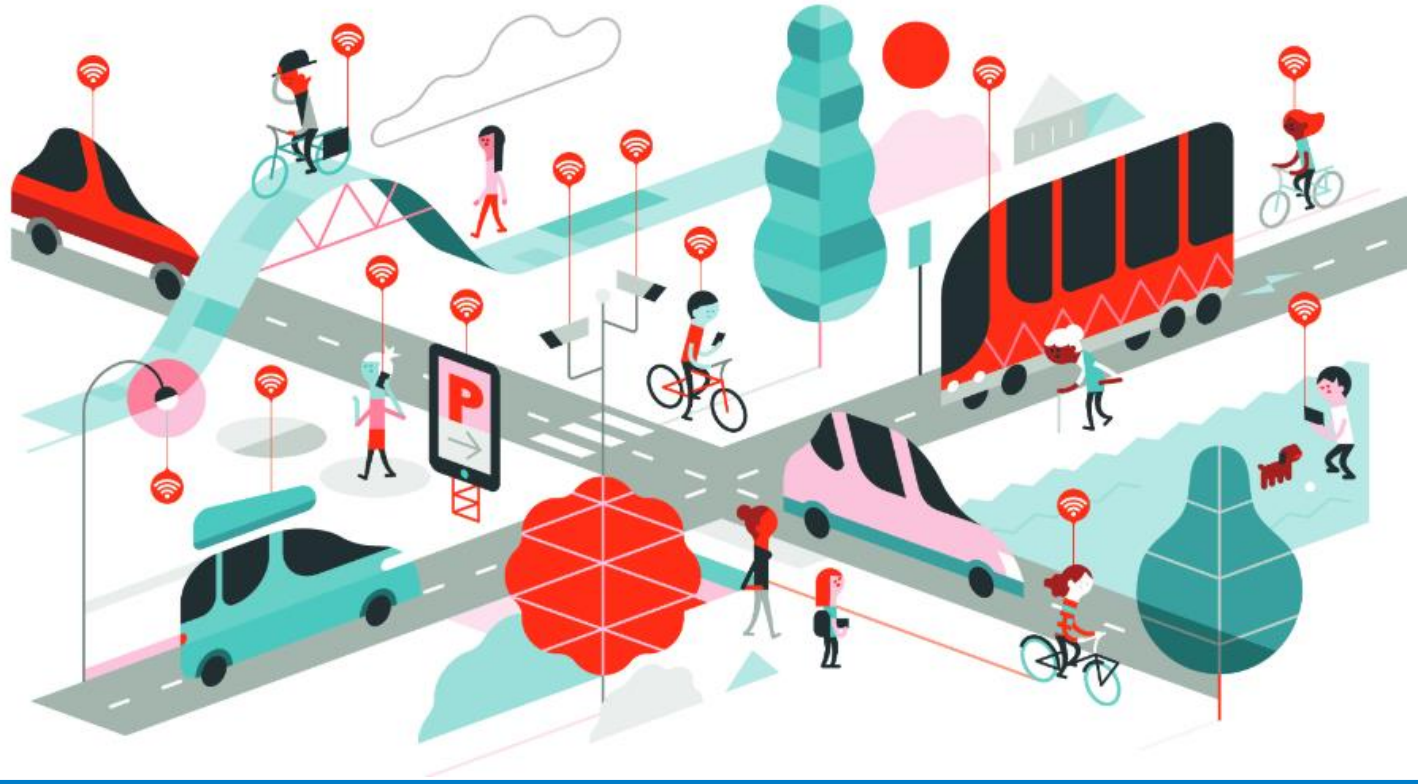


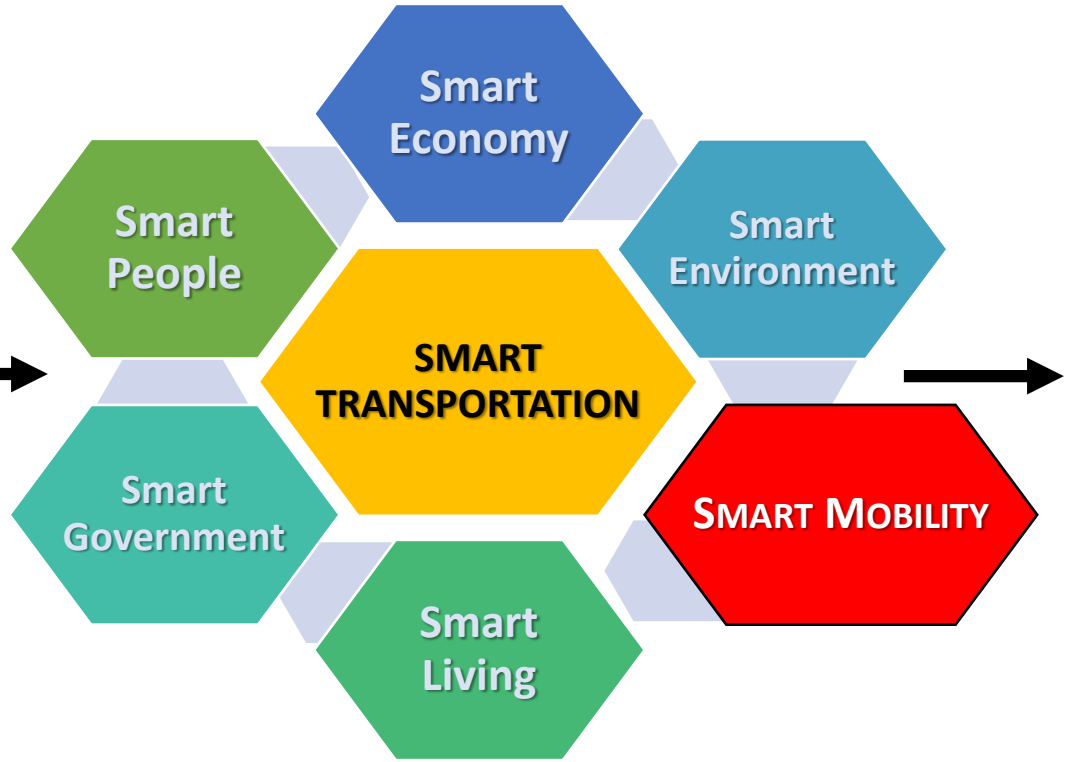
RESEARCH AND INNOVATION TO ACHIEVE INTELLIGENT, INTEGRATED, AND SUSTAINABLE TRANSPORTATION

Background and Urgency

17

SUSTAINABLE DEVELOPMENT GOALS

Background and Urgency



Sustainable Transportation Development Concept

01 | Avoid

02 | Shift

03 | Improve

Sustainable Transportation Development Concept

01 | Avoid

+ Avoid the usage private vehicle and inefficient logistics system

- Transportation system planning with **The Concept of Mixed Use**
- Development of **Transit Oriented Development (TOD)** Infrastructure

+ Benefit

Reducing travel time, improving air quality, health, safety, etc.

Source : sustainabledevelopment.un.org

Sustainable Transportation Development Concept

02 | Shift

+ To shift private vehicle user to environment friendly public transport

- Construction of Mass Public Transport for Passanger and Railway Network for Logistic Transport
- Increase the use of public transport, number of pedestrian and cyclist

+ Benefit

Reduce road congestion, distribution of activity, reduce polution and enhance safety

Source : sfmta.com

Sustainable Transportation Development Concept

03 | Improve

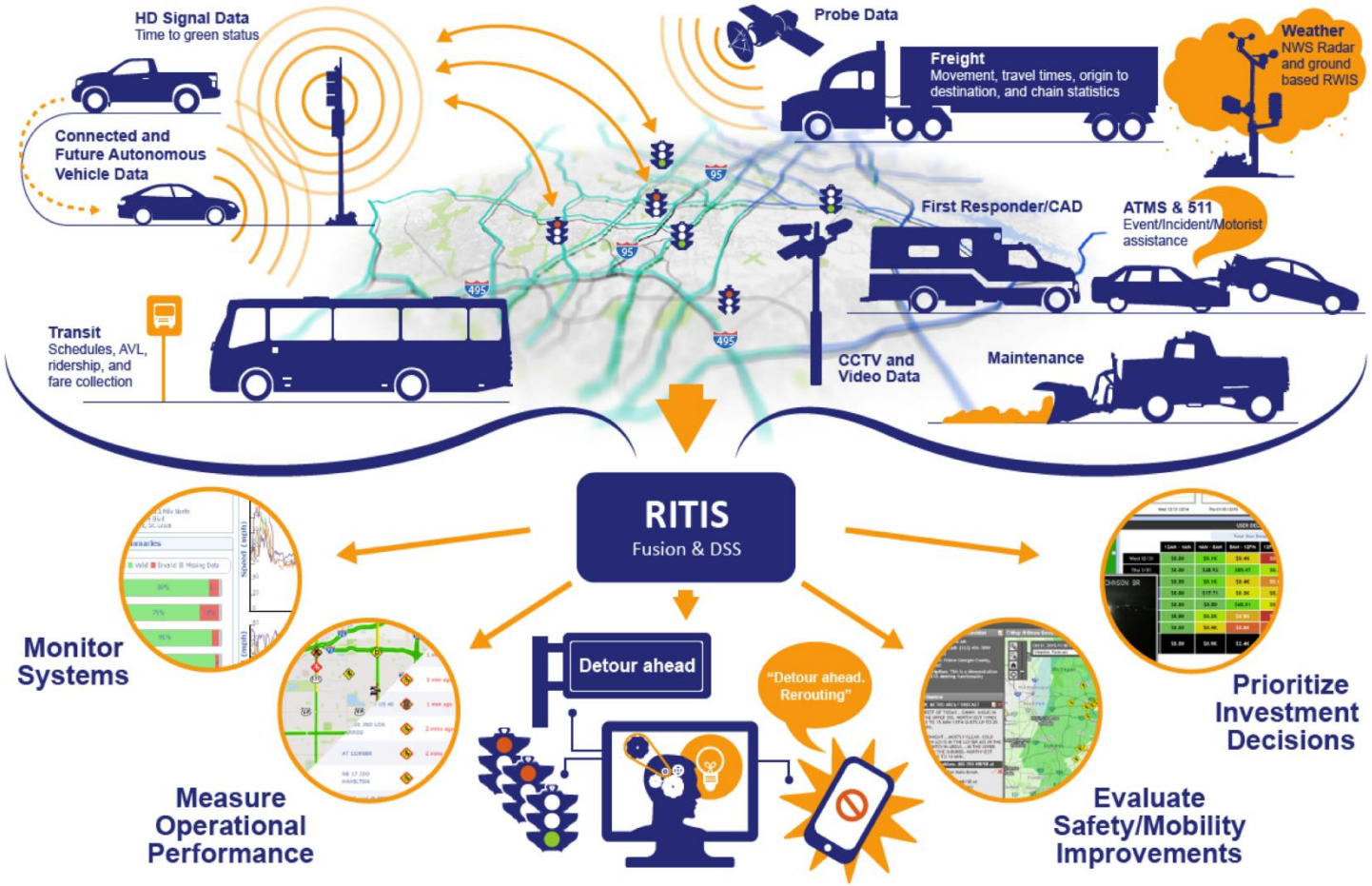
+ Increase the utilisation of ICT for Tranportation

- Technology utilisation
- Development of **Intelligent Transportation Systems** (ITS)

+ Benefit

Increase the usage of renewable energy, productivity affordability and accesibility

Example of Intelligent Transportation Systems



Source : i95coalition.org

RESEARCH AND INNOVATION ON SMART TRANSPORTATION (1)

Low Carbon Emission

Fuel Efficient Mode:
- ✓ Train
- ✓ Ship
- ✓ Airplane
- ✓ Car

Renewable Energy:
- ✓ Electric Energy
- ✓ Biofuel

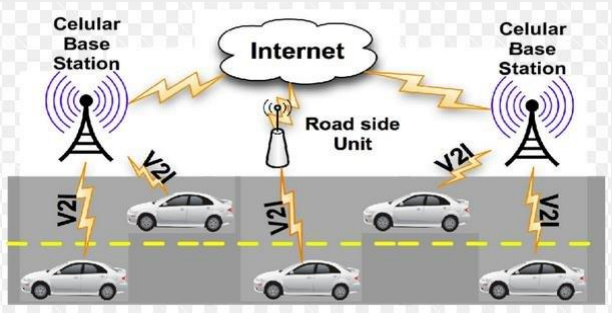
RESEARCH AND INNOVATION ON SMART TRANSPORTATION (2)

To Achieve:

- Traffic efficiency
- Enriches users with prior information about traffic
- Reduces travel time
- Enhances safety and comfort.

1. VEHICLE TO VEHICLE (V2V) COMMUNICATION

2. VEHICLE TO INFRASTRUCTURE (V2I) COMMUNICATION



3. AUTONOMOUS VEHICLE

4. ONE TICKETING SYSTEM FOR ALL PUBLIC TRANSPORTATION

5. INTEGRATED MULTIMODA SYSTEMS

6. SMART PARKING

Research and Innovation (Flagship Program 2020-2024)

Railway Transportation

TARGET :

1. High Speed Train 250 km/hr prototype,
2. 80% Local Component for Urban Train

01 20 21

TECHNOLOGY CLEARING FOR RAIL-BASED PUBLIC TRANSPORT

BPPT, INKA, KemenHub, Pemda

02 20 21 22 23 24

CARBODY & BOGIE DESIGN INNOVATION

BPPT, INKA, BARATA, KemenRistekDikti, Kemenperindustrian, ITB, LIPI

03 20 21 22 23 24

INTERIOR & EXTERIOR DESIGN INNOVATION

BPPT, INKA, KemenRistekDikti, ITB, ITS, UI

04 20 21 22 23 24

PROPULSION SYSTEM TECHNOLOGY ADOPTION

TRAIN CONTROL DESIGN

BPPT, INKA, PINDAD, INTI, LEN,ITB, UI, UGM, UNDIP

05 20 21 22 23 24

PRODUCTION SYSTEM

BPPT, INKA, UNS, ITB

06 21 22 23

RAILWAY TESTING

BPPT, INKA, ITB, Kemenhub, KAI

07 20 21 22 23 24

RAIL ROAD, BRIDGE AND TEST TRACK

BPPT, INKA, KemenHub, KemenPUPERA, Wika Beton, LIPI, ITS

08 22 23

TEST TRACK AND TESTING FACILITIES

KemenHub, KemenBUMN, BPPT, INKA, KemenRistekDikti, PNM, KAI

09 20 21 22 23 24

OPERATION FACILITY INNOVATION

BPPT, INKA, KemenHub, KemenKominfo, LEN, INTI, LIPI

10 20 21 22 23 24

TECHNOLOGY AUDIT, STANDARISATION & RAMS

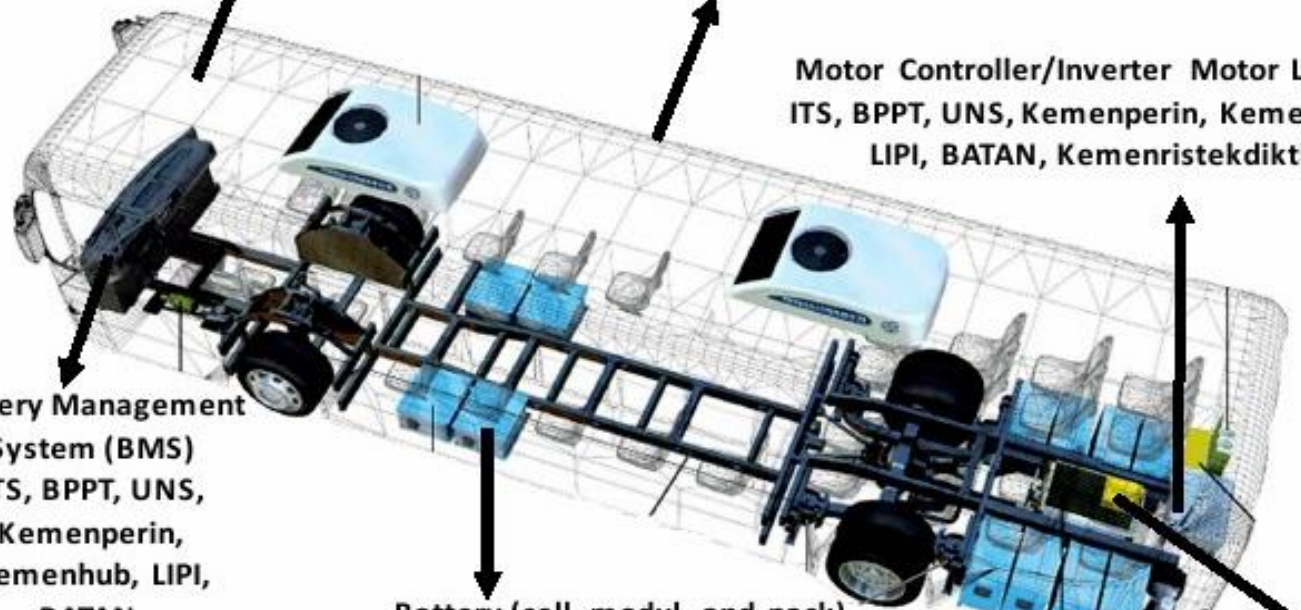
BPPT, UI, BSN, Kemenhub

Electric Vehicle

Body Exterior dan Interior
ITS, BPPT, UNS, Kemenperin, Kemenhub, LIPI, BATAN, Kemenristekdikti

Platform Kendaraan
ITS, BPPT, UNS, Kemenperin, Kemenhub, LIPI, BATAN, Kemenristekdikti

Motor Controller/Inverter Motor Listrik
ITS, BPPT, UNS, Kemenperin, Kemenhub, LIPI, BATAN, Kemenristekdikti



Battery Management System (BMS)
ITS, BPPT, UNS, Kemenperin, Kemenhub, LIPI, BATAN, Kemenristekdikti

Battery (cell, modul, and pack)
ITS, BPPT, UNS, Kemenperin, Kemenhub, LIPI, BATAN, Kemenristekdikti

Thermal Managemen System
ITS, BPPT, UNS, Kemenperin, Kemenhub, LIPI, BATAN, Kemenristekdikti

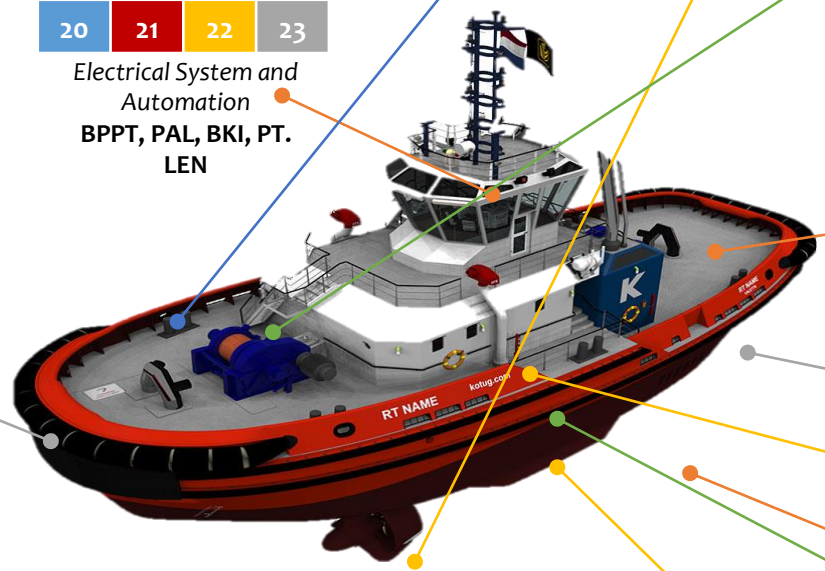
Electric bus normal charging

Electric Bus Fast Charging
Pengisi Bateral (Battery Charger)/Charging Infrastructure
ITS, BPPT, UNS, Kemenperin, Kemenhub, LIPI, BATAN, Kemenristek-dikti

Kajian Regulasi, Tekno-Ekonomi, dan Sosial Budaya
ITS, BPPT, UNS, Kemenperin, Kemenhub, LIPI, BATAN, Kemenristekdikti

Maritime : Harbour Tug Dual Fuel Boat

Target : Tug Boat Prototype for
***Pelindo 3* Port Service**



22
Material (Marine Grade) Structural Testing
BPPT, BKI, PT. KS

20 21 22 23
Navigation and Communication System
BPPT, PT. LEN, PT. INTI

20 21 22 23
Electrical System and Automation
BPPT, PAL, BKI, PT. LEN

21 22
Hydrodynamics Testing and Analysis
BPPT, BKI

20 21 22 23
Engine and Propulsion System Design
BPPT, PAL, BKI

21 22
Traction and control system for tugboat winches
BPPT, PINDAD, BKI

20 21 22 23 24
Ship design & certification
BPPT, ITS, Kemenhub, PAL, BKI

20 21 22 23
Piping And General System
BPPT, PAL, BKI

23 24
Sea Trial and Bollard Pull Test
BPPT, PT. LEN, PT. INTI

21 22 23
Safety and Fire System
BPPT, Kemenhub, PT. BKI

21 22 23
Production Technology
BPPT, PAL

21 22
Structure Analysis and Design Construction
BPPT, ITS, BKI

21 22
Maneuvering and Stability Analysis
BPPT, BKI

Aeroplane - N219A

19 20 21 22 23 24

Aircraft Improving Performance, Reduce Weight, Stability

(LAPAN, PTDI, BPPT)

23 24

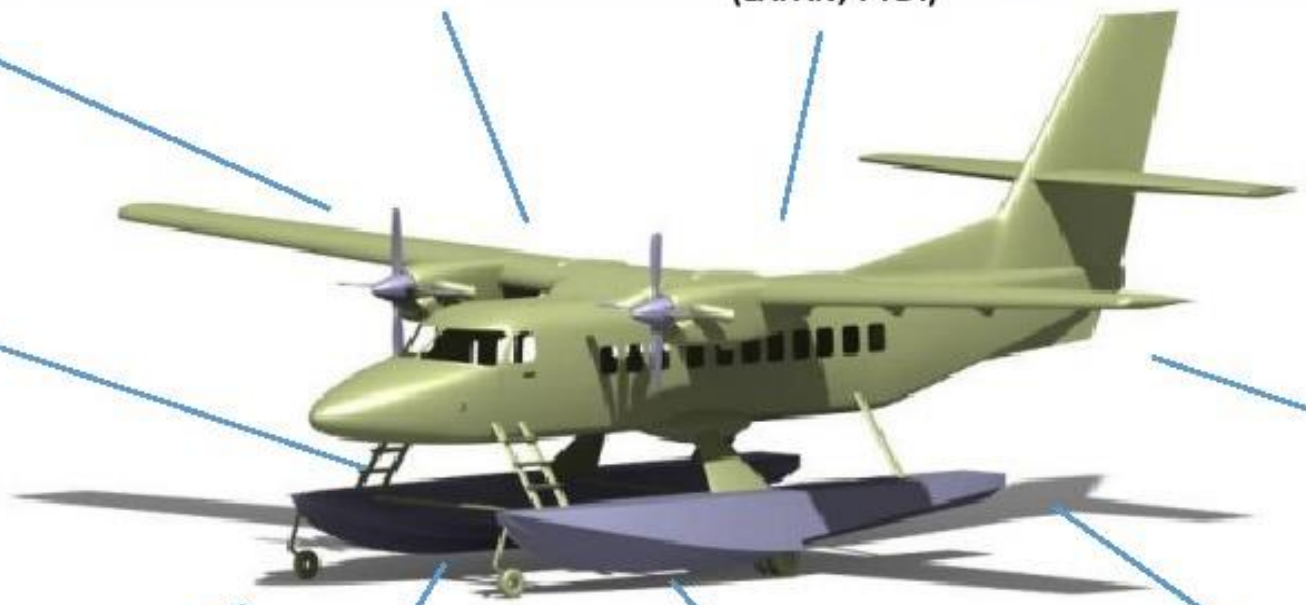
Flight Test Development

(LAPAN, PTDI, BPPT)

20 21

Flight Simulator Development

(LAPAN, PTDI)



19 20 21 22 23 24

Regulation and sertification development

KEMENHUB, BPPT, LAPAN, PTDI

20 21

Aircraft Reinforcement in Attachment

LAPAN, PTDI

19 20 21

Aerodynamics Test & Analysis

BPPT, LAPAN, PTDI

21 22 23

Aircraft structural Test & Prototyping

LAPAN, BPPT, PTDI

19 20 21

Hydrodynamics Test & Analysis

BPPT, LAPAN, PTDI

19 20 21 22 23 24

Composite and Material for Structure Float Gear

LAPAN, BPPT, PTDI

19 20 21 22 23

Seaplane Dock Development

KEMENHUB, PUPR, BPPT

Transportation Innovation Products

TECHNOLOGY CLEARING : MEDIUM SPEED TRAIN JAKARTA-SURABAYA

Main Characteristics

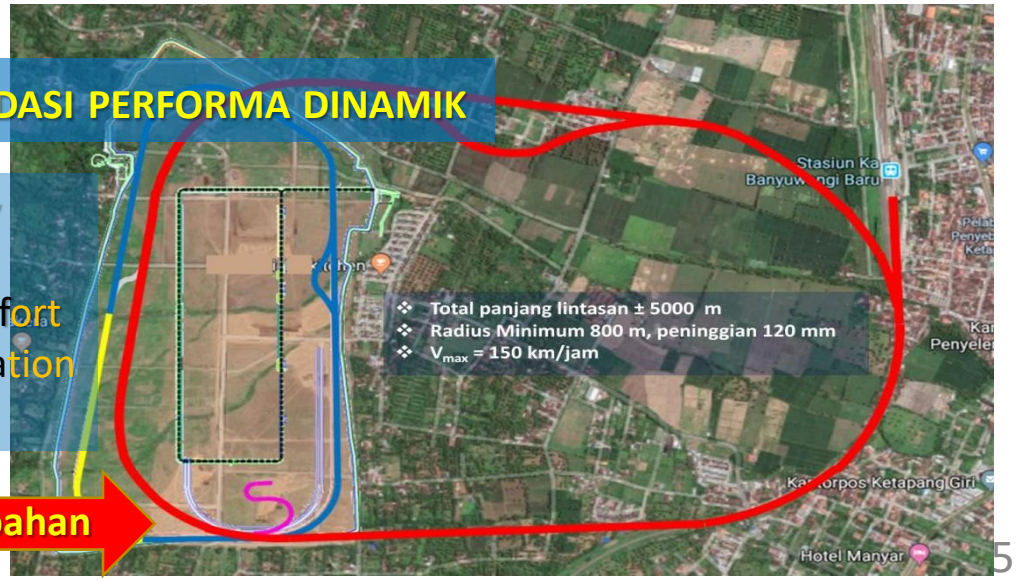
- Construction Cost 80 T
- Increase of Local Components
- Travel Time Jakarta-Surabaya 5,5 hour
- Ballastless track & without level crossing
- Signalling System ETCS level 1
- Diesel Electric Multiple Unit

Wind Tunnel Test
Mask of Car
– B2TA3 –

Soil Reinforcement for Railway
Structure at Beach
- BTIPDP -

TEST TRACK UTK VALIDASI PERFORMA DINAMIK

- Durability & Reliability
  –> loop test track
- Safety, stability & comfort
  –> small curve & elevation
- Noise level



Technology Audit for Jabodebek LRT

LRT PALEMBANG	ELECTRIC MULTIPLE UNIT	PASSENGER COACH	LOCOMOTIVE
TKDN HINGGA 42%	TKDN HINGGA 43%	TKDN HINGGA 63%	TKDN HINGGA 40%

INKA

Current

01

TKDN HINGGA 45%	TKDN HINGGA 72%	TKDN HINGGA 45%	TARGET TKDN HINGGA 40%	TARGET TKDN HINGGA 42%
DMU PHILIPPINE	FREIGHT WAGON	DEMU MINANGKABAU	MEDIUM SPEED TRAIN	LRT JABODEBEK

PRODUCT	ESTIMATED PROPORTION OF COST OF MATERIALS
Sistem Propulsi dan Traksi	27%
Carbody Materials (Aluminium)	9%
Electrical Controls	
Interior (Fabric, Floors, Walls)	
Fabricated Steel Body Component	
Fiberglass	
Air Conditioning	
Wheels, Axle and Bogie	5%
Pipe works & Ducts	3%
Seats : Passanger & Driver	3%
Sheet, structural	3%
Brakes	3%
Windows	2%

Target: 80% Local Component

Sumber :Research strategic Connection group, estimates based on the production of electric train , Australia

02 Bogie Full Scale Dynamic Test – Target 2022 –

03 Structural Test of LRT-Jabodebek Bogie – B2TKS –

04 Validation Test of LRT Jabodebek – TIRBR 2019 –

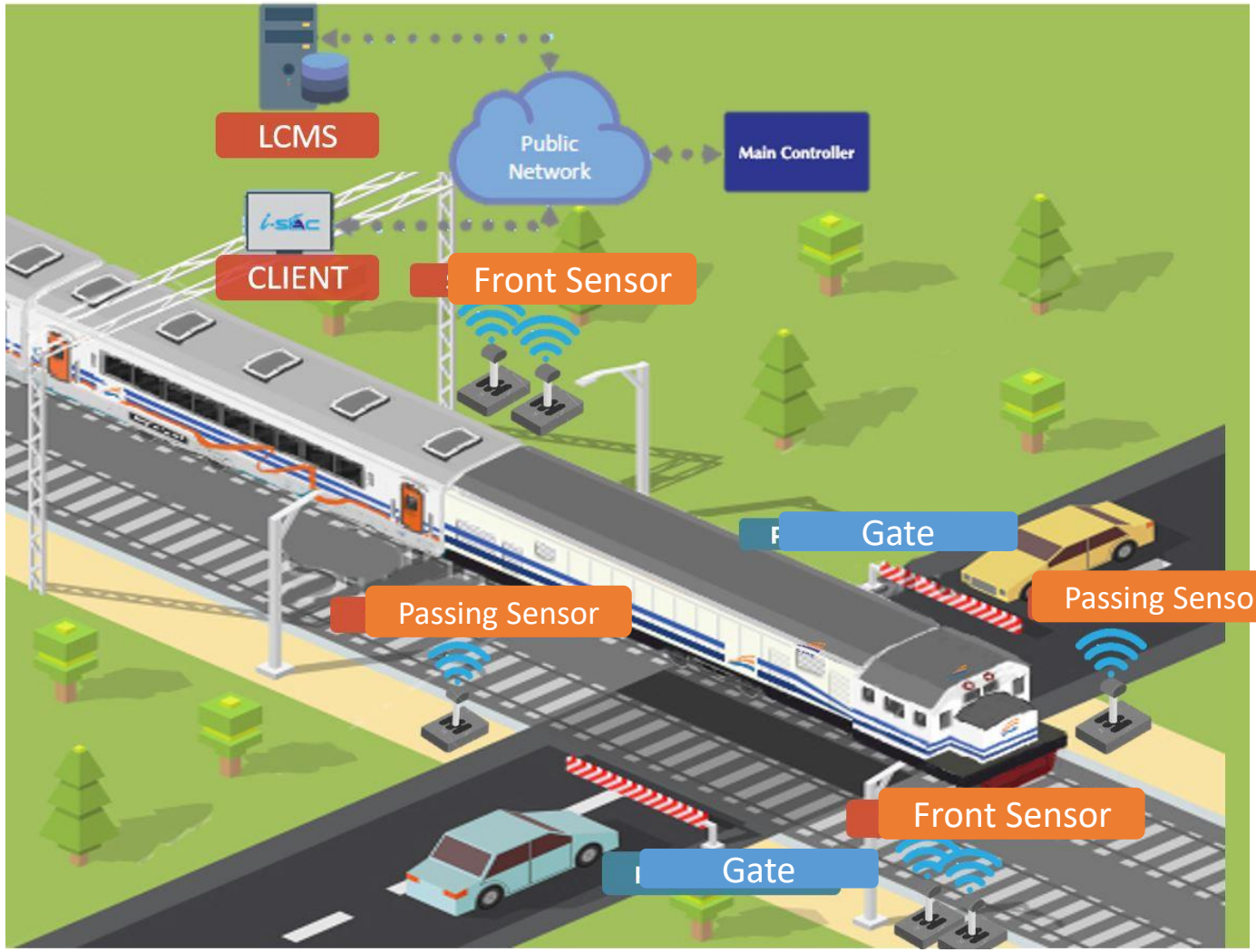
PRODUCT INNOVATION : SMART LEVEL CROSSING

Background

To enhance safety at Level Crossing between railway and road, and ensure the safety of both road user and train passanger.

+

i-SLC is a safety enhancement system at the crossing between railway and road, that use sensor to automatically detect train.



AUTOMATIC DEPENDENT SURVEILLANCE - BROADCAST

Automatic Dependent Surveillance Broadcasting

ADS-B is surveillance system that can be integrated with other surveillance technologies or also can be operated as independent information sources for surveillance monitoring

Benefit :

- Airplane Crash Avoidance
- Enhancement and optimisation of sky space on the airport

THANK YOU