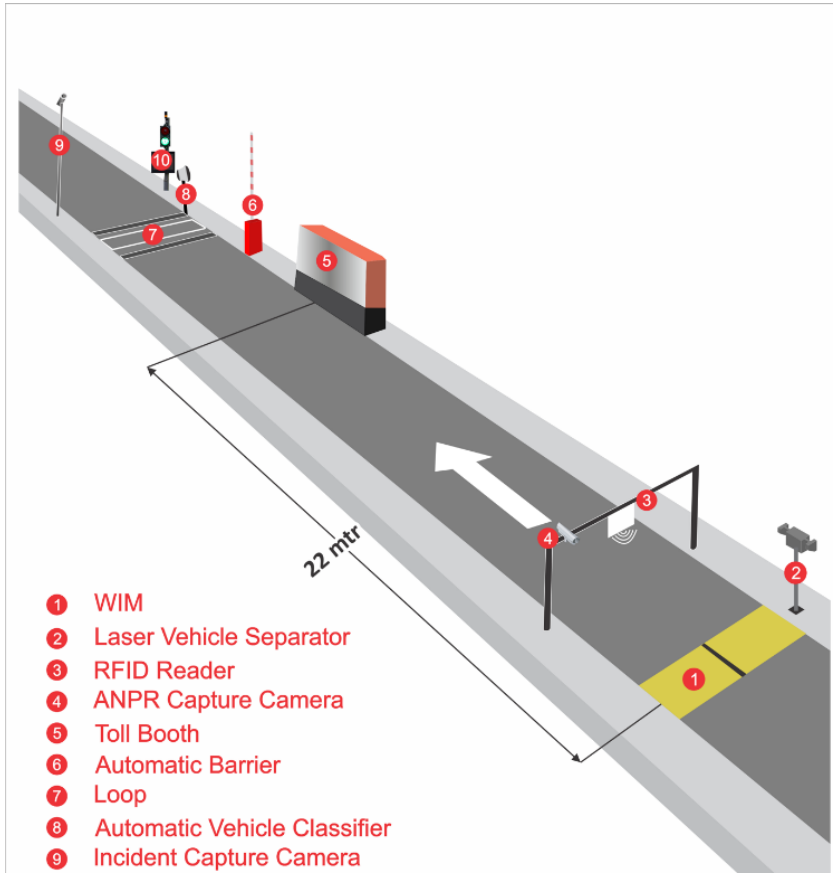
- **Technology Integration:** Integrating GNSS with existing tolling infrastructure, including both hardware and software.
- **Infrastructure Upgrade:** Upgrading or replacing existing toll plazas and related infrastructure to support GNSS technology. Also an opportunity to upgrade FASTag readers/ANPR cameras.
- **Phased Transition:** Managing the transition period where both traditional tolling (FASTag) and GNSS tolling coexist.
- **Communication Networks:** Enhance communication networks to ensure reliable data transmission between vehicles, satellites, and tolling servers.
- **Public Awareness and Acceptance:** Educating the public and ensuring acceptance of the new tolling method by dedicating Lane.

Key Requirements from MLFF and Road Infrastructure:

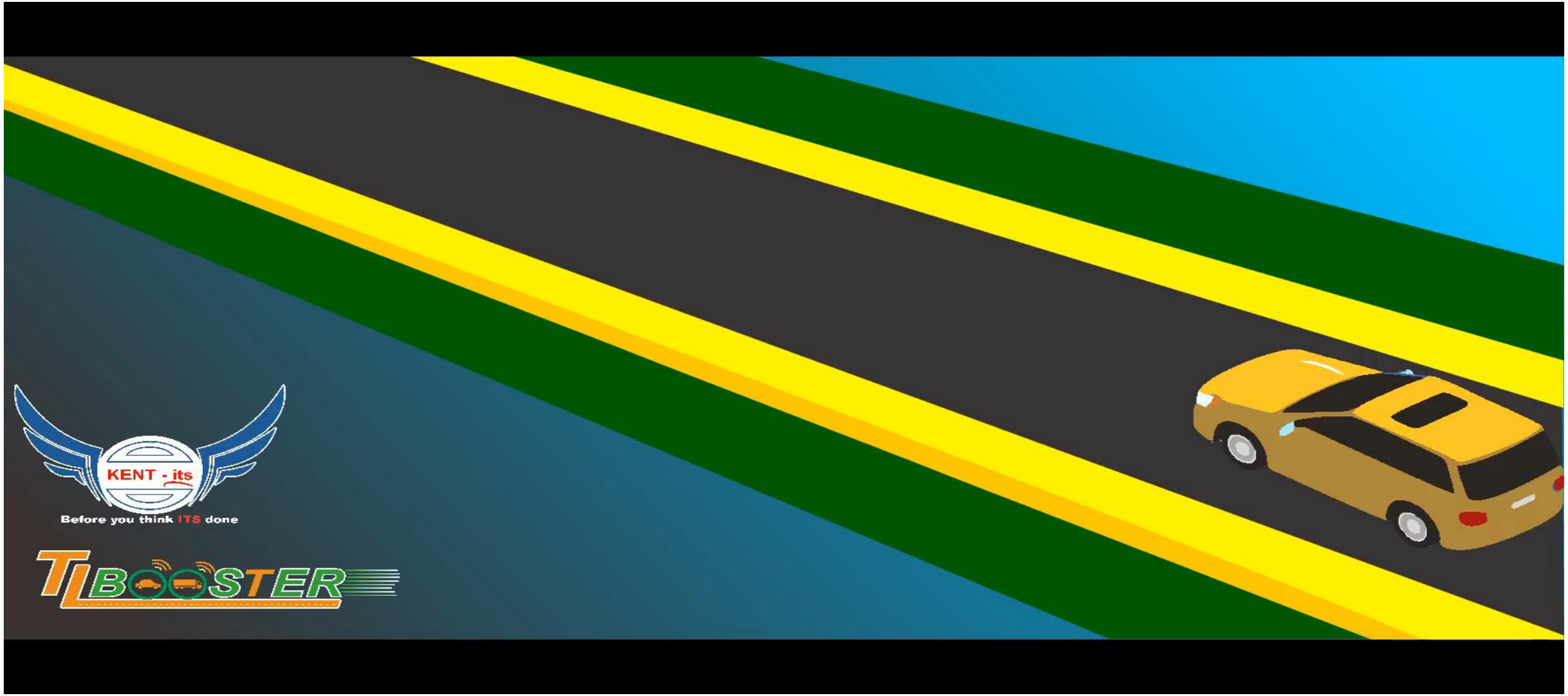
- **Risk of Incorrect Vehicle Entry:** Mitigate the possibility of the wrong vehicle entering the GNSS lane.
- **Handling Defective OBUs:** Implement early detection systems for defective OBUs to allow vehicles to move out of the GNSS lane with minimal disruption.
- **System Performance Optimization:** Ensure the adequacy of signage and markings to manage conflicts, lane-changing behavior, delays, and vehicles violating lane rules.
- **Enhanced Pavement Markings and Signage:** Introduce new pavement markings and signage to guide vehicles effectively.
- **Safety at Toll Plazas:** Conflict of fast moving and slow-moving vehicles.
- **Lane Allocation Strategy:** Decide on the number and positioning (right side or left side) of free-flow lanes to minimize conflicts and improve traffic flow.

Flow of Vehicles through the GNSS Hybrid lanes at the toll plaza

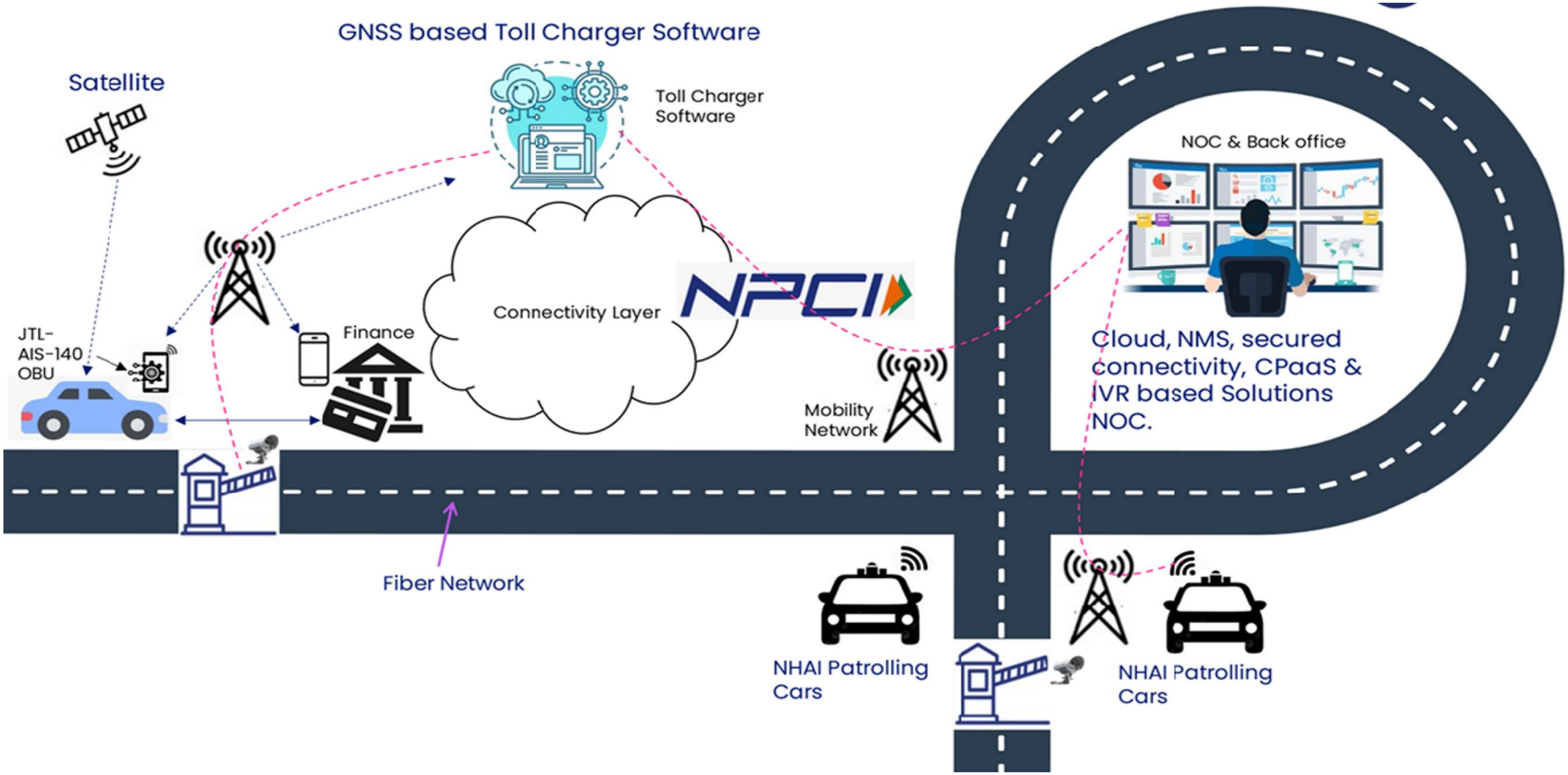
- Vehicle with AIS 140 VLT device approaches the dedicated GNSS lane.
- Barrier in the GNSS lane is set to the default open position.
- RFID reader detects FASTag, sends validation request to Toll Charger.
- Lane software sends a separate validation request for FASTag as per ICD 2.5.
- ANPR camera detects and performs OCR on the registration number plate.
- System verifies Red/Green status with Toll Charger with ANPR output.
- If both validations are positive, the vehicle is allowed to pass without barrier operation or further action.



Non-Stop



Role of Telecon Network in GNSS Tolling



WAY Forward

- Proper layout of GNSS to avoid conflicts at toll plazas.
- Segregation of fast-moving GNSS traffic and slow-moving non-GNSS vehicles at toll plazas.
- Identification of high-performance lane equipment for GNSS lanes, including their specifications and testing protocols.
- Ensuring proper cellular and high-speed network coverage on the highway.
- Advanced communication protocol between GNSS lanes – Cellular Vehicle To Everything (CV2X).

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NHAI

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Thank You