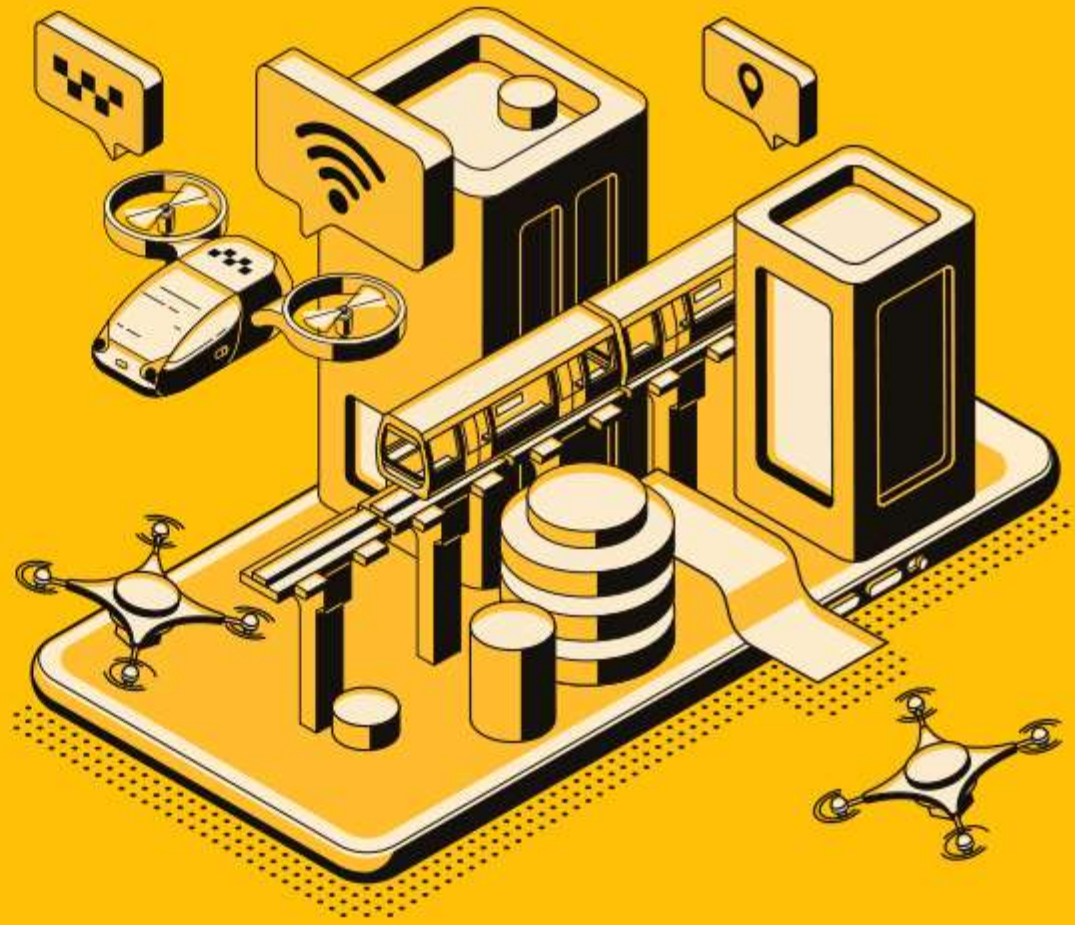
ITS Asia-Pacific Leaders Forum
Intelligent Transportation System Asia- Pacific, 28-30 May 2024
JCC, Jakarta, Indonesia

Current Development and Implementation of Intelligent Transport System in Indonesia



Dr. Ir. Resdiansyah., ST., MT., IPM

CMILT, MIITS, MTSSM, MEASTS, MIEM,MITS

Vice President ITS Indonesia – International Relationship
Chief Urban Mobility – Nusantara Capital Authority, Indonesia
Senior Researcher, Center for Urban Studies, Universitas Pembangunan Jaya
Adjunct Professor, University of East London and University Malaysia Sarawak
Founder S-MUS (Smart Mobility, Smart Urban and Smart Society)

28 May 2024

ITS Indonesia Profile

ITS Indonesia is a member of ITS Asia Pacific Forum and ITS World Community, a non- profit organization set up jointly between industry, academia, government agencies and communities in order to encourage development initiatives and the use of intelligent transport systems in order provide safe and convenient transportation ecosystem.

Vision of ITS Indonesia 2020-2023

ITS Indonesia as a platform for the development of smart mobility and the development of a digital transportation ecosystem, which supports economic growth and recovery, equitable mobility, and environmental sustainability.

- Digital Transformation for Transport Development
- *Integrated Urban Transport System*
- *Electric Transport*
- *Smart Driving & Logistics*
- *Safety & Healthy Mobility*

Action Plan ITS Indonesia

ITS Indonesia Benchmarking Framework

ITS Benchmarking Framework

Leading companies with **leading practices**

Global

Indonesia

*The 12 categories are not strict and limiting, and are subject to future updates

Grand Design ITS Indonesia

Implementation Roadmap ITS 2020-2030 – Phase 1

2021

Strengthen Existing ITS

ITS Focus

S-ITS 011, S-ITS 012, S-ITS 013, S-ITS 014, S-ITS 021, S-ITS 022, S-ITS 023, S-ITS 041, S-ITS 042, S-ITS 043, S-ITS 051, S-ITS 052, S-ITS 053, S-ITS 061, S-ITS 062, S-ITS 091, S-ITS 092, S-ITS 093

2022

Development Integration of ITS

ITS Focus

S-ITS 017, S-ITS 023, S-ITS 024, S-ITS 033, S-ITS 034, S-ITS 035, S-ITS 036, S-ITS 037, S-ITS 042, S-ITS 043, S-ITS 051, S-ITS 052, S-ITS 053, S-ITS 054, S-ITS 055, S-ITS 063, S-ITS 091, S-ITS 092, S-ITS 093

2023

Development of ITS Infrastructure

ITS Focus

S-ITS 013, S-ITS 015, S-ITS 016, S-ITS 024, S-ITS 025, S-ITS 026, S-ITS 027, S-ITS 034, S-ITS 035, S-ITS 036, S-ITS 037, S-ITS 044, S-ITS 045, S-ITS 054, S-ITS 055, S-ITS 091, S-ITS 092, S-ITS 093, S-ITS 094

2024

Improvement of ITS Technology

ITS Focus

S-ITS 013, S-ITS 015, S-ITS 016, S-ITS 024, S-ITS 025, S-ITS 026, S-ITS 027, S-ITS 044, S-ITS 045, S-ITS 046, S-ITS 047, S-ITS 064, S-ITS 094, S-ITS 0101, S-ITS 0101, S-ITS 0102

2025

Knitting of ITS Connectivity

ITS Focus

S-ITS 013, S-ITS 015, S-ITS 016, S-ITS 031, S-ITS 032, S-ITS 046, S-ITS 047, S-ITS 056, S-ITS 064, S-ITS 071, S-ITS 072, S-ITS 094, S-ITS 0101, S-ITS 0102, S-ITS 0103, S-ITS 0111,S-ITS 0112, S-ITS 0113

Grand Design ITS Indonesia

Implementation Roadmap ITS 2020-2030 – Phase 2

Alignment of ITS

ITS Focus

S-ITS 031, S-ITS 032, S-ITS 056, S-ITS 071, S-ITS 072, S-ITS 073, S-ITS 081, S-ITS 082, S-ITS 083, S-ITS 0102, S-ITS 0103, S-ITS 0104, S-ITS 0111,S-ITS 0112, S-ITS 0113

2026

Fostering Innovation in ITS

ITS Focus

S-ITS 031, S-ITS 032, S-ITS 073, S-ITS 074, S-ITS 081, S-ITS 082, S-ITS 083, S-ITS 0103, S-ITS 0104, S-ITS 0114

2027

Core Future ITS

ITS Focus

S-ITS 074, S-ITS 083, S-ITS 084, S-ITS 0104, S-ITS 0105, S-ITS 0106, S-ITS 0107, S-ITS 0114, S-ITS 0115

2028

Toward Autonomous

ITS Focus

S-ITS 084, S-ITS 0105, S-ITS 0106, S-ITS 0107, S-ITS 0113, S-ITS 0114, S-ITS 0115, S-ITS 0116

2029

Full Implementation of Autonomous

ITS Focus

S-ITS 084, S-ITS 0105, S-ITS 0106, S-ITS 0107, S-ITS 0111,S-ITS 0112, S-ITS 0113, S-ITS 0114, S-ITS 0115, S-ITS 0116

2030

ITS Indonesia Pilot Project

Intelligent Transport Tourism System

ITTS - Intelligent Transport Tourism System

PILOT PROJECT :**Option and Plan**

Implementation Option

IDEAL

ITTS Platform Development by ITS

REALISTIC

- Scale-up from JakLingko current Platform
- Integration with Gmaps

Data aggregation & analytical development

- Building the foundation of technology infrastructure
- Cross-carrier data integration

2021

2022

2023

ITTS POC Development

- Analytical database creation
- ITTS platform development
- Further development of technology infrastructure

ITTS POC Deployment

- Implementation of the ITTS platform in tourism areas
- ITTS platform socialization

ITTS - Intelligent Transport Tourism System

PILOT PROJECT :**ITTS Planner** – Tourist Mobility Planning Platform

Pre-departure

Mobility Path Planning Apps

Choice of transportation mode & cost estimation

Foreign and domestic health statements

Purchase multimodal tickets online

Updated travel regulation information

In destination

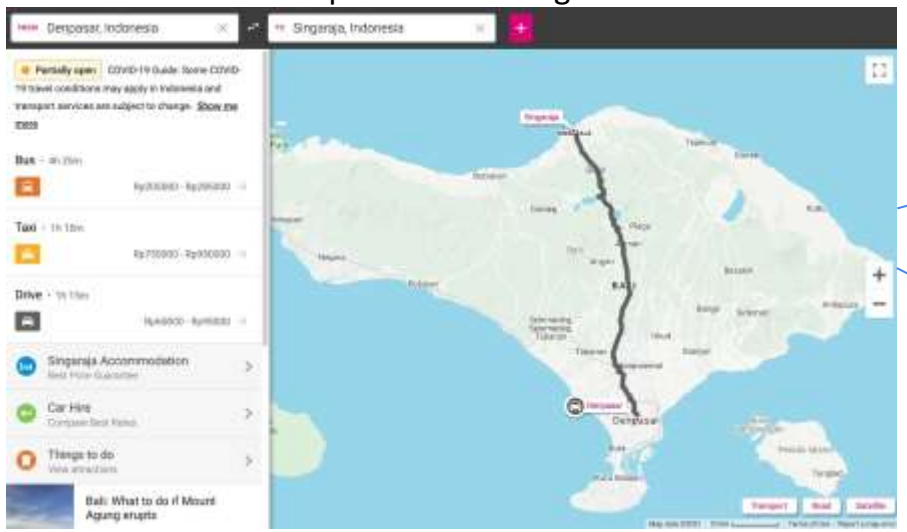
Self-Check in Points to redeem purchases or make purchases of transportation modes within the city and/or tourist attractions.

In city usage

Application with GPS on - tourist mobility within the city

Data Aggregation ITS & Platform Database

Independent national and local transport operators, transport aggregators, accommodation and tourism venues. Technology partners, payments and telcos.



Ngurah Rai Airport

Gilimanuk

rental /taxi

bus/shuttle

Motorbike rental

Destination

Direct implications for tourism: increasing consumer confidence, integrated local economy movement & equity, real-time insight on tourism mobility

Timeline: 2023-2024

ITS Indonesia Pilot Project

Electronic Traffic Law Enforcement

Electronic Traffic Law Enforcement (ETLE)

ETLE INDONESIA

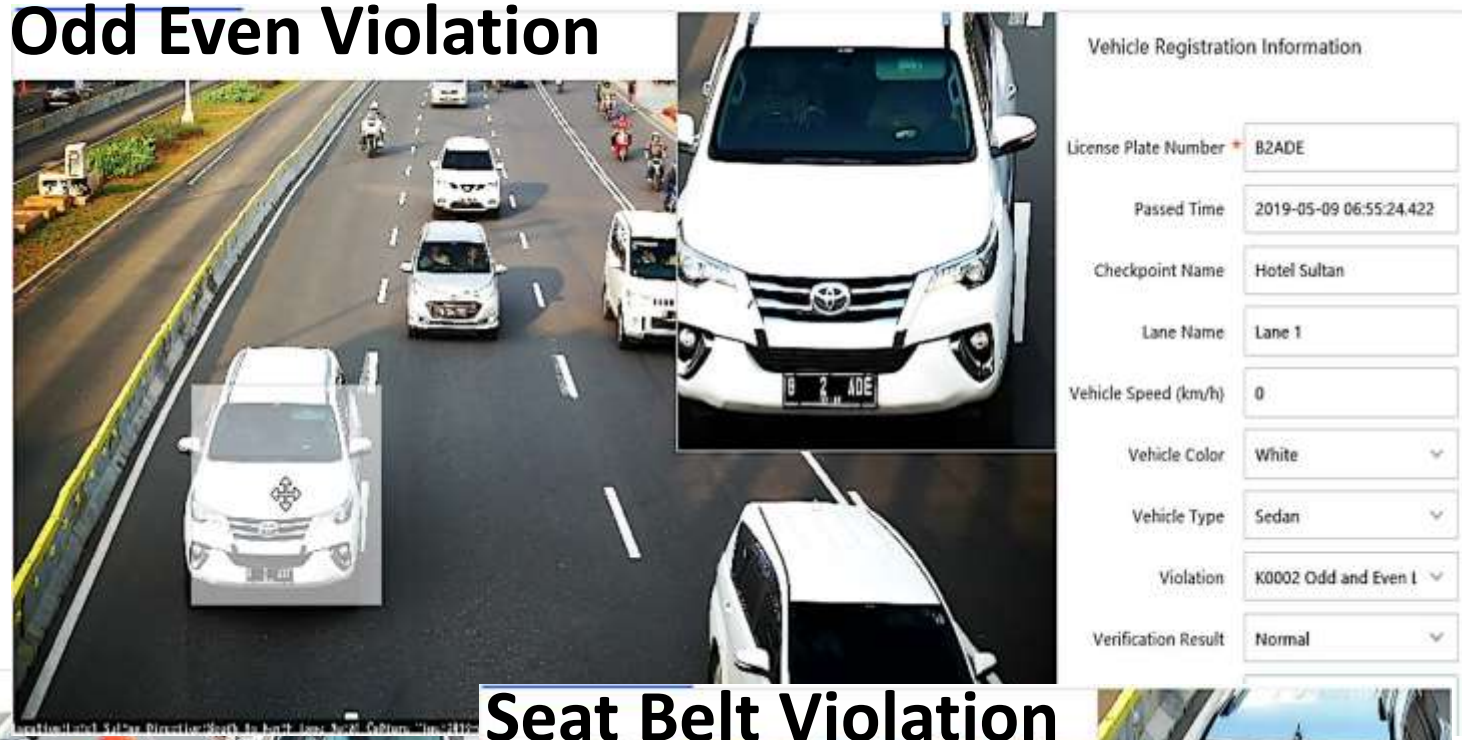
VIPS Connection License - Including 14 Analytics Life Time Licenses

1. ***Detecting Odd and Even Vioalation*** / Pelanggaran Ganjil – Genap
2. ***Detecting Seat Belt Violation by Drivers*** / Pelanggaran Tidak Menggunakan Sabuk Pengaman
3. ***Detecting Over Speed Violation by Drivers*** / Pelanggaran Melampui Batas Kecepatan
4. ***Detecting Cell Phone Violation by Drivers*** / Pelanggaran Penggunaan HP Saat Mengemudi
5. ***Detecting Violations by Motorcycle*** / Pelanggaran Tidak Menggunakan Helm dan Melawan Arus untuk sepeda motor
6. ***Capable to detect multiple vehicles in infraction at the same time*** / Mampu mendeteksi pelanggaran lebih dari satu kendaraan pada saat yang bersamaan
7. ***Illegal lane crossing detection*** / Kemampuan Deteksi Pelanggaran Garis Batas Lampu Merah
8. ***Capable to detect multiple types of offence for a single vehicle*** / Mampu mendeteksi beberapa jenis pelanggaran bagi kendaraan tunggal
9. ***Classification between trucks and light vehicles*** / Klasifikasi antara truk dan kendaraan pribadi
10. ***Capability to set speed limit for trucks and light vehicles independently*** / Kemampuan deteksi batas kecepatan
11. ***Capability to set speed limit for each lane independently*** / Kemampuan untuk deteksi batas kecepatan yang ditetapkan untuk setiap lajur
12. ***Capability to track vehicles in both direction (approaching and receding) at the same time*** / Kemampuan untuk melacak kendaraan di kedua arah pada saat yang bersamaan
13. ***Capability to detect Forbidden U-Turn*** / Kemampuan untuk mendeteksi pelanggaran putar balik
14. ***Capability to detect vehicles stopped on a yellow box (middle of the road intersection)*** / Kemampuan untuk mendeteksi kendaraan berhenti pada marka kuning

ELECTRONIC LAW TRAFFIC ENFORCEMENT (E-TLE)

- **E-TLE using Closed Circuit Television (CCTV) that operating for 24 hours**
- **Would be operated in 34 province especially cities, trial period in Jakarta is already over in 2018 and already operated since 2019 in several national road in Jakarta**

Odd Even Violation



Seat Belt Violation

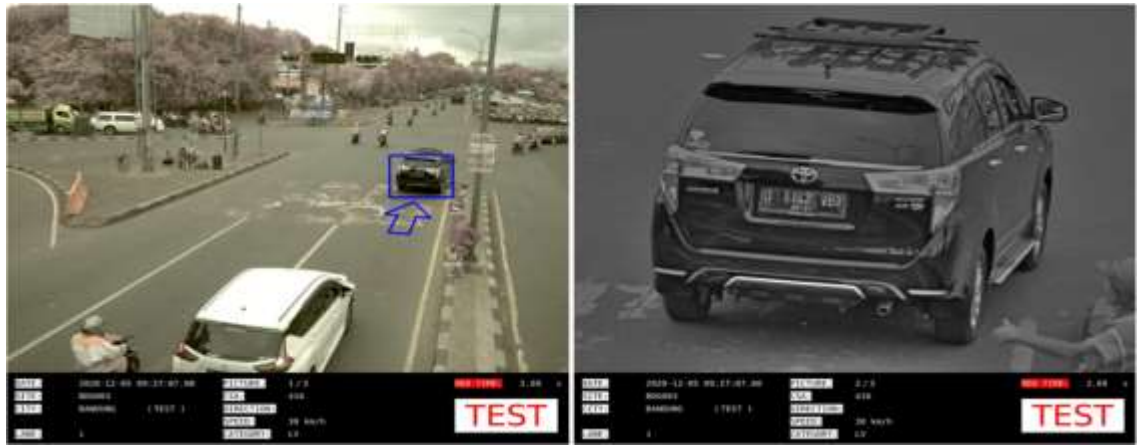
Using cellphone while driving

Capture Violations: Speed & Red Light

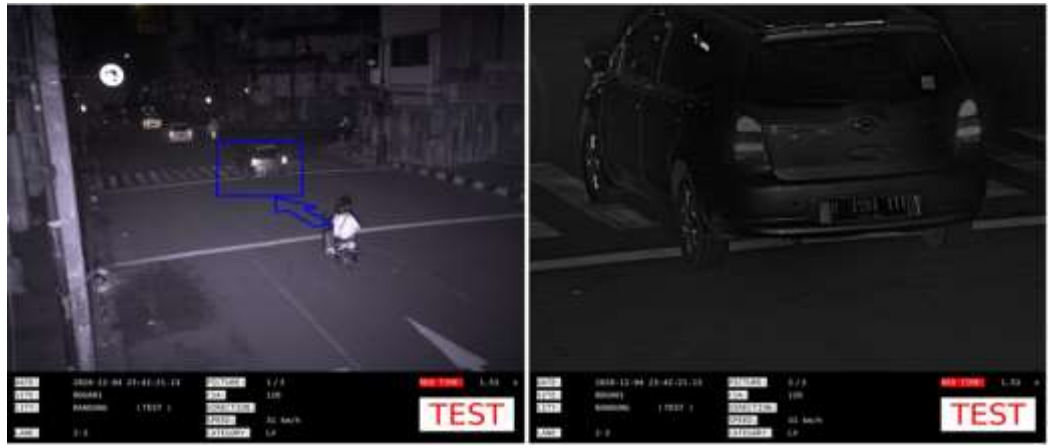
Overspeed Daytime

Overspeed Night time

Red Light Daytime



Red Light Night time



Capture Violations: Seatbelt, Phone & Helmet

Unfastened Seatbelt Day time

Phone Using While Driving Day time

No Helmet Detection Day time

Unfastened Seatbelt Night time

Phone Using While Driving Night time

No Helmet Detection Nighttime

ITS Indonesia Pilot Project

IoT Bus – Buy The Service Program

Advance Public Transportyation System

Teman Bus

DOWNLOAD SEKARANG

GET IT ON Google Play | Download on the App Store

Transportasi Ekonomis Mudah Andal dan Nyaman

IoT Bus – Buy The Service Program

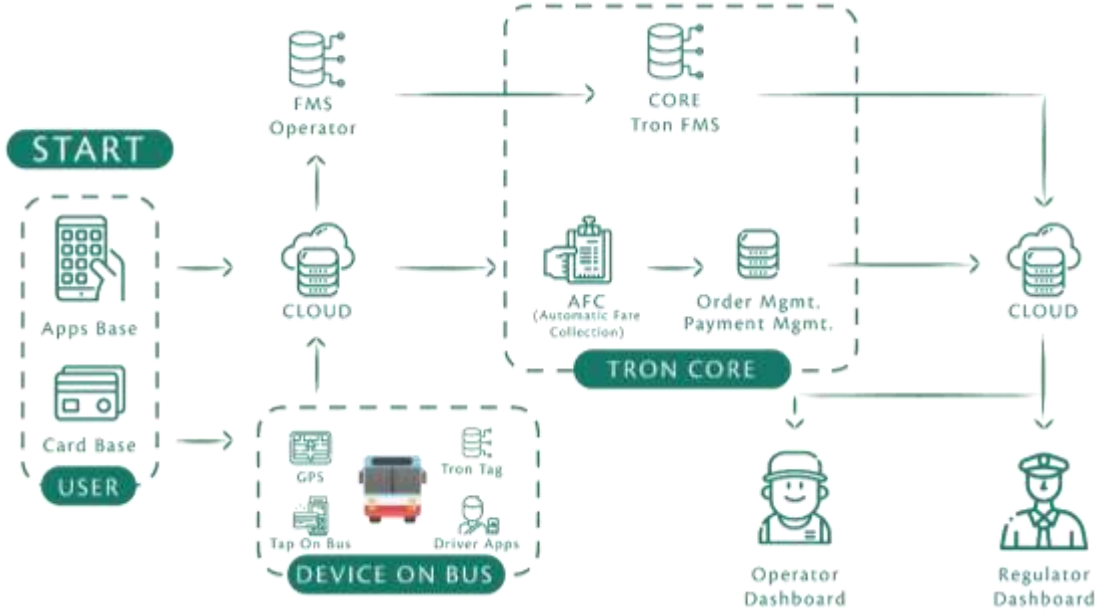
FULL SUBSIDY

10

CITIES IN

2021

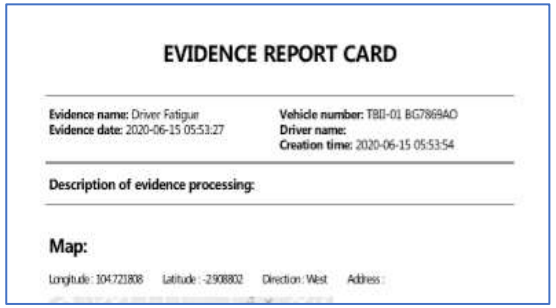
TECHNOLOGY IN BUY THE SERVICE PROGRAM



IOT (Internet Of Things) in Bus

NUMBER OF PASSENGER

CABIN MONITORING



ITS Indonesia Pilot Project

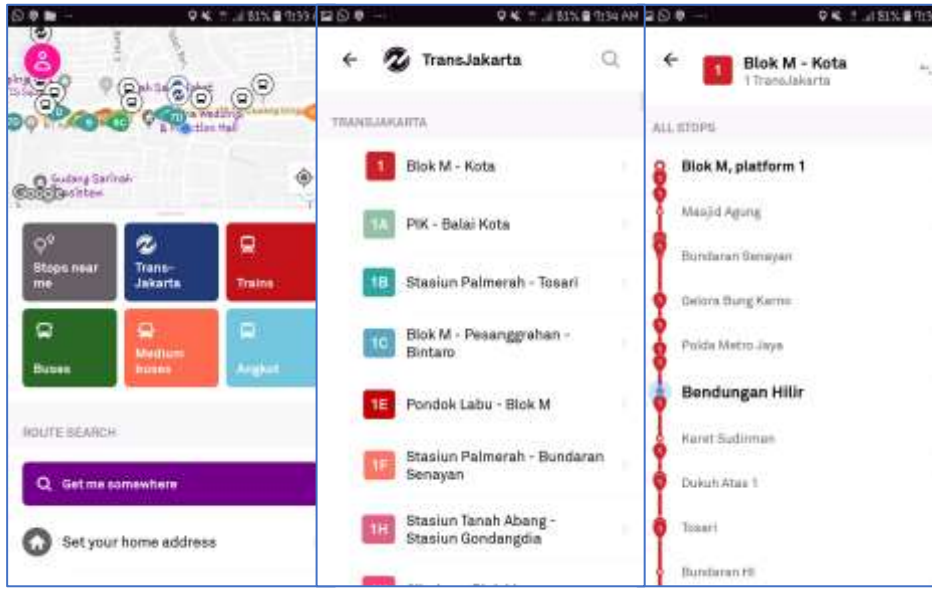
Traveler Information System

TRAVELER INFORMATION SYSTEM

Traveler information system improvement as a part of public transport service already applied.

There are some infrastructures such as:

- ❖GPS Tracker
- ❖ VMS on bus stops
- ❖ Travel application on smartphone
- ❖ Real time fleet information at Bus Stop (halte) and station



ITS Indonesia Pilot Project

Electronic Payment System

ELECTRONIC PAYMENT SYSTEM

Now with JakLingko system passenger only pay 5k IDR for a 3 hours trip throughout Jakarta. JakLingko can be used in all integrated public transportation modes (KRL, MRT, LRT, BRT, Angkot)

Implementation Phase of Integrating Digital Payment

Tahapan Fase Implementasi Sistem Integrasi JakLingko

Central Clearing House System dan Mobile App (Phase 1, pada Agustus 2021)

Central Clearing House System (CCHS) masing-masing operator transportasi menjadi terhubung dalam satu platform pengelolaan pembayaran tiket terpadu. **Mobile App** untuk merencanakan, memesan, dan membayar layanan Transportasi Umum.

Mobility as a Services (Phase 2, Mar 2022)

Mobility-as-a-Service (MaaS) adalah jenis layanan yang melalui saluran digital bersama memungkinkan pengguna untuk merencanakan, memesan, dan membayar berbagai jenis layanan mobilitas secara menyeluruh.

Account Based Ticketing (Phase 3, Sept 2022)

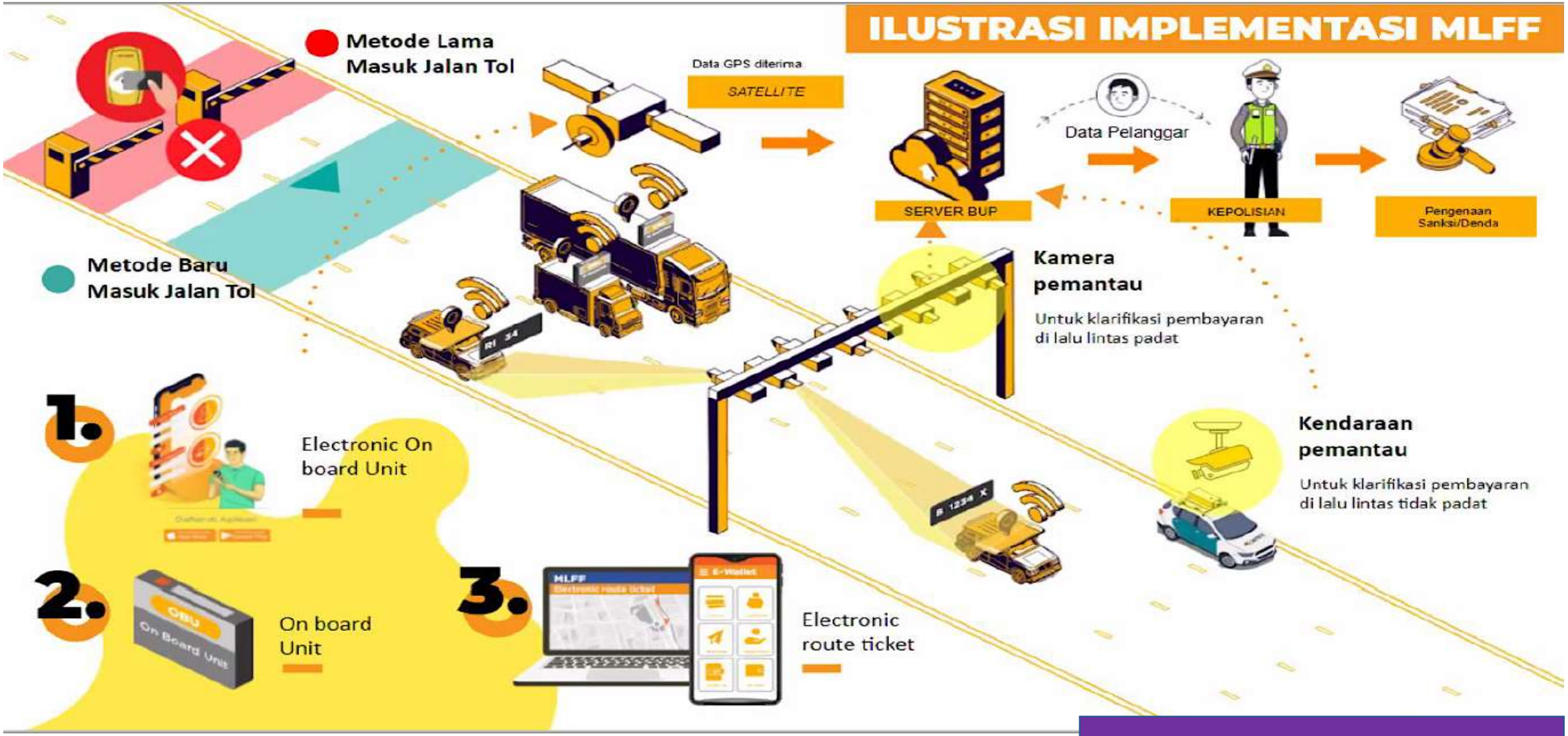
Account Based Ticketing (ABT) memungkinkan implementasi model tarif fleksibel (harian, mingguan, bulanan), variasi produk tiket khusus sesuai profil target (pelajar, manula, dsb).

Sumber: Jaklingko, 2021

ITS Indonesia Pilot Project

Multi Lane Free Flow System

GNSS Technology Implemented in MLFF (TOLL)

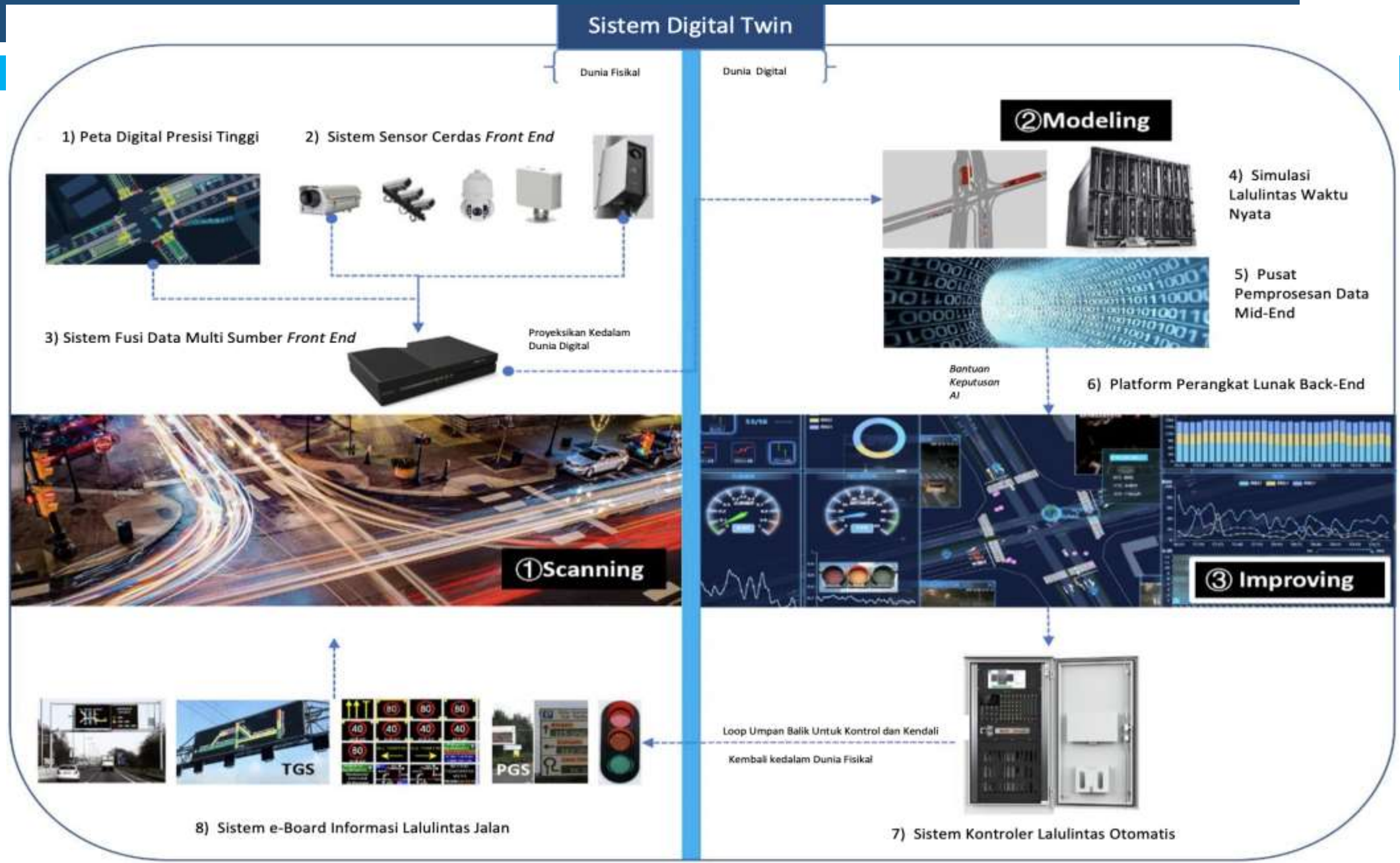


Sumber: BPJT, 19 July2021

ITS Indonesia Pilot Project

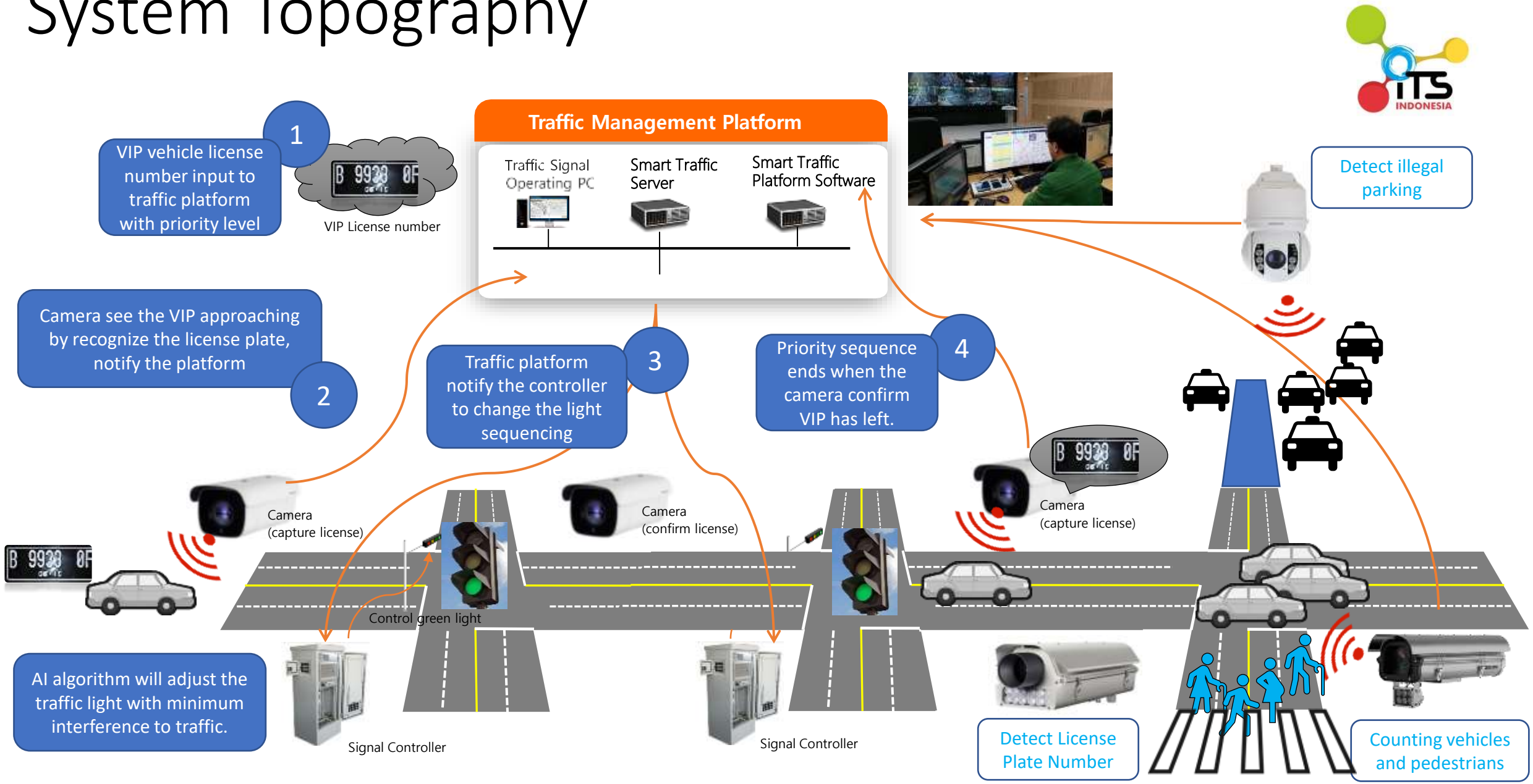
Intelligent Traffic Control System (5th gen)

Implementation of Smart Traffic Controller 5th Gen -Digital Twin (2022-2025)



Implementation of Smart Traffic Controller 4th Gen –AI Network in Medan City

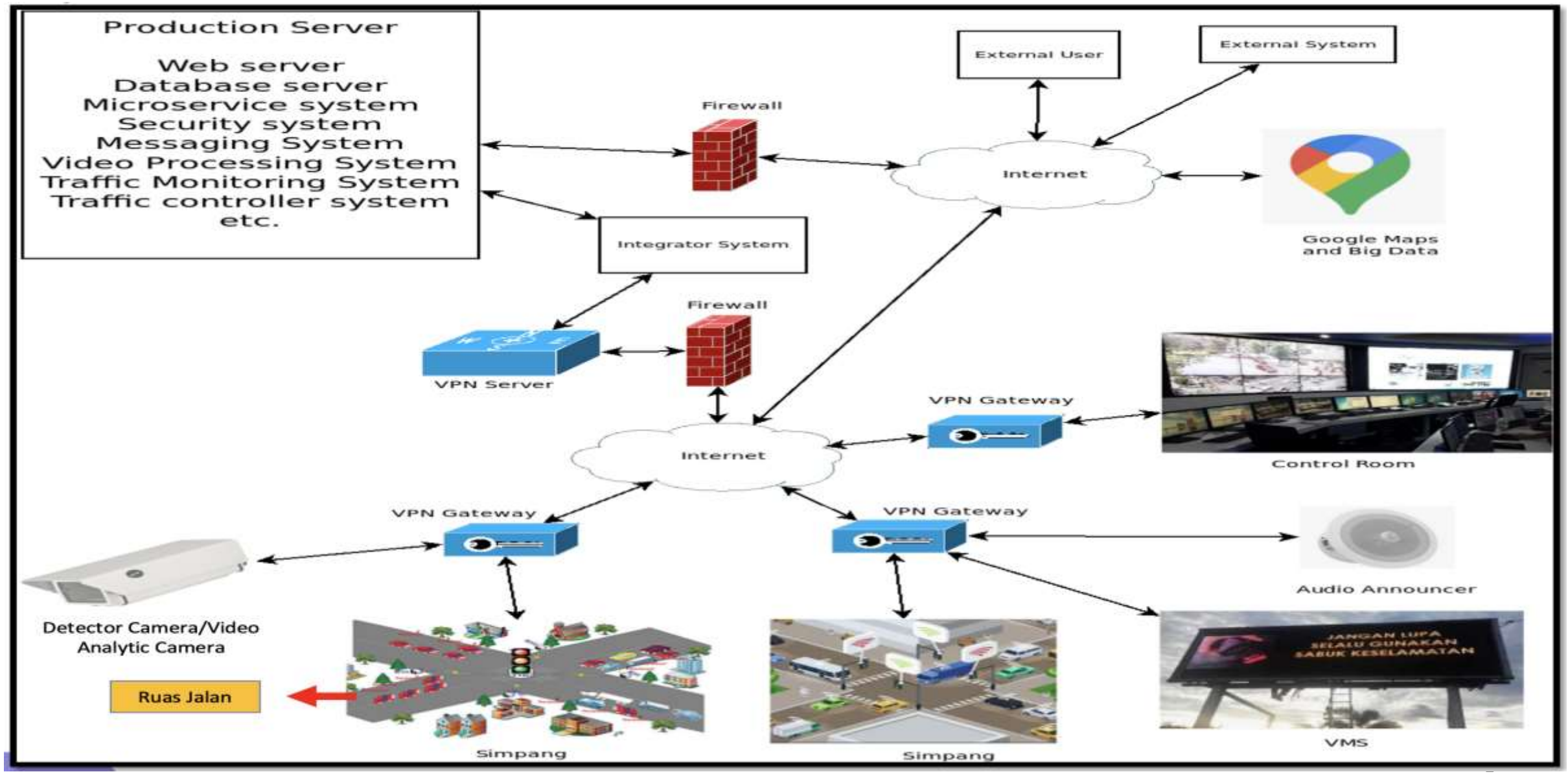
System Topography



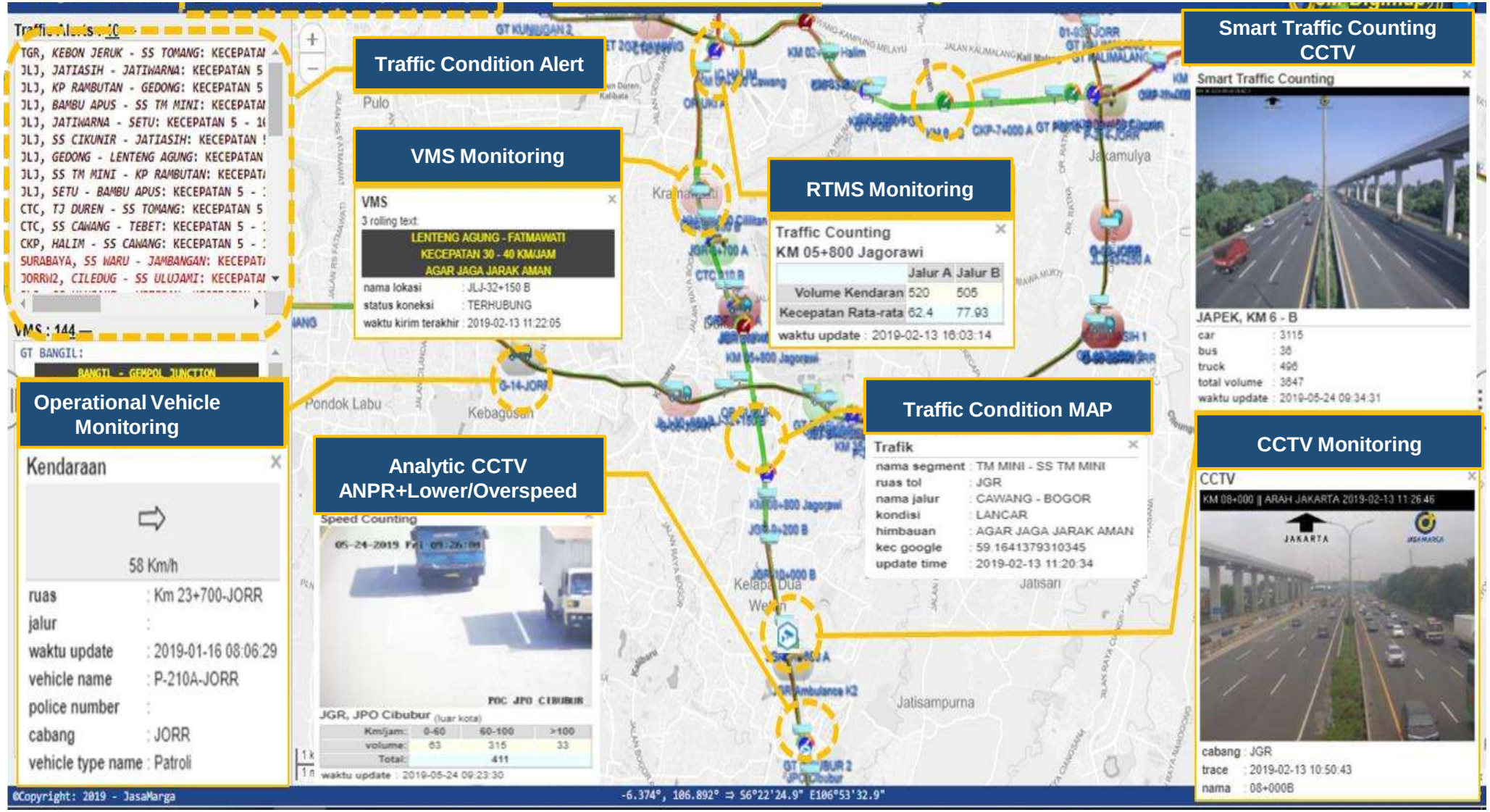
ITS Indonesia Pilot Project

Arterial transport Management System (AtMS)

Arterial – ITS (Arterial Transport Management System) – MoT



Arterial – ITS (Arterial Transport Management System) – MoT



ITS Indonesia Project in Collaboration with Nusantara Capital City of Indonesia

Transportation | Framework Policy & Strategy

Key Performance Indicator

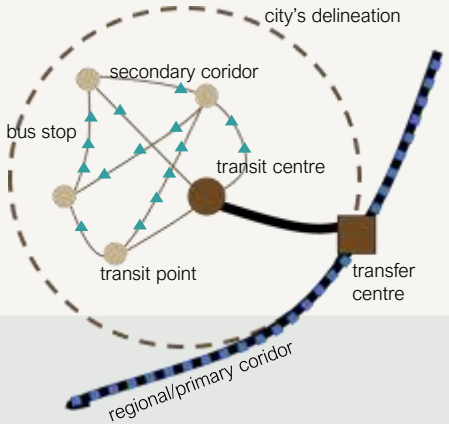
3. Connected, Active, and Easily Accesible

- 3.1 **80%** of travel with public transportation or active mobility
- 3.2 **10 minutes** travel to important facilities and public transportation nodes
- 3.3 **<50 minutes** Transit express connection from KIPP to strategic airport in 2030

4. Low Carbon Emmissions

- 4.3 ***Net zero emission*** for IKN (when operating) in 2045 in the 256K Ha area

Integrated



Optimize Network Design

Segregate function of Urban Transportation Network and Intercity Transportation Network.

Transfer centre (park n ride) as a barrier for cars from outside nusantara.

100% land developed are covered by public transporation services in 10 minutes walking and cycling.

Smart

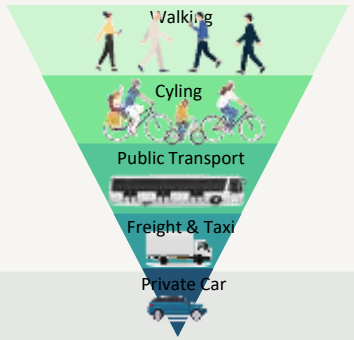
Developing Intelligent Transport System (ITS)

Develop 8 system of ITS to ensure people move and connected to public transport easily.

ITS optimize operation of public transportation.

Prioritize pedestrian, cyclist and public transport on cross section.

Green



Prioritize Active Mobility and Electric Public Transportation

Build Active Mobility Infrastructure, e.g Pedestrian-Cycling Path, walking-cycling shortcut path, and bike parking area.

Giving pedestrian and cyclist more space than private cars.

Developing Electric Bus Ecosystem.

Sources: 1. Tatanan Transportasi Perkotaan IKN (2022); 2. Rencana Induk Transportasi Darat di KIPP IKN (2022)

Transportation | Green Transportation

Secondary Arterial Road (ROW 54)

Source: Rencana Pengembangan Kawasan (RPK) West Precinct KIPP 1A: Kementerian PUPR - Otorita IKN (2022)

ROW 16 (Shared Street)

Source: Executive Summary Urban Design Development (UDD) KIPP IKN Kementerian PUPR - Otorita IKN (2022)

Pedestrian & Cyclist (Shortcut) Path on Pond

Source: Executive Summary Urban Design Development (UDD) KIPP IKN Kementerian PUPR - Otorita IKN (2022)

Green Transportation: Priority for Active Mobility

Pedestrian and Cyclist are prioritize on every road section in urban area: Secondary Arterial, Collector, Local/Shared Street.

Nusantara is designed as a 10 minutes city with shortcut ways for pedestrian & cyclist on pond, precinct, more.

CYCLING AND ELECTRIC VEHICLE

NON MOTORIZED TRANSPORT AND ELECTRIC VEHICLE

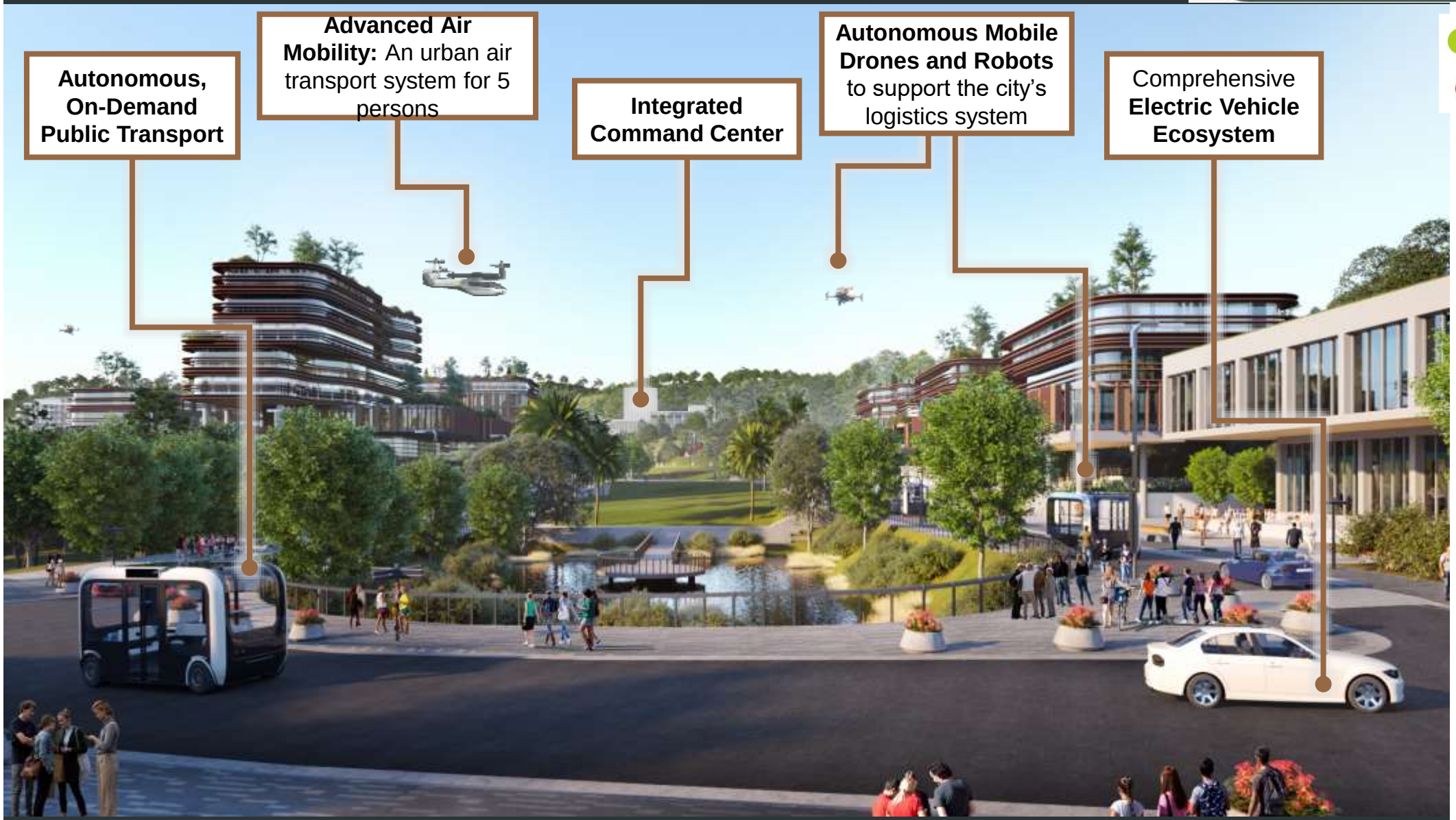
- Presidential Decree 55/2019 about The Acceleration of The Program for Battery Electric Vehicle

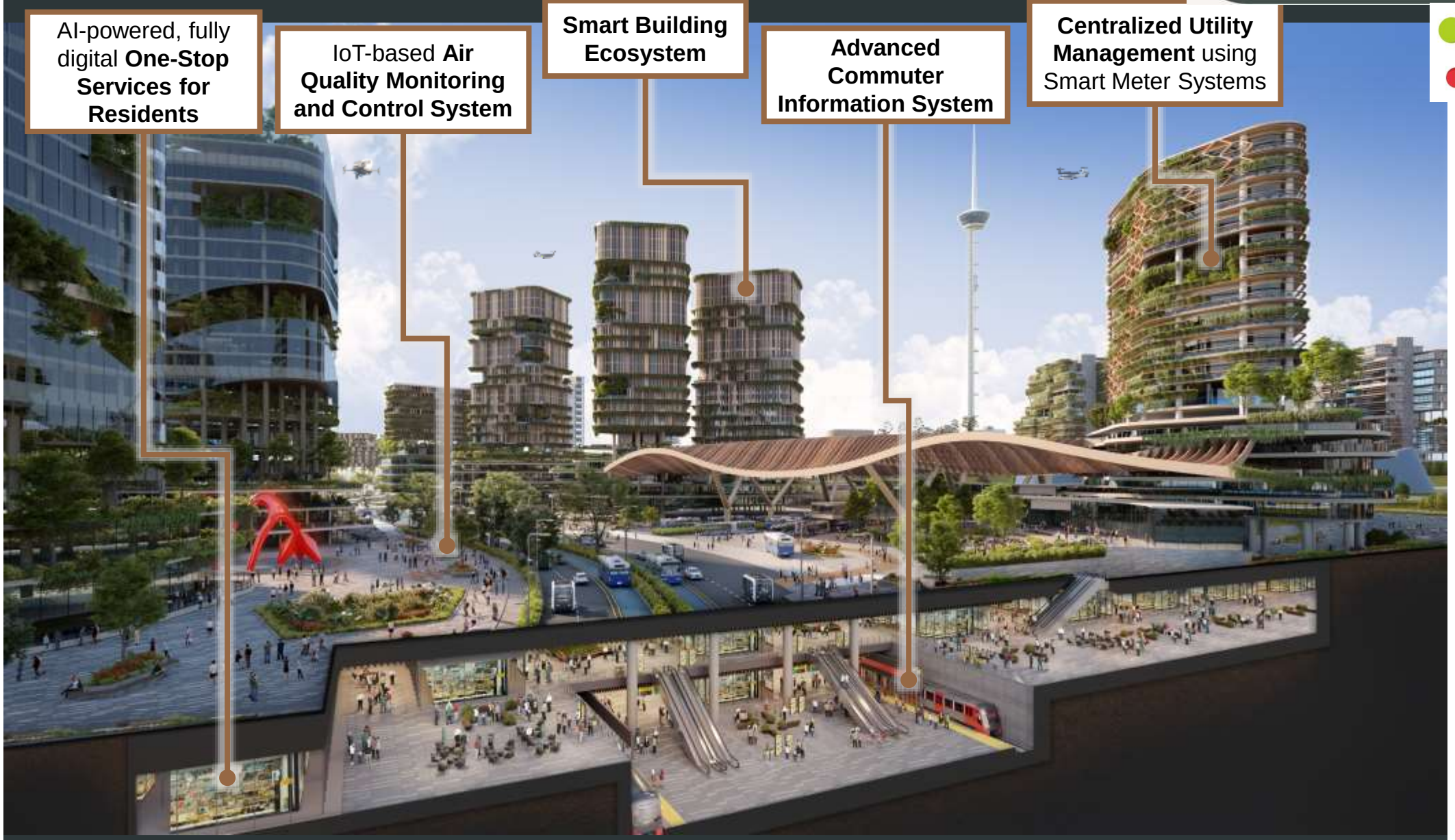
Issues and challenges in battery

electric vehicle using are :
- vehicle production
- charging facility
- control and safety system
- battery changing facility

Imagining Nusantara in 2045

NUSANTARA




AI-powered, fully digital **One-Stop Services for Residents**
IoT-based **Air Quality Monitoring and Control System**
Smart Building Ecosystem
Advanced Commuter Information System
Centralized Utility Management using Smart Meter Systems


A city fully powered by renewable energy, optimized by smart grids and meters
Smart Farming Ecosystem: Precision Farming, Urban Agriculture, Smart Agroforestry
IoT-based Water Quality Monitoring and Control System
Natural Disaster Early Warning System
Forest Management System: Fire and Climate Censors, Hotspot Monitoring, Firebreak System
Biodiversity and Carbon Stock Monitoring System

Nusantara's ITS Planning and Implementation

Incident Management System (IMS)
IMS detect all incident happened in road, e.g traffic violation and traffic accident, and then report to ITS CC[1]

Advanced Public Transport System (APTS)
APTS support fleet management system, bus position tracking (bus arrival time), and then these information could send to VMS[2] in bus shelter or Smartphone

Electronic Payment System (EPS)
EPS support for seamless mobility, which help passengers to pay public transportation fare.

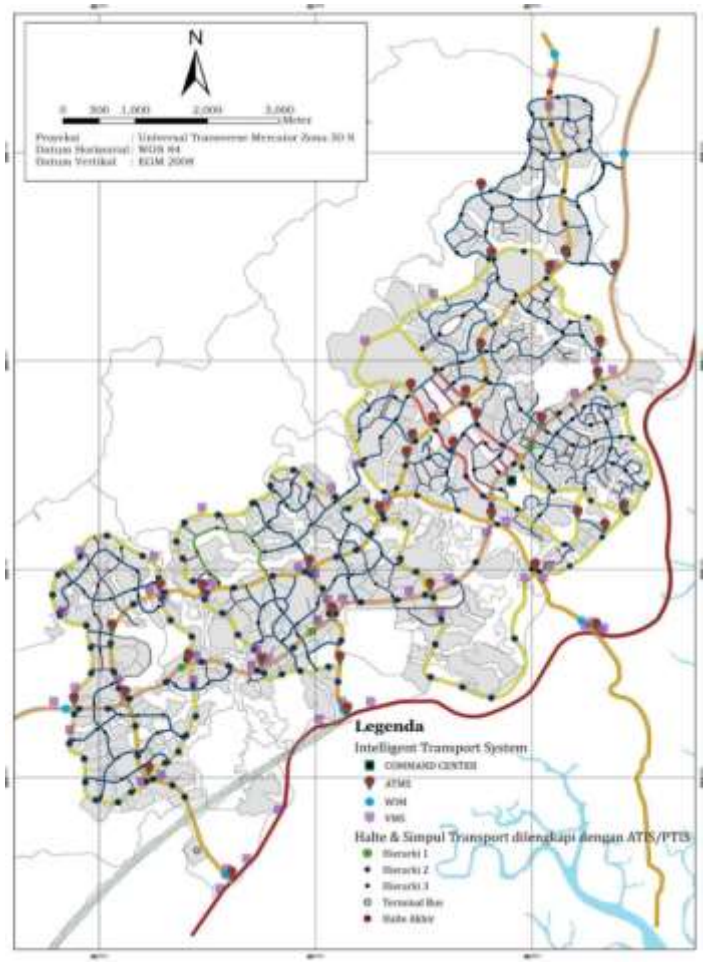
Advanced Parking Management System (APMS)
APMS will sent information how many parking area available to VMS or smartphone (ATIS)

Advanced Traffic Management System (ATMS)
IKN will develop 5th gen ITCS in 2045, which provide A.I predictive modelling with digital twin solution. ATMS will prioritize pedestrian, cyclist and public transportation over private car.

Autonomous Driving System (ADS)
ADS could optimize public transportation's operation, to specify for Paratransit Services by Metropod as first and last mile for GEDSI.

Advanced Traveller Information System (ATIS)
ATIS will collect floating car data (fcd) and floating phone data (fpd) and then sent information about: traffic density, alternative route, parking, etc.

Commercial Vehicle Operation System (CVOS)
CVOS arrange operation of commercial (freight) vehicle to avoid traffic jam in urban area.



ITS INDONESIA

Coming Soon..

- Electronic Road Pricing (ERP(in Jakarta)
- ETLE in Toll Highway
- ITS Data Center in New Capital City
- Bali Subway Tourism System
- EV Project with IoT and AI Implementation
- Intelligent Tourism Transportation System
- Autonomus Vehicle (Nusantara)
- Autonomus Rail Rapid Transit (ARRT)
- IKN Smart City
- Intelligent Traffic Control System (Gen-5)
- AVCSS (Advanced Vehicle Control and Safety System) in Public Transport
- CVOS (Comercial Vehicle Operating System) including Over dimension and over load technology detection – High Speed WIM – Dimension Scanner/Lidar in Toll/Arterial Road
- Digital Twin Technology in ITS

Transforming The Nation
Through Smarter Mobility

Provide safe and convenient transportation ecosystem

Thank You