ITS Development in Taipei

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Background

- Taipei: 3,000 sq km, Population 7 mi
  - Car- 2.5 mi, Motorcycle-3.2 mi
  - MRT 136 km + BRT 60 km (2.2 mi pax/day)
  - Bus 6,200 Vehicles + 136 Routes (1.9 mi pax/day)
  - Taxi 54,000 vehicles (1.1 mi pax/day)
  - Bike Sharing: 33,800 bikes w/ 820 stations

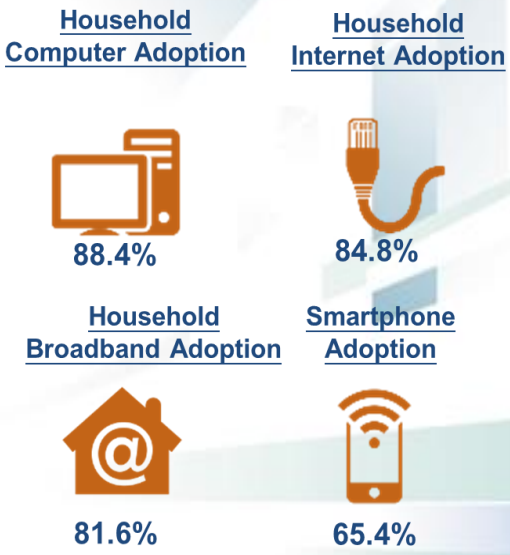
- Taiwan: 36,000 sq km, Population 23 mi
  - Highway: Freeway 989 km, Provincial Hwy 5,154 km
  - Inter-City Rail: 1,100 km
  - Car- 7.2 mi, Motorcycle- 13.8 mi
    - Mobile phone penetration rate: 113.2% (SP: 80.2%)
    - 100% e-Bus; 94% e-tag car; 75% e-Taxi
    - 6.5 mi Smart Card Issued; 92% e-payment Public Transit
    - 18/22 Cities with Traffic Control Center
    - Public Transport Information Sharing Platform PTX
- ETC- All MLFF Distance-based Charge (94% e-tag)
- High Speed Rail: b/w Taipei and Kaohsiung (345km) 90 min

ICT in Taiwan

- Internet of Things
- Sharing Economy

ICT Industries

- Taiwan has **over 80% ICT service** penetration rate & Internet usage rate



- Taiwan's ICT hardware market share ranks **World No. 1**

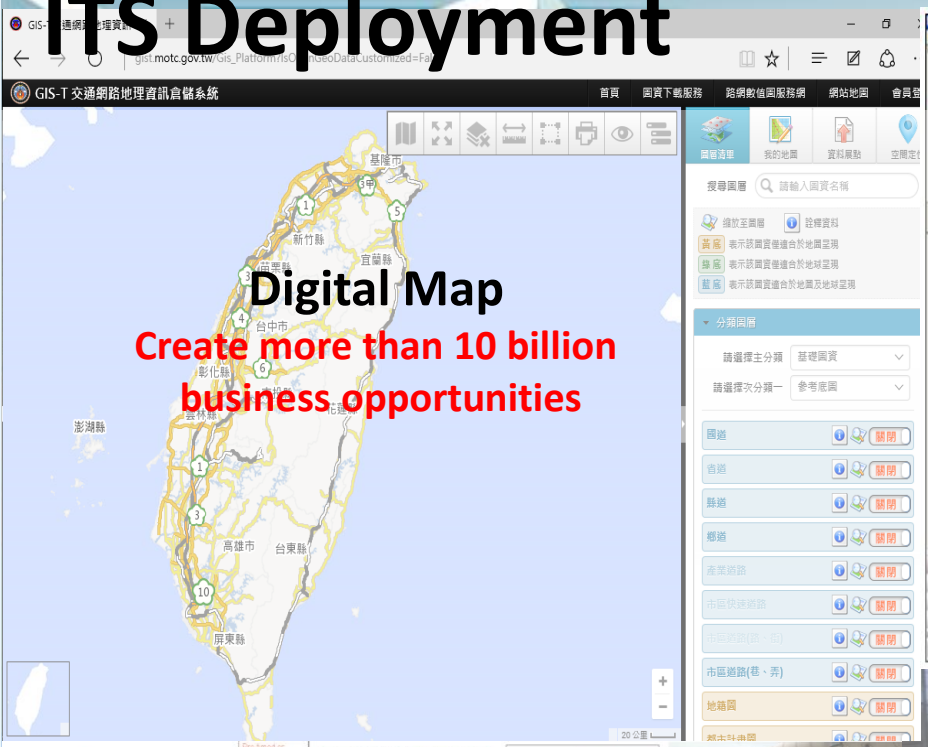
ITS Plan 2017-2020

5 S- Safe, Smooth, Seamless, Sharing, Sustainable

- US$100 million for investing and leveraging ITS development
  - Smart Traffic Safety Program
  - Smart Integrated Corridor Management Program(ICM)
  - Rural Area ITS Application
  - MaaS (Mobility as a Service)
  - Connected vehicles and automated vehicles
  - ITS R&D

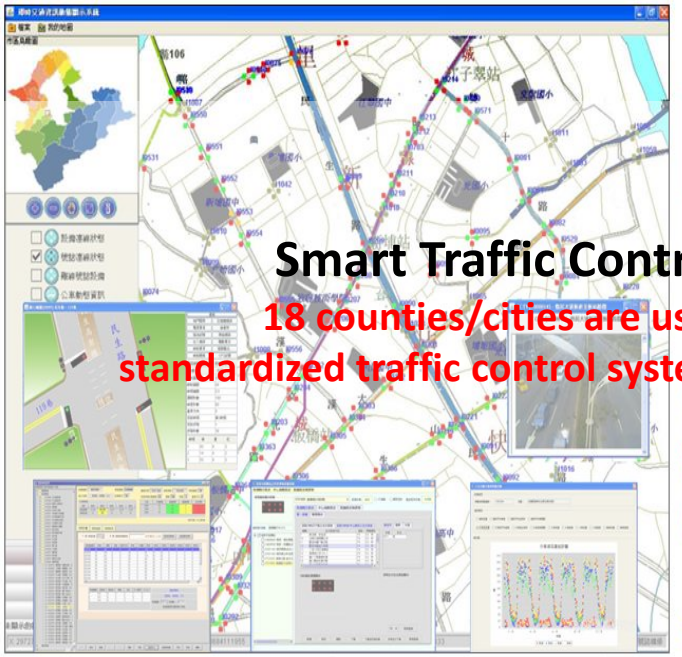
Supply By MOTC

ITS Deployment



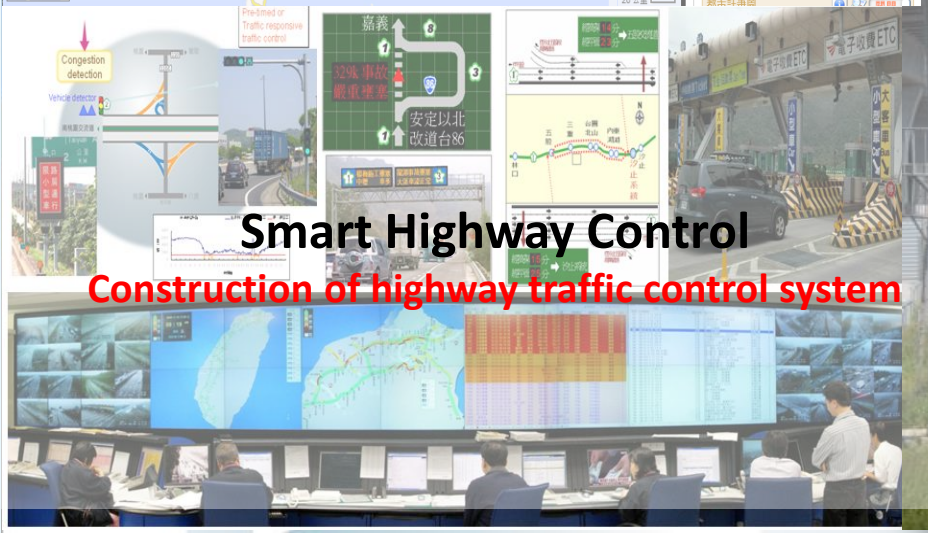
Digital Map

Create more than 10 billion business opportunities



Smart Traffic Control

18 counties/cities are using standardized traffic control system software



Smart Highway Control

Construction of highway traffic control system

Highway ETC

Export ETC know-how to other countries- ex:Malaysia, Kazakhstan and Vietnam

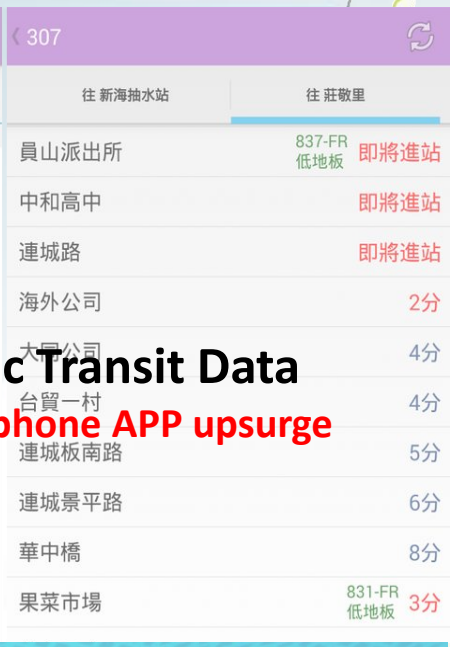
ITS Deployment

Multi-Smartcard Integration

Island-wide tour one card in hands

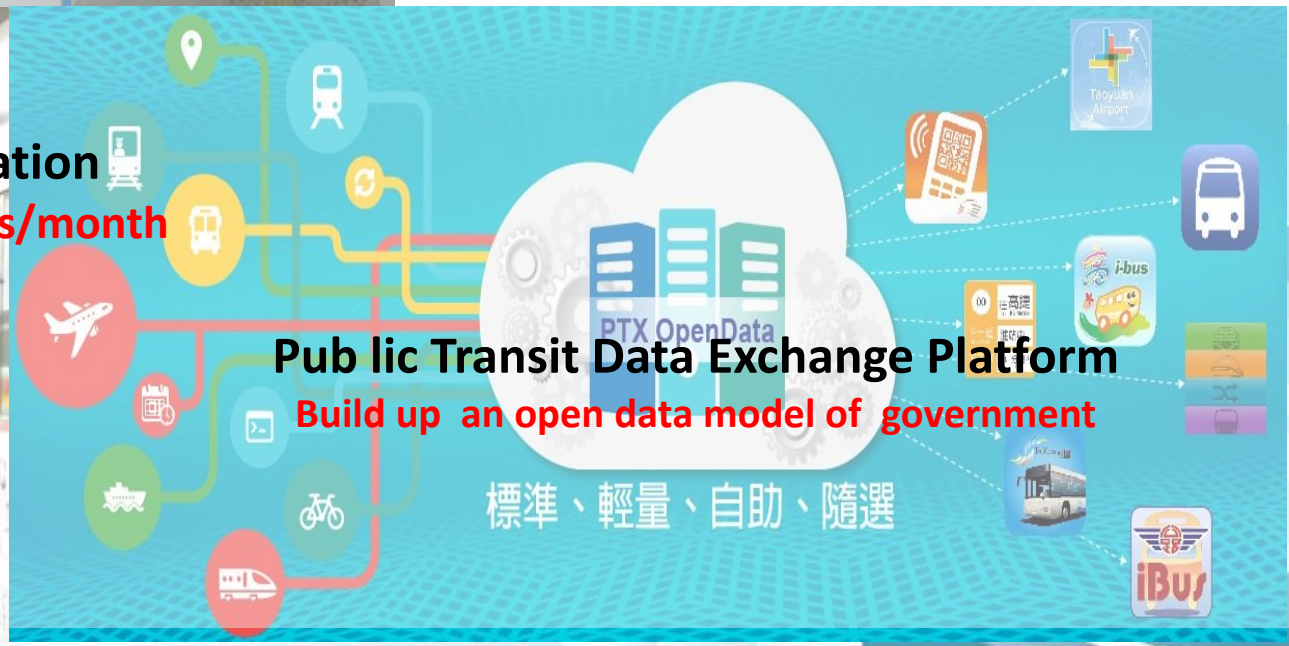
Open Public Transit Data

Form a mobile phone APP upsurge



Bus Real-time Information

More than 30 million queries/month for Taipei City

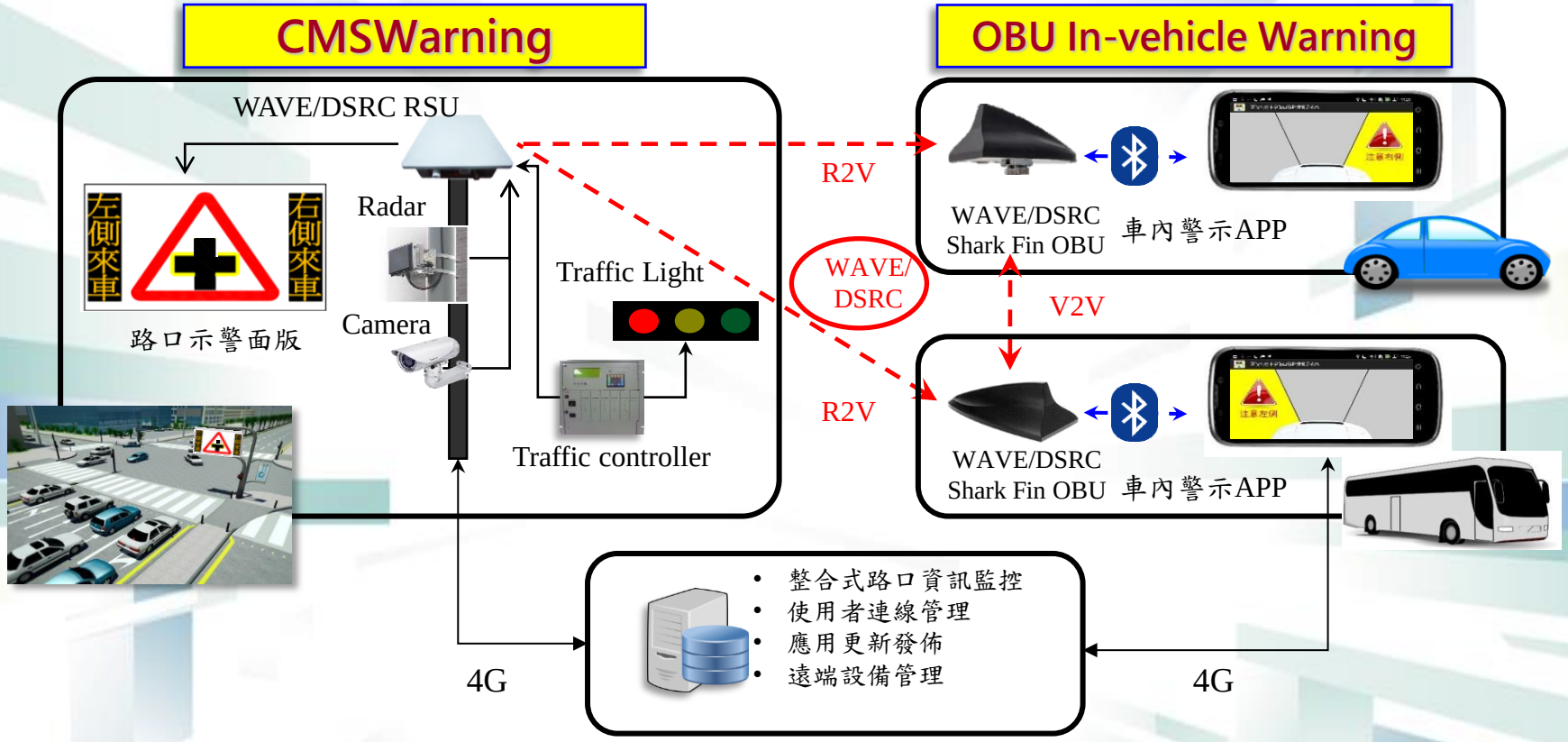


Pub lic Transit Data Exchange Platform

Build up an open data model of government

ITS Traffic Safety and CV

CV Apply to Road Traffic Safety



ITS Traffic Safety and CV

Two-wheeler Safety

On Motorcycle

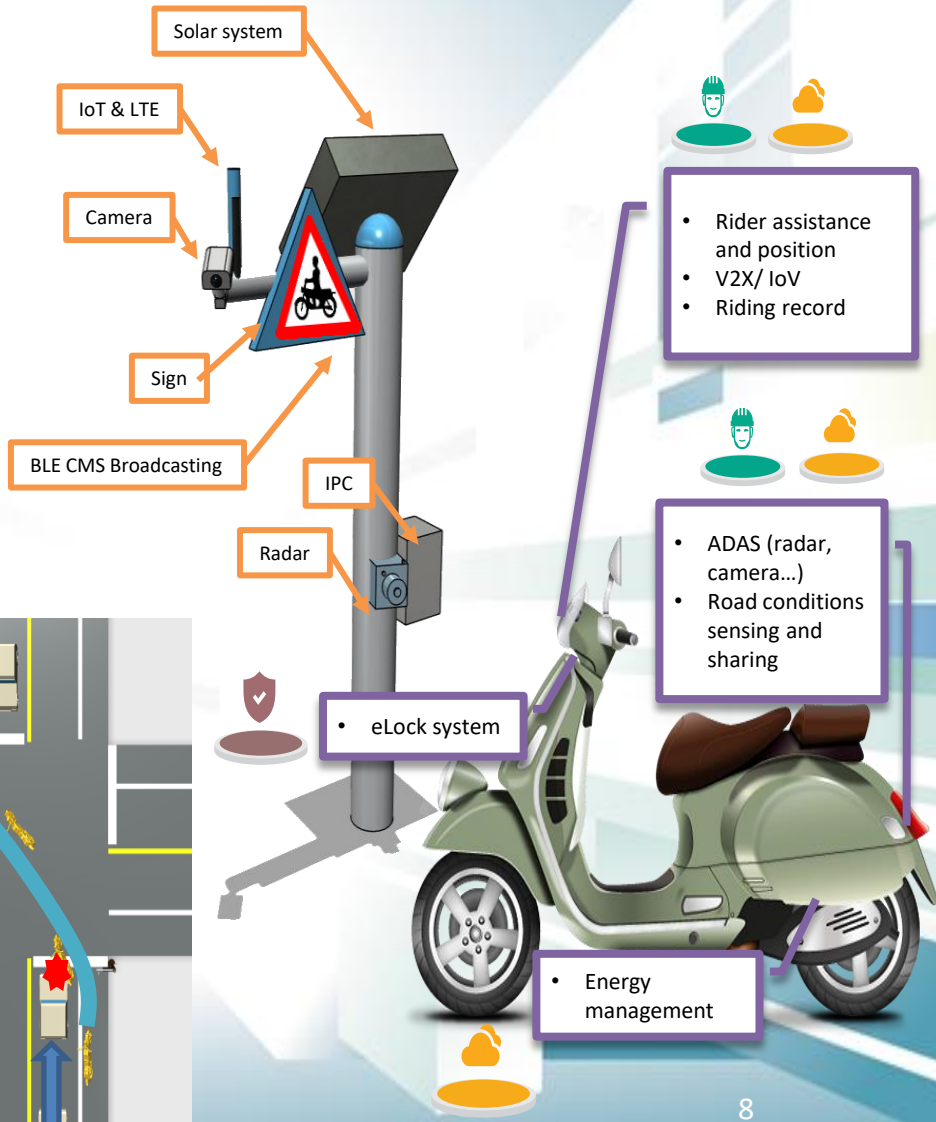
- Use sensor and active RFID to broadcast the position

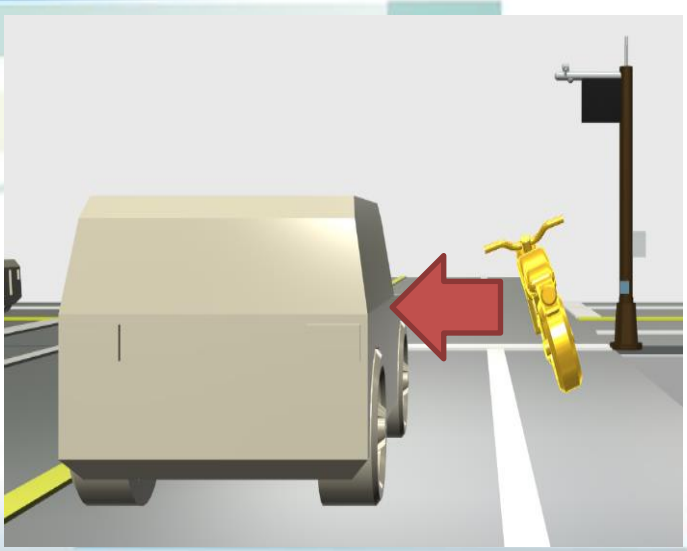
On Car

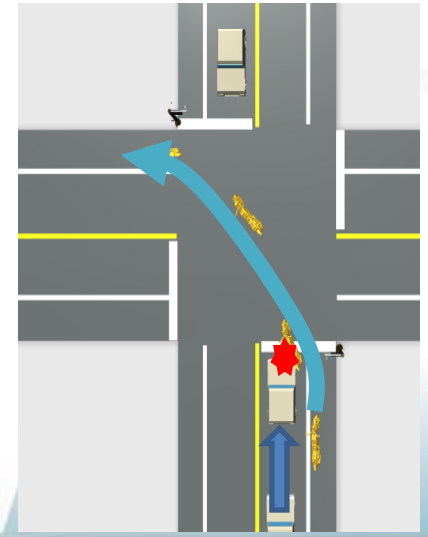
- Receive the advise from roadside smart pillar
- Predict the motorcycle behavior (Intelligent ADAS)

Roadside

- Sensor fusion technology to detect motorcycle behavior (not only detect the object)
- Use Edge computing to estimate the dangerous case
- Report traffic condition for traffic management



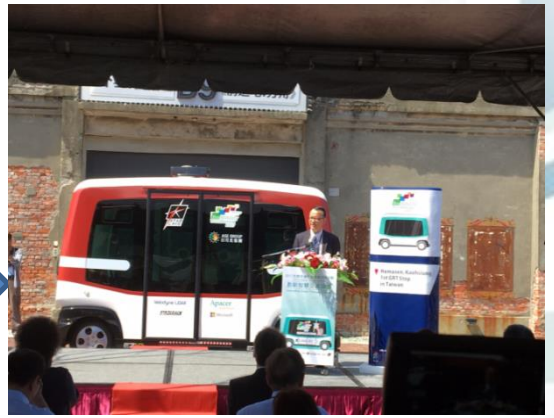




ACE Center
Automated, Connected and Electric Vehicles Research Center

- Subsidies driverless pilot projects in Taipei, Kaohsiung & Taoyuan Cities
- Draw regulatory sandbox for applying autonomous vehicle tests
- Build up Autonomous vehicle testbed in Taipei, Taoyuan and Tainan

Driverless Bus Trials



Integrated Corridor Management

Goals：Over 85% traffic information coverage

Expand real time traffic information coverage via eTag、VD & Mobile data

Goals：Optimize traffic control by regional integration

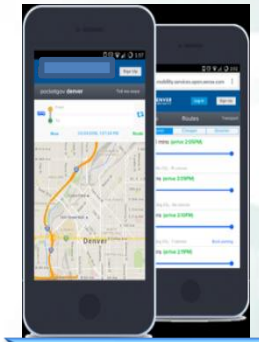
- Taipei-Yilan corridor: Highway No. 5, provincial and local road system
- Hsinchu： Freeway No. 1 & local road system
- Taichung： Freeway No. 1 provincial highway No. 74 & local road system

Goals：Trip -reservation、Real-time traffic information、Load-balance of road system

Predict vehicle flow & travel time by both historical & real-time traffic information

Trip-reservation、Active publish travel time & best route path

Handheld & OBU devices interface



Expand traffic information coverage → **Integrated traffic information & control** → **Traffic information publish**

Supply By MOTC

MaaS

Taipei-Yilan Corridor & Kaohsiung City

Customers

- Customers behavior and preference learning
- Trigger behavior change
- Transport systems optimization

MaaS Provider

Dynamic journey planner

Bundled service

Pay as you go

Booking Payment

Users behavior analysis

On-demand mobility

Transport operators

Transport infrastructure

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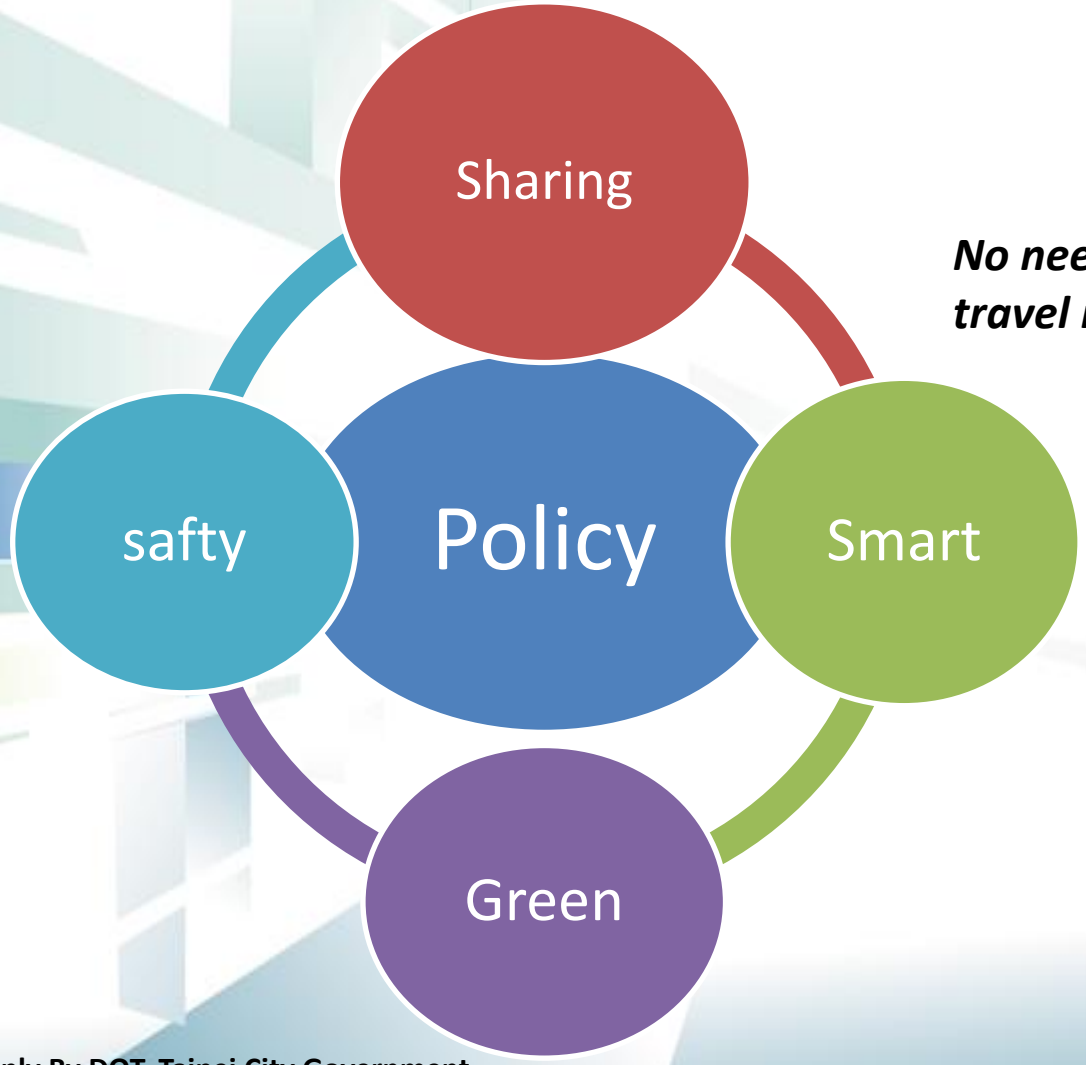
Transport Policy in Taipei



No need to buy cars to satisfy travel needs for citizens

Vision: Sharing transport as the core and smart management as the base to realize a safe and harmony green living

Supply By DOT, Taipei City Government

EasyCard e-Payment System
All Pass Ticket

Monthly travel pass for Metro, Bus, and Public Bike

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Sharing Mobility in Taipei

Bike sharing
- YouBike
- oBike

Bus
- Rehab Bus

Scooter sharing
- WeMo

Car sharing
- EV sharing

Taxi
- Wheelchair-accessible Taxi
- Uber

Supply By DOT, Taipei City Government

YouBike

- Launched in March, 2009
- PPP Approach
- Scale in City Core: 400 stations and 13,000 bikes / Metropolitan: 820 stations and 36,500 bikes
- Turnover rate: 6.2 trips/day/bike (city core 8.3)

Fare strategy:
No Annual Fee

Easy to Register in 3 min in Kiosk

WeMo
Motorcycle Sharing System

- Launched October 2016
- Battery exchangeable E-scooter
- 1,000 scooters in Taipei
- NT$15 for the first 6 minutes , than NT$2.5 for every additional minute.
- Extra discount for 18 – 24 years old.

Supply By DOT, Taipei City Government

Management of New mobility

- To draw up "Autonomy Regulation for the Operation and Management of Sharing System Operator"
- To set a Line group for authorities and bike company as a platform for immediate contact and communication
- To enhance the enforcement of bike illegal parking

New stationless-based BBS (oBike) launched in April, 2017

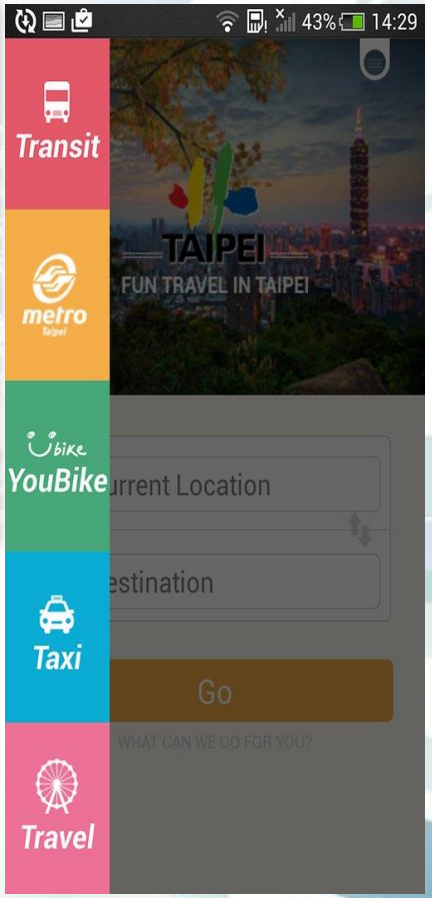
Seamless Service: Smart Bus System

Bus information search facilities

- Intelligent stop
- 5284Website
- Smartphone App
- Free voice call

Average daily usage over 3 million

- Accuracy rate：94.5%
- User’s satisfaction：93%



Safe driving system

1.Driving vision assistance
2.Anti-collision system
3.Driving ratings
4.CCTV

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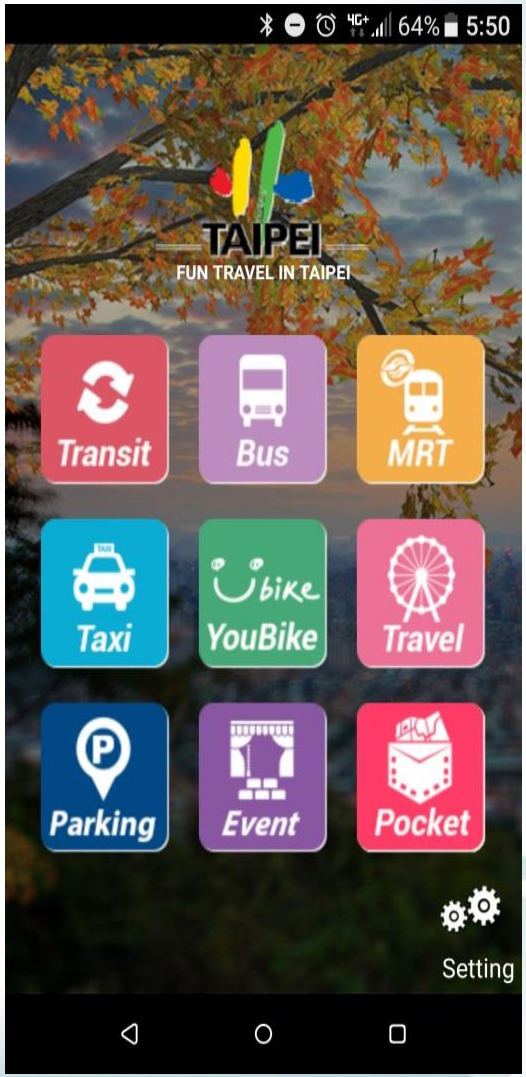
“Fun Travel in Taipei” App

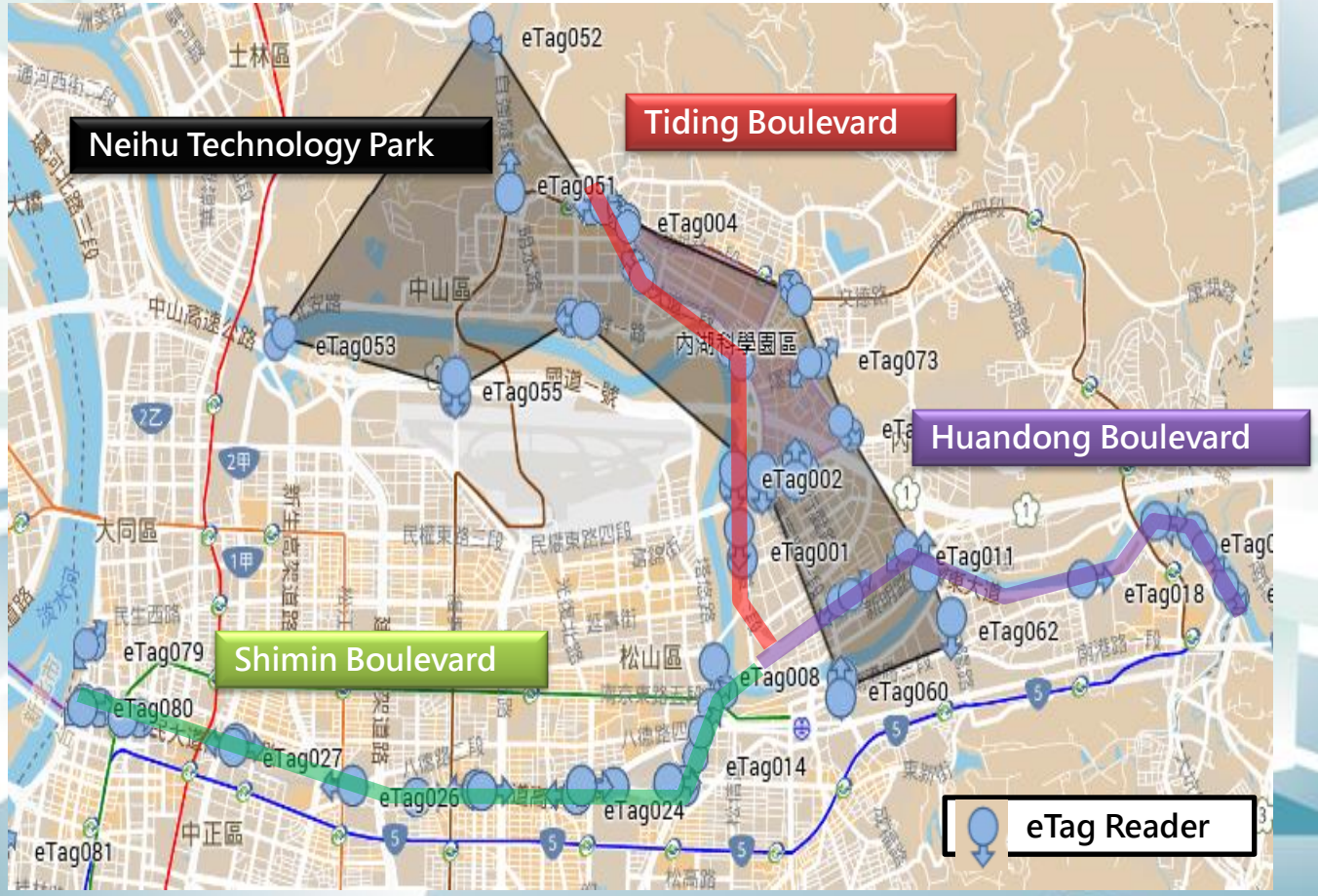
- Providing integrated smartphone App with real-time information of multi modes



Taipei Smart Station

E-Tag Applications in Taipei

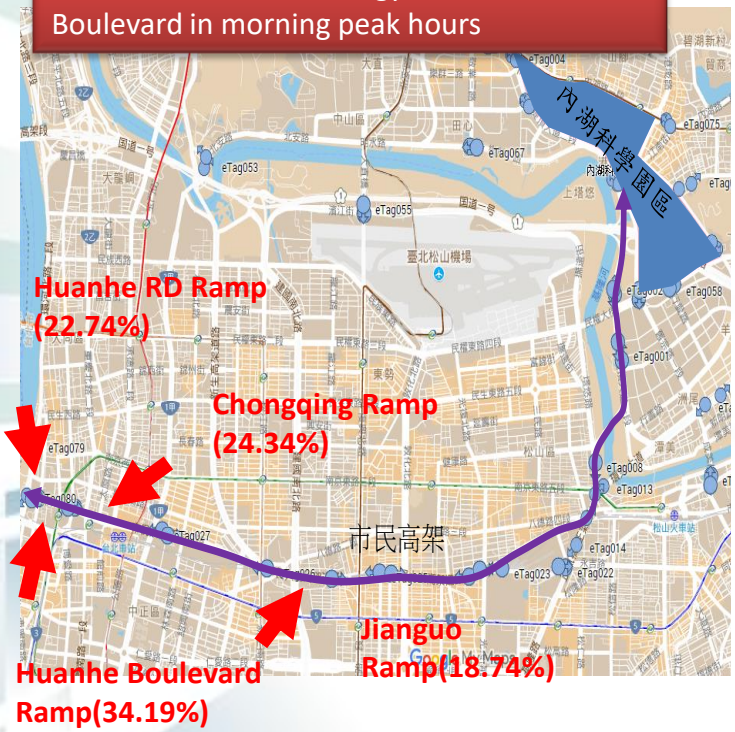
73 eTag Readers built on 3 Expressways in Taipei City and around Neihu Technology Park



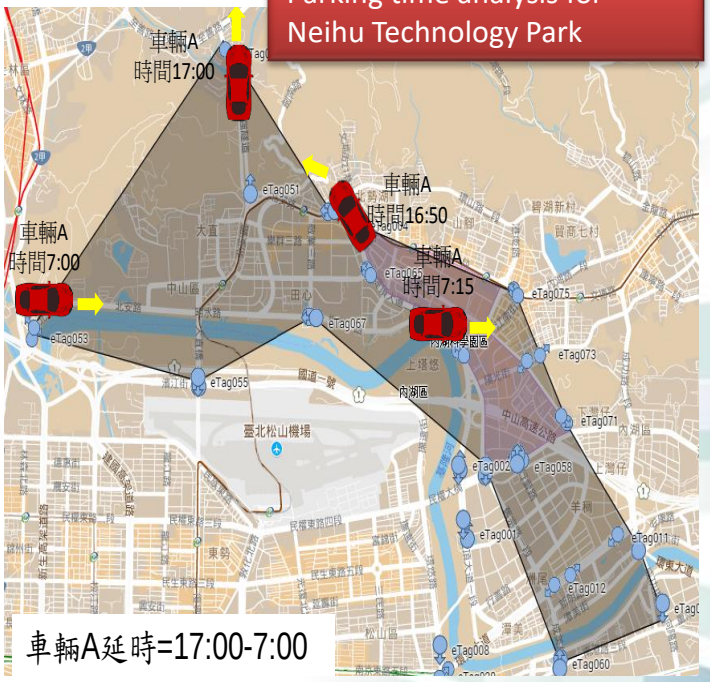
Analysis of Historical Data

- O-D demand analysis
- Travel/ Parking time analysis

Traffic to Neihu Technology Park via Shimin Boulevard in morning peak hours



Parking time analysis for Neihu Technology Park



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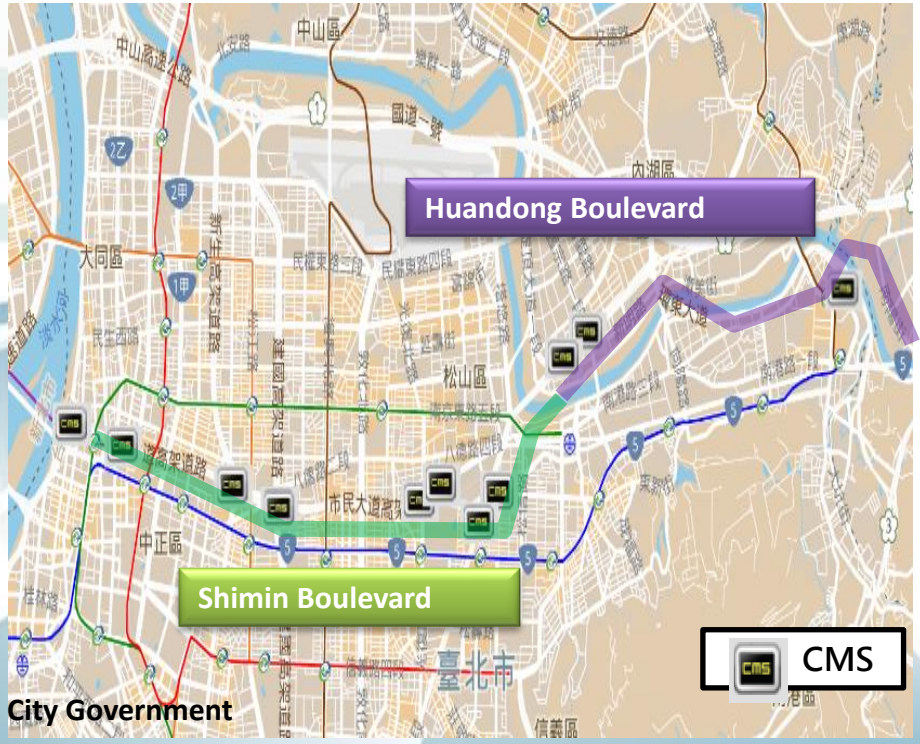
Provision of Travel Time Information

- Analyze and update travel time per minute
- Provide travel time information of 22 road segments via CMS



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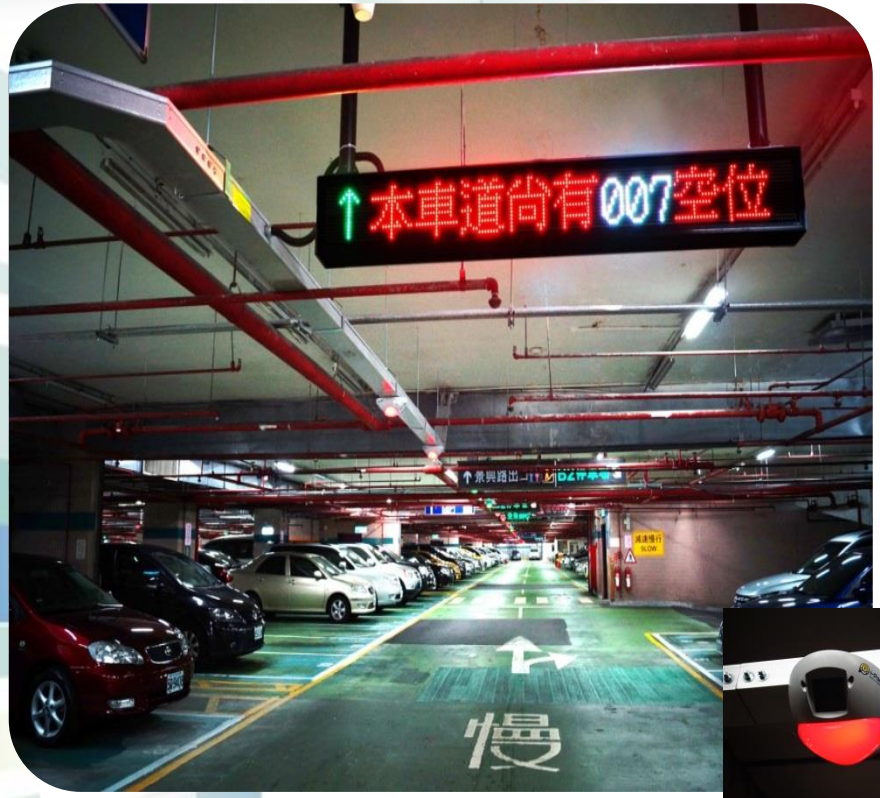
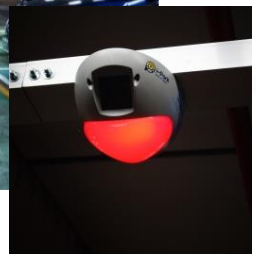
Smart Parking Management



Parking Meter



No Vacancy

Vacancy

Special parking space

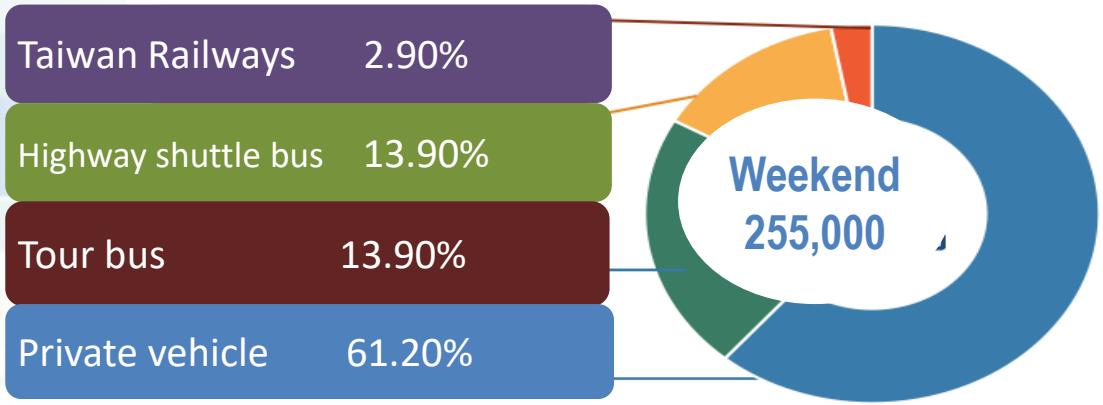
APP

Parking guide

MaaS for Taipei-Yilan Corridor

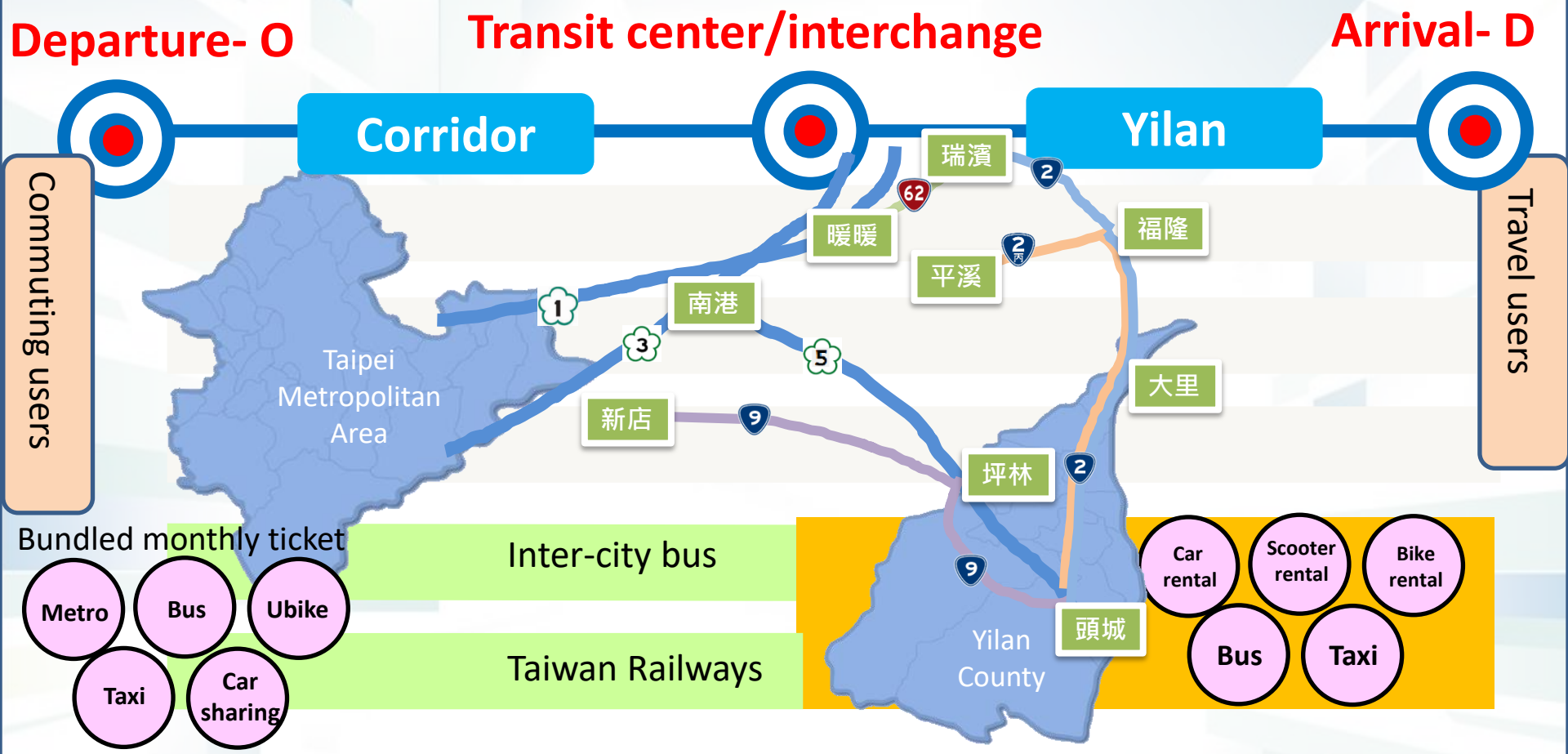
1. The implementation area includes Taipei City, New Taipei City and Yilan County. Yilan County is the most popular recreation destination in North Taiwan.
2. The daily trips is 160,000 on the weekday and 255,000 on the weekend.

Private vehicle use accounts for 61.2%。



3. **The high proportion of private vehicle causes congestion problem that needs to be solved.**

Taipei MaaS Implementation Area



1. Intermodal journey planner & bundled monthly ticket for daily commuting users;
2. Informed travel time and alternative routes for travelers between Taipei-Yilan;
3. Integrated public and private transport service in Taipei-Yilan corridor.

MaaS Journey Planner

Seamless Mobility Service

First Mile

- MRT/Bus
- Taxi
- Chartered Vehicle
- Shared

Taipei-Yilan Corridor

- Highway shuttle bus
- Train
- Chartered Vehicle
- Ride Sharing
- Alternative time or route choice

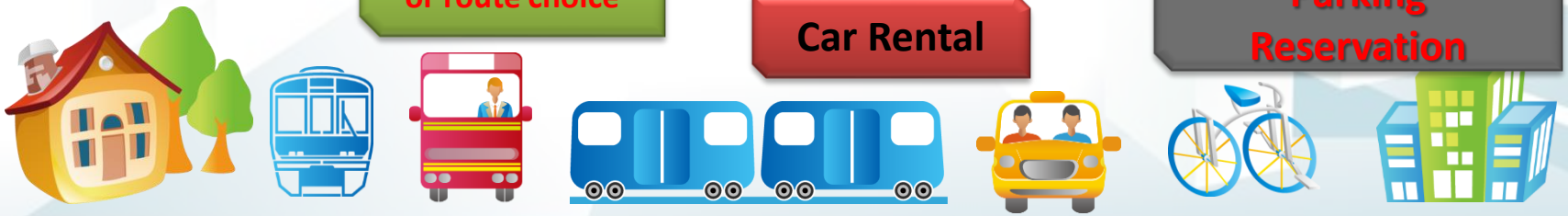
Last Mile

- Local Bus
- Taiwan Tour Bus
- Chartered Vehicle
- Taxi
- Shared
- Car Rental

Value-added Services

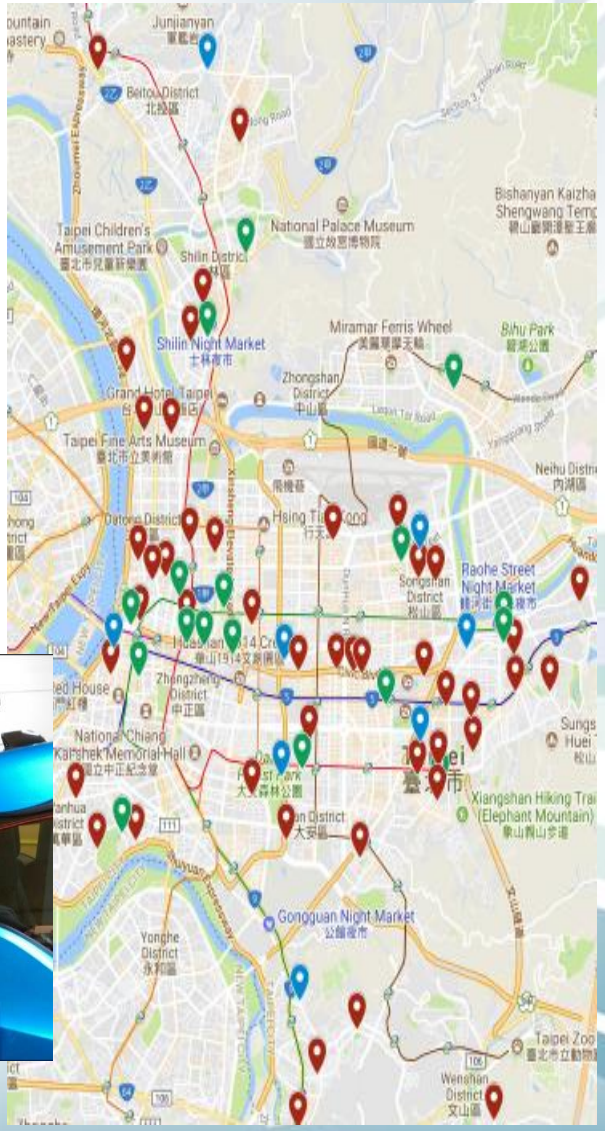
Attractions

- Restaurant & Cuisine
- Scenic Spots
- Gift & Souvenir
- Accommodation
- Parking Reservation



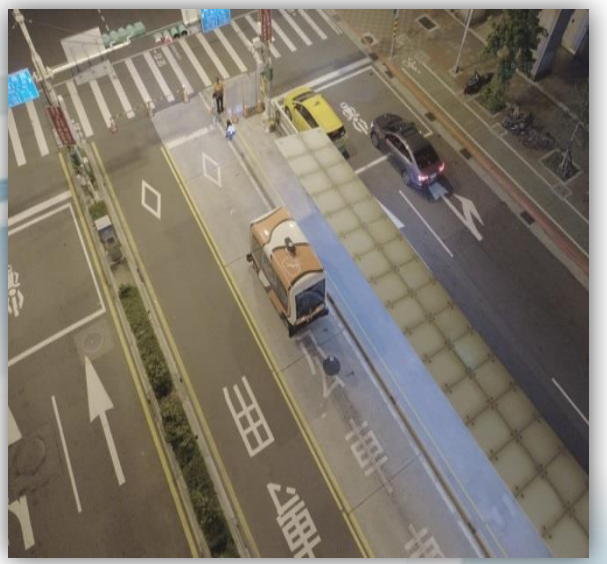
Friendly Environment for EV Sharing

- 128 EV chargers in 79 public parking lots



Vice Mayor Charles Lin, Taipei City Government

Autonomous Bus Testbed



Supply By DOT, Taipei City Government

next

1. Technical experiment (V2V · V2I)
2. Regulatory adjustment
3. Public Service/ Business model

Thanks

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