# JAPAN'S URBAN TRANSPORT POLICY & THE NEW TRANSPORT SYSTEM (NTS)


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JTPA *Japan Transportation Planning Association*

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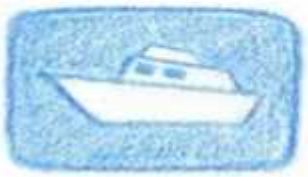
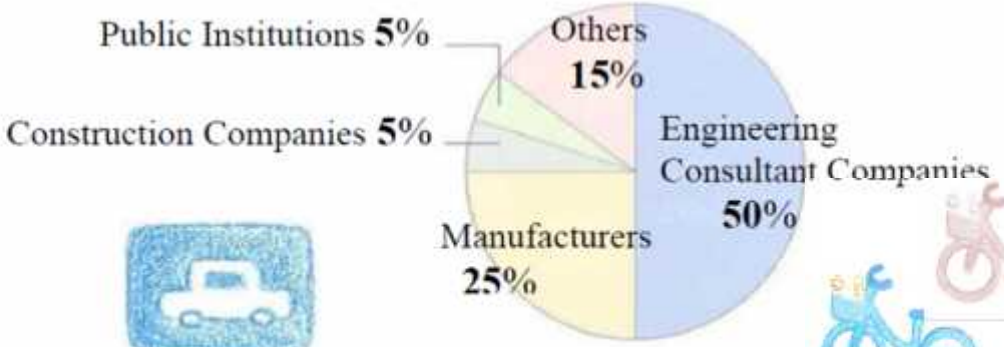
# JTPA

## *Japan Transportation Planning Association*

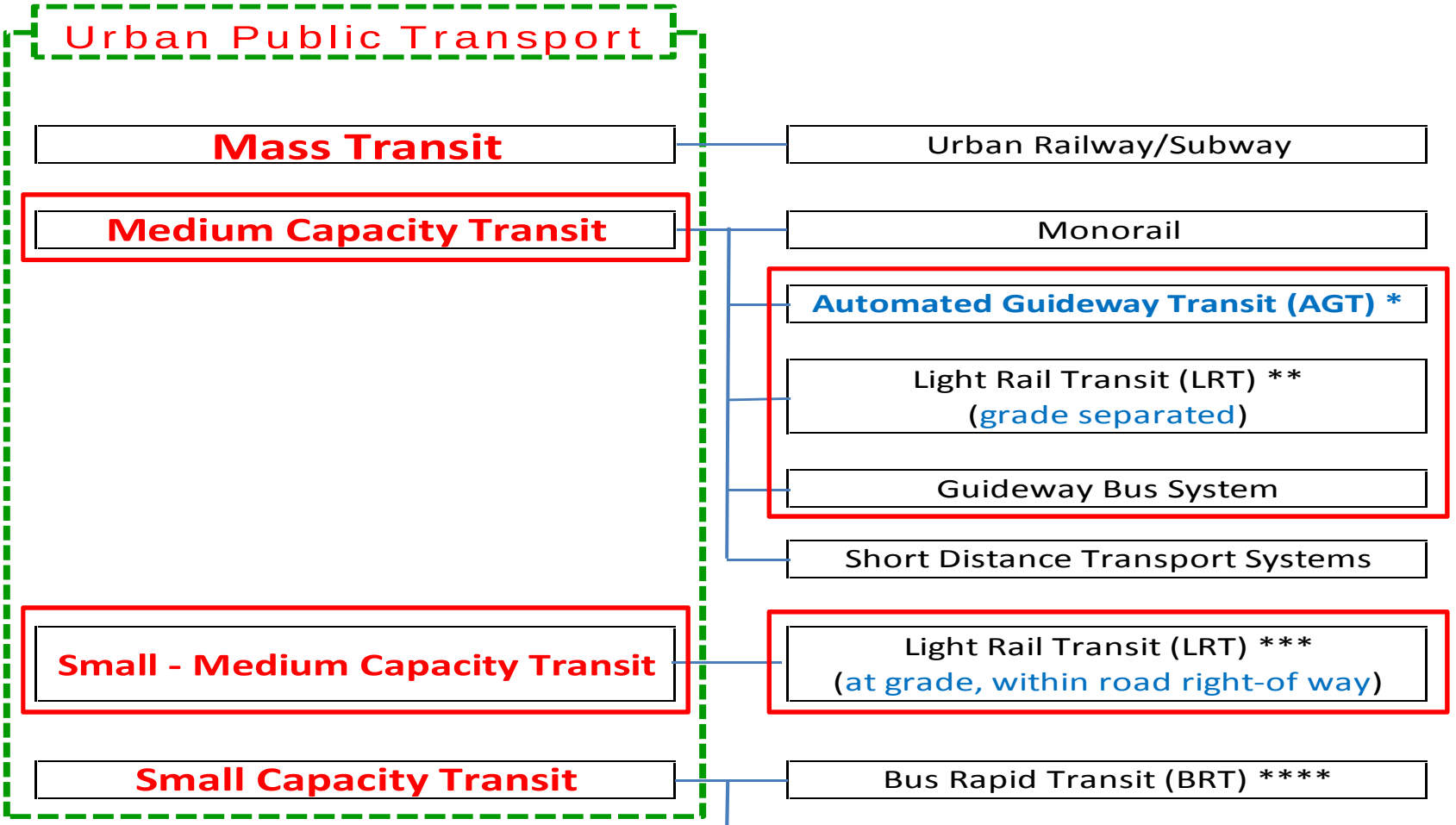
### JTPA's Overview

1. *Objective* : ***JTPA***, established in 1957, is a nonprofit public corporation to research/study, plan, design, and publish on integrated transportation system and facilities, including road, railway, railtrack, port, and airport, coordinating the member organs/firms.
2. *Supervisory Agency* : Ministry of Land, Infrastructure, Transport and Tourism (MLIT) under the Public Corporation Act
3. *Member Companies* : More than 100 corporate members, including general enterprises, manufacturers, construction companies and engineering consultant companies related to the transportation and urban planning sectors.






# Classification of
# Urban Public Transport Systems




* AGT is regionally called as: New Transport System (NTS) in Japan, Automated People Mover (APM) in North America.
** such as LRTs in Metro Manila, Philippines
*** LRT is locally called such as Streetcar, Tram, Tramway, Light Rail or Light Railway.
**** BRT is regionally called as Key Route Bus in Japan.

Source: MLIT, 2012

# Types of Railways/Railtracks & *JTPA*'s Contribution

| under the **Railway Business Act**, conducted by the **Railway Bureau**, MLIT | | under the **Railtrack Act**, conducted by the **City Bureau**, MLIT |
|---|---|---|
| railways | ordinary railway | |
| | guided railway (**N**ew **T**ransport **S**ystem) | ✔ |
| | suspended railway (monorail- type 1) | ✔ |
| | straddled railway (monorail- type 2) | ✔ |
| | non-guided electric car (trolley bus) | |
| | wire-roped railway | |
| | float-typed railway (linear-motor car) | |
| | others | |
| | - magnetic-inducted railway (ex. IMTS) | |
| cablecars | ordinary cablecar | |
| | special cablecar | |
| exclusive railways | exclusive railway | |
| | Streetcar | ✔ |
| | Light rail transit (LRT) | ✔ |

Railways/Railtracks which ***JTPA*** has carried on.

# Comparison of
# the Cars in NTS and Monorail

| | Large NTS | Standard NTS | Large Monorail |
|---|---|---|---|
| Example |  Miami, USA MIA Mover |  Yokohama, Japan Seaside Line |  |
| Maximum load of car | 28 ton | 18 ton | 44 ton |
| Car Dimension | Length : 12.0 m<br>Width : 2.8 m<br>Height : 3.8 m | Length : 8.00 m<br>Width : 2.47 m<br>Height : 3.34 m | Length : 15.2 m<br>Width : 2.98 m<br>Height: 5.2 m (3.74 m) |
| Car Capacity | Approx. 120 | Approx. 70 | Approx. 150 |

# Comparison of the Structure

## MRT

Over-head
Catenary system

Turnout
system

Movable Guideway
for **Turnout**


## AGT

Moving
the **Girder beam**
for **Turnout**

## Monorail

# Number of Lines for Monorail and AGT already Installed/Planned

| Contents | | Total | Regions | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Japan | High Income countries | | | | Upper Middle Income Countries | | Lower Middle Income Countries | | Asia Total (except Japan) |
| | | | | Europe | North America | Asia | Others | Asia | Others | Asia | Others | |
| Monorail | Urban area | 35 | 9 | 5 | 4 | 3 | 4 | 5 | 4 | 1 | 1 | 9 |
| | within facilities | 23 | 1 | 8 | 6 | 2 | 1 | 3 | 1 | 0 | 0 | 5 |
| | sub-total | 58 | 10 | 13 | 10 | 5 | 5 | 8 | 5 | 1 | 1 | 14 |
| AGT | Urban area | 55 | 11 | 13 | 12 | 9 | 1 | 7 | 0 | 2 | 0 | 18 |
| | within facilities | 45 | 0 | 12 | 25 | 3 | 1 | 4 | 0 | 0 | 0 | 7 |
| | sub-total | 100 | 11 | 25 | 37 | 12 | 2 | 11 | 0 | 2 | 0 | 25 |
| Total | | 180 | 23 | 50 | 51 | 17 | 9 | 19 | 7 | 3 | 1 | 39 |

Source: MLIT, 2012

# What's NEW TRANSPORT SYSTEM (NTS)

Japan's standardized automated guideway transit (AGT) system!

## NTSs & GB currently operated in Japan

Port Liner, KOBE

Nanko Port Town Line, OSAKA

Rokko Liner, KOBE


Astram Line, HIROSHIMA

Seaside Line, YOKOHAMA

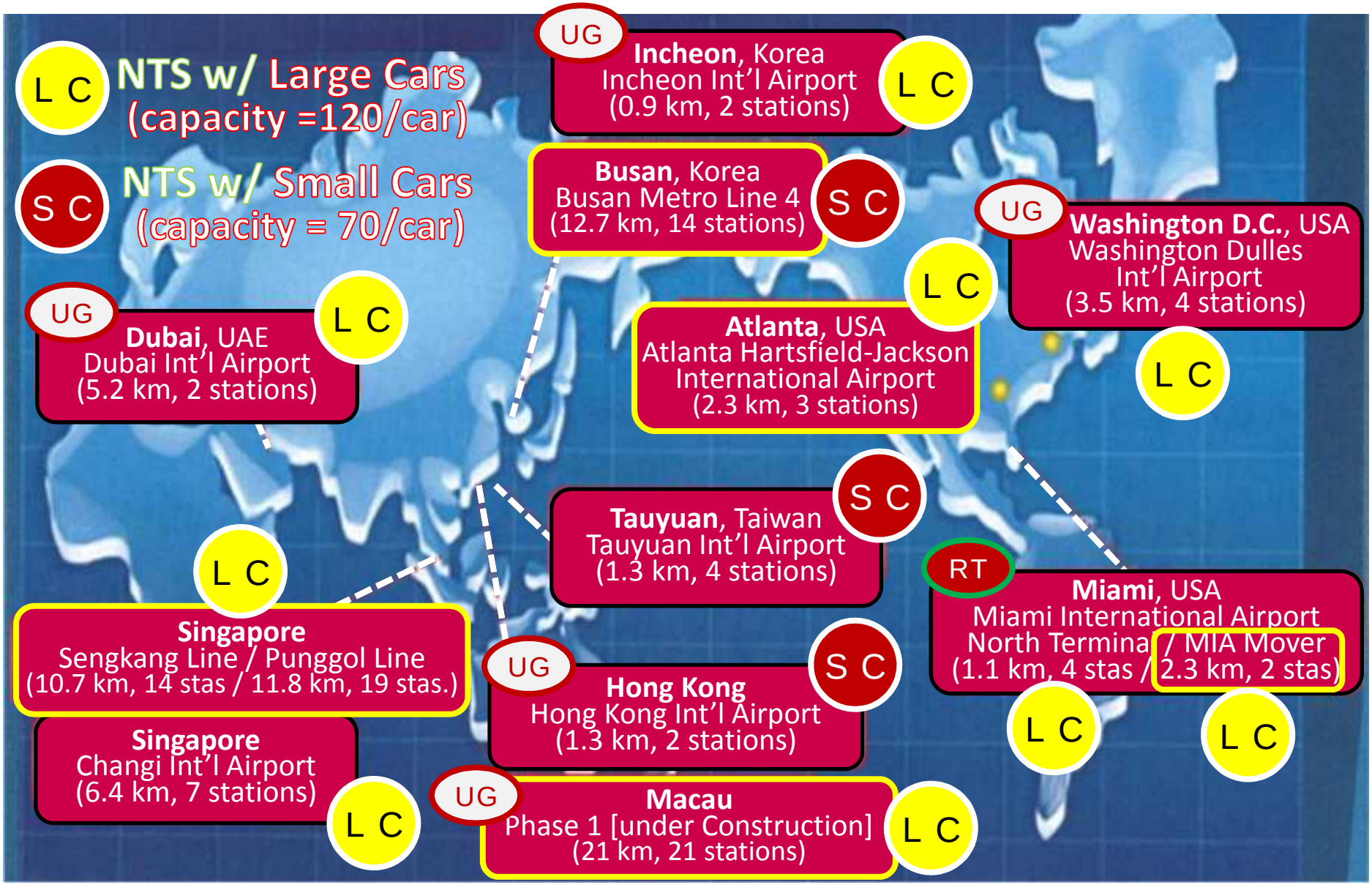
Yurikamome, TOKYO


Nippori Toneri Liner, TOKYO

GB:Yutorito Line, NAGOYA*

UG : Underground section exists

# 13 NTS lines have been introduced outside Japan.



# U.A.E.



**Completion:** 2015 (anticipated) – Vehicles already delivered

**Capacity:** 6,050 passengers/hour/direction

**Length:** 1.0km

**No. of Stations:** 2 stations **No. of Cars:** 18 cars

Airport APM
(Underground)

# Hong Kong

MHI Test Track

- **Capacity: 5,270 passengers/hour/direction**
- **Length: 1.1km**
- **No. of Stations: 2 stations**
- **No. of Cars: 8 cars (original) / 8 cars (additional)**

Airport APM
(Underground)

# Singapore


**Length: 19.9km**

**No. of Stations:** 33 stations

**No. of Cars:** 41 cars

**Capacity: 4,800 Passengers/hour/direction**

# Singapore



**Completion:** 2006

**Capacity:** 2,300 passengers/hour/direction

**Length:** 6.0km

**No. of Stations:** 7 stations **No. of Cars:** 16 cars

# Korea


**Completion:** 2008

**Capacity:** 5,340 passengers/hour/direction

**Length:** 0.8 km

**No. of Stations:** 2 stations **No. of Cars:** 6 cars

Airport APM
(Underground)

USA


**Completion:** 2010

**Capacity:** 6,550 passengers/hour/direction

**Length:** 3.5km

**No. of Stations:** 4 stations **No. of Cars:** 29 cars

# USA




**Completion:** 2009

**Capacity:** 4,930 passengers/hour/direction

**Length:** 2.2km

**No. of Stations:** 3 stations **No. of Cars:** 12 cars

USA

# North Terminal APM



**Completion:** 2010

**Capacity:** 9,000 passengers/hour/direction

**Length:** 1.1km

**No. of Stations:** 4 stations **No. of Cars:** 20 cars

# USA

# MIA Mover APM


**Completion:** 2011

**Capacity:** 3,300 passengers/hour/direction

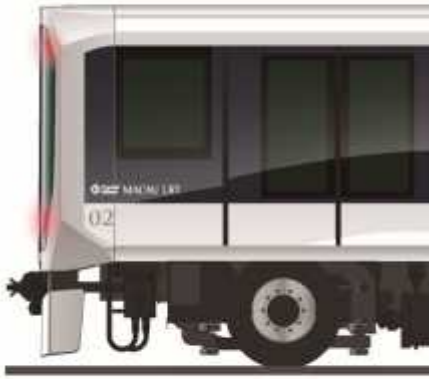
**Length:** 2.0km

**No. of Stations:** 2 stations **Number of Cars:** 8 cars

Light Rail for Airport
(Car Park to Airport Terminal)

# Macau Construction on going






**Completion:** 2015

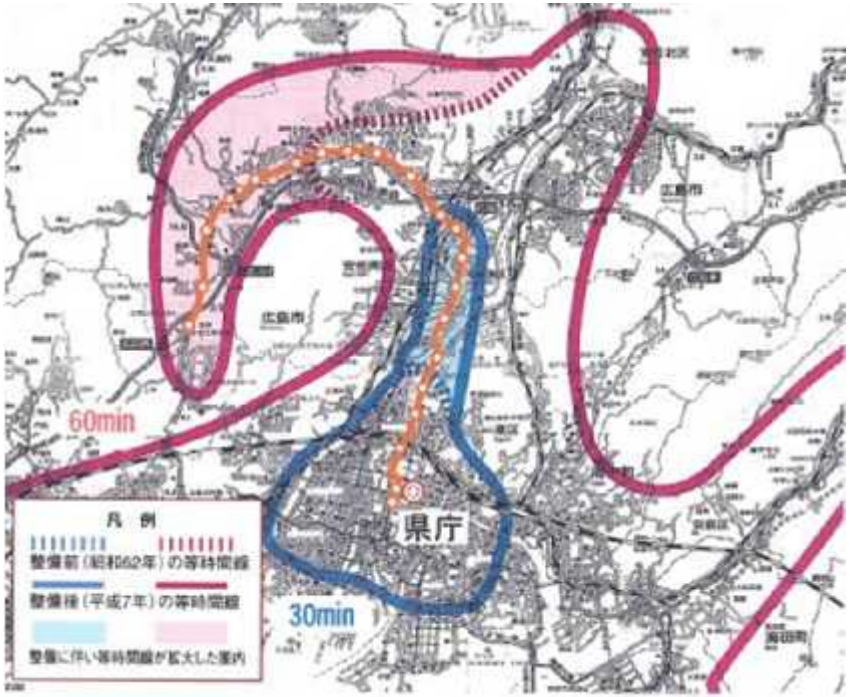
**Capacity:** 7,800 passengers/hour/direction

**Length:** 20.2km

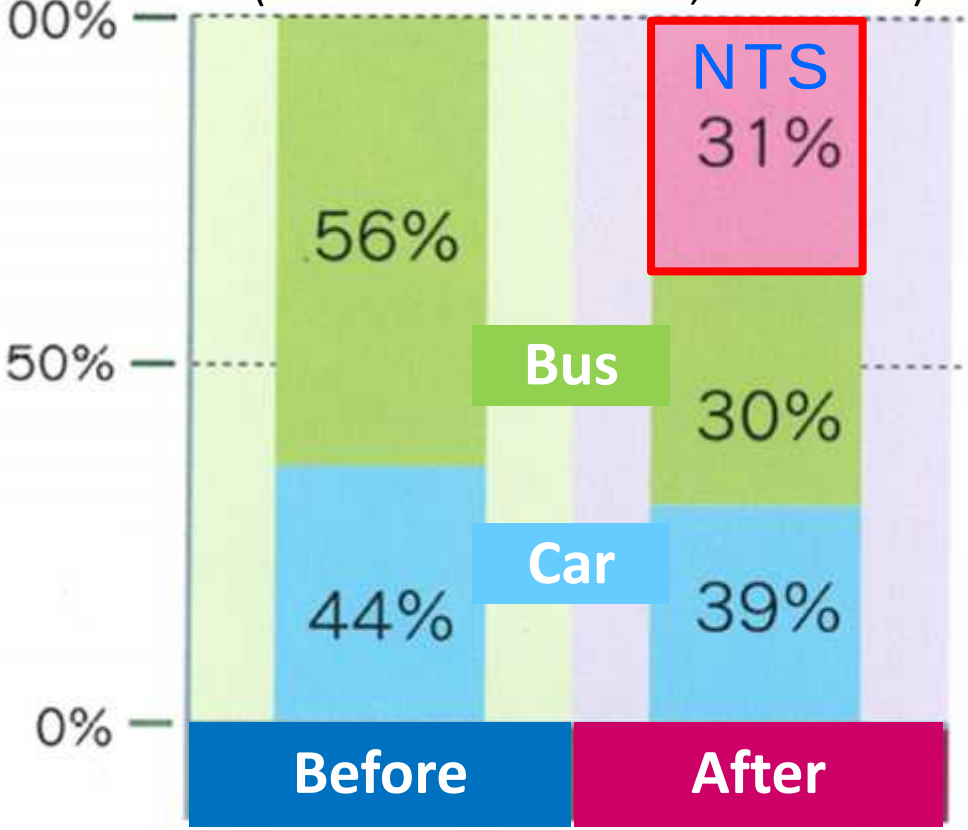
**No. of Stations:** 21 stations **No. of Cars: 110** cars

# Results of NTS 【No. 1】

**Modal change** to **NTS** from Bus/Car




Change in Modal share
(A Case of Astram line, Hiroshima)

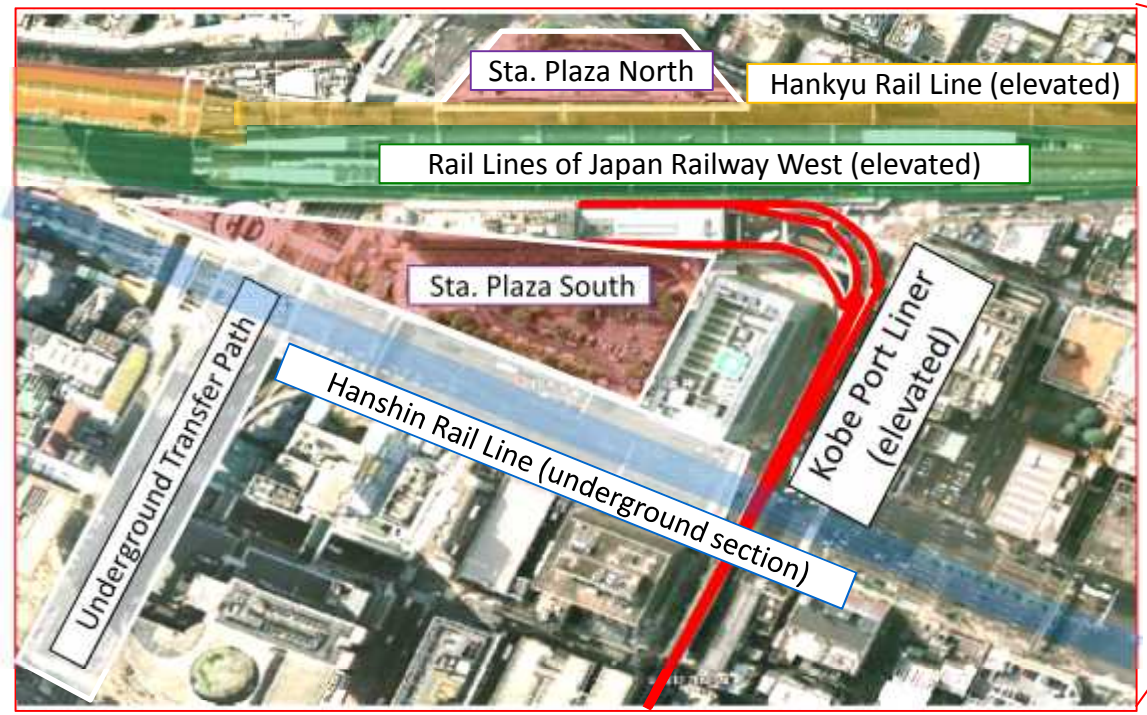


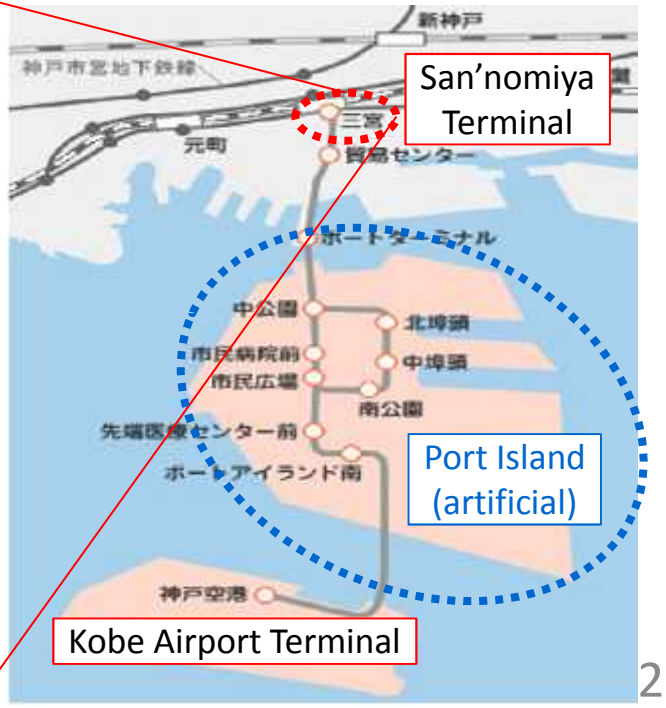

Source: MLIT "Urban monorail & New Transport System"

# Results of NTS 【No. 2】

**Quick and Smooth Transfer**
w/ other transport modes

**This would be realized with close coordination in planning and designing stages.**



# Several Merits of Japan's AGT
## = New Transport System =

# Ten (10) Merits of NTS
# 【No. 1】

## Sufficient Transport Capacity

- 10-20 thousand passengers per hour
  (≒ Four (4) times of the Streetcar)
- or more that depends on customer's requirement

13,000 vehicles

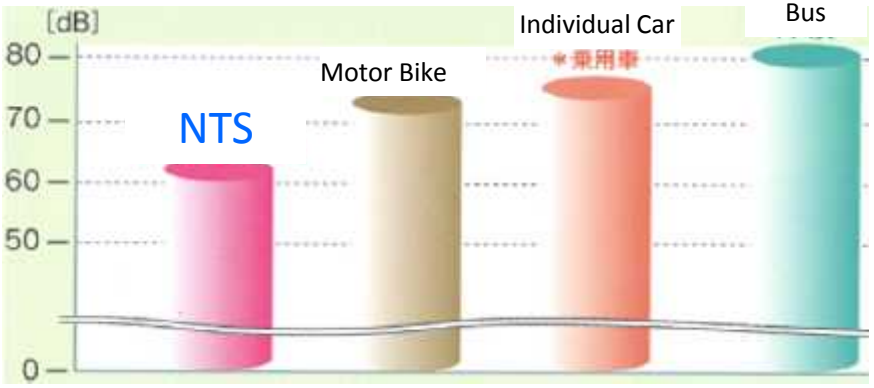
＝

1 train
(20 thousand passengers / hour)

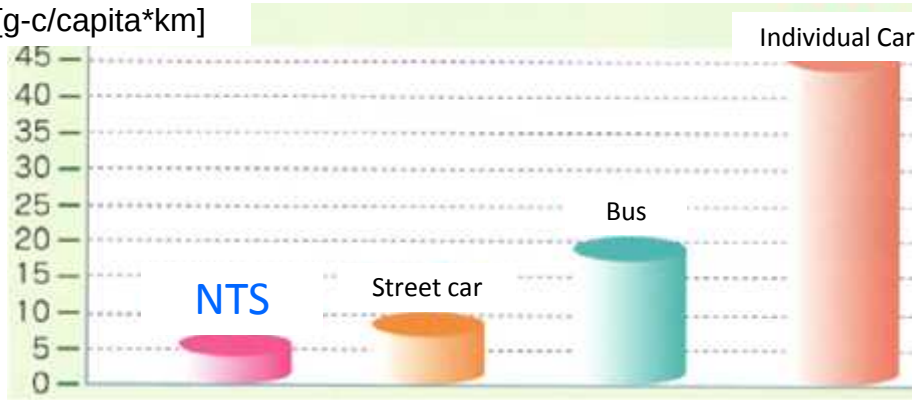
# Ten (10) Merits of NTS
# 【No. 2】

## Environmentally Friendly & Stable System

- lower noise and vibration!
- no exhaust gas!!
- Stable structure with less swinging!!!


Noise Level (7.5m far from the road-edge)




Emission Unit of $CO_2$

Source: MLIT "Urban monorail & New Transport System"

# Ten (10) Merits of NTS
# 【No. 3】

## Easy to Turn around

- Turning radius: 30 meters minimum
  (in case of the Large car)
  (Usually, more than 160 m (ordinary train) & 100 m (monorail)
- Gradient: ten (10) % maximum
  (Usually, 1 % for the cargo train; 3 % for the ordinary train)

# Ten (10) Merits of NTS
# 【No. 4】

## Simplified Structure

AGT: **Simple construction** for running plinth (**no catenary** system is needed.)

MRT: **Catenary** system is required.

Monorail: Higher accuracy is required for the **girder beam**, and Special work shops are necessary.

# Ten (10) Merits of NTS
# 【No. 5】

**Lower Costs for Construction & others**

= lighter and small-sized infrastructure =

Examples of
**Construction** Costs
(in case: NTS = 1)

| NTS | 1 |
|---|---|
| Subway | 3 |
| Monorail | 1.2 |
| Guideway Bus | 0.5 |
| Streetcar | 0.7 |

* Costs for land acquisition are excluded.

Source: Eiji WATANABE "Project findings of Monorail overseas & Project Management", 2010

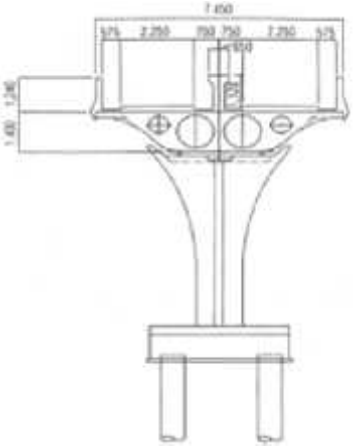
# Ten (10) Merits of NTS
# 【No. 6】

**No Delay for Construction**

= No need for R.O.W. land acquisition =
**vs.** ordinary train system

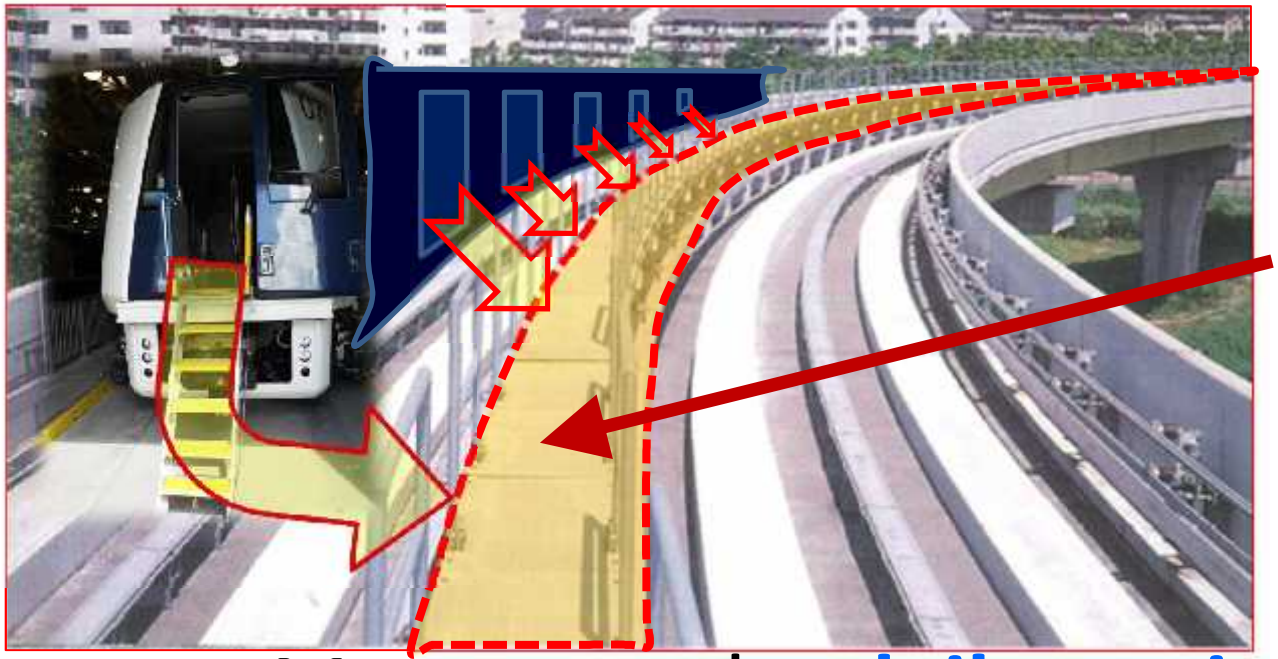
Infrastructure of **NTS** is to be constructed within the current road space.

Just **7.45** meters wide



# Ten (10) Merits of NTS
# 【No. 8】

## Safer System in an Emergency



**Path** for the **daily maintenance**;
it will be utilized in case of **evacuation**!

Moreover, the **daily maintenance** is easy to safely carry out.

# Ten (10) Merits of NTS
# 【No. 9】

**Strong & Safer System w/ simple structure against natural disasters such as Typhoon, Earthquake, or Road flooding**


Direct access to the upper floor of the building!

# Ten (10) Merits of NTS
# 【No. 10】

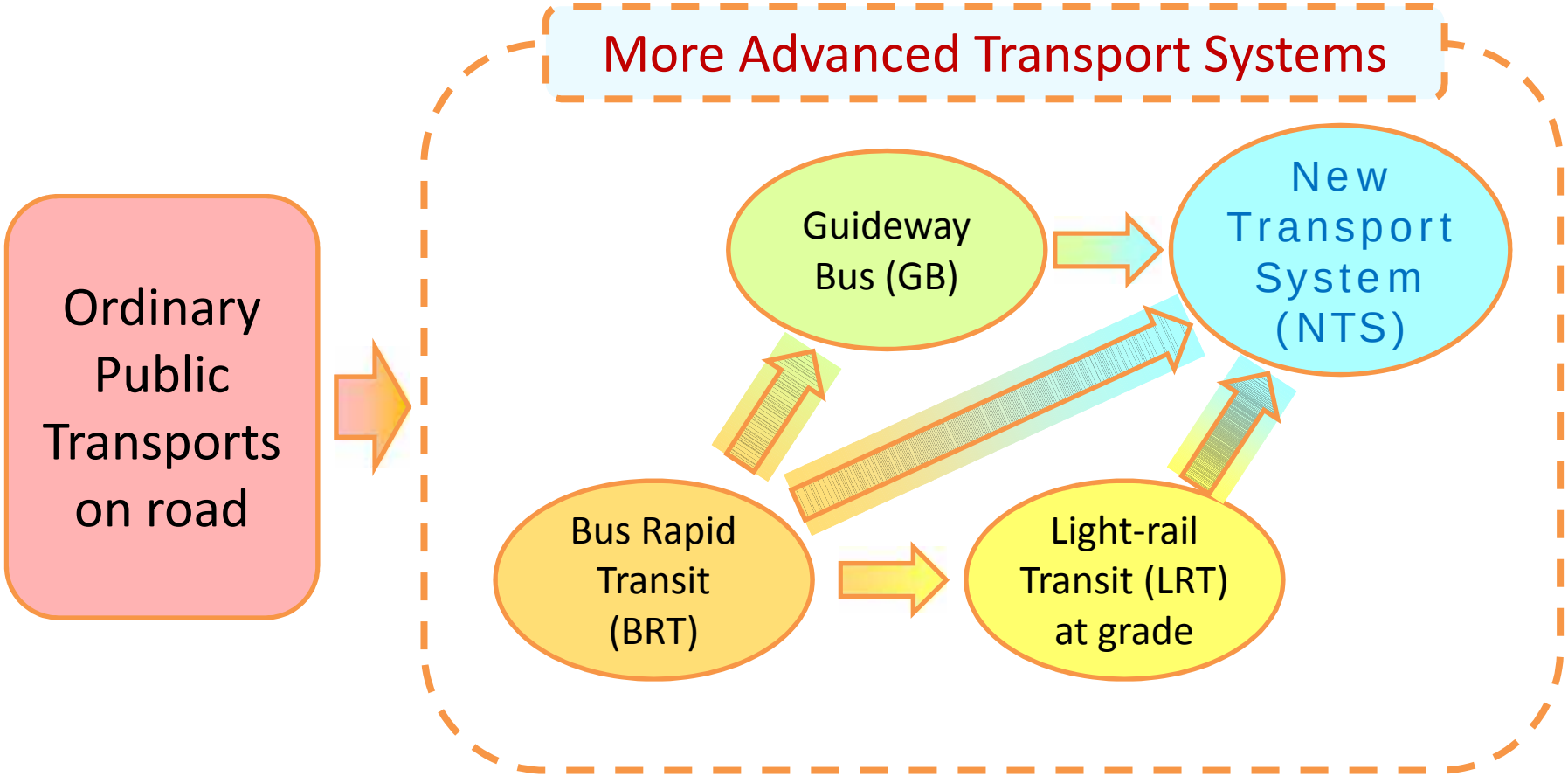
**No Driver needs for Operating Trains**

# We are waiting for you in Tokyo !!!

TOKYO 2020


Refined Transport System, Better Quality-of-Life
= WE PROVIDE COMPREHENSIVE SOLUTIONS! =
JTPA
Japan Transportation Planning Association
http://www.jtpa.or.jp/eng/
E-mail to: mail@jtpa.or.jp

# Ideas for Shifting Transport Modes to More Advanced Systems following increasing in passenger needs



# Guideway Bus

The Guideway Bus, or **GB**, is the **standardized system** of Japan.

It can **run both** on:

**(i)** **ordinary streets**; and

**(ii)** **elevated exclusive guideways** in **areas with frequent traffic jams**.

# Japan's LRT at grade

LRT provides passengers quicker and more regular moving, and realize modal change from private cars and other transport modes.

Okayama
MOMO

Kagoshima
YOUTRAM Ⅱ

Hiroshima
Greenmover

Toyama
PORTRAM


LRT of the **next generation** is more **environment-friendly** and more **accessible to aged and physically or handicapped passengers**.

# LRT grade separated

## Manila MRT Line 3

**Scope by Japan's maker:**

System Integration,
Train, E&M System, Civil,
Maintenance

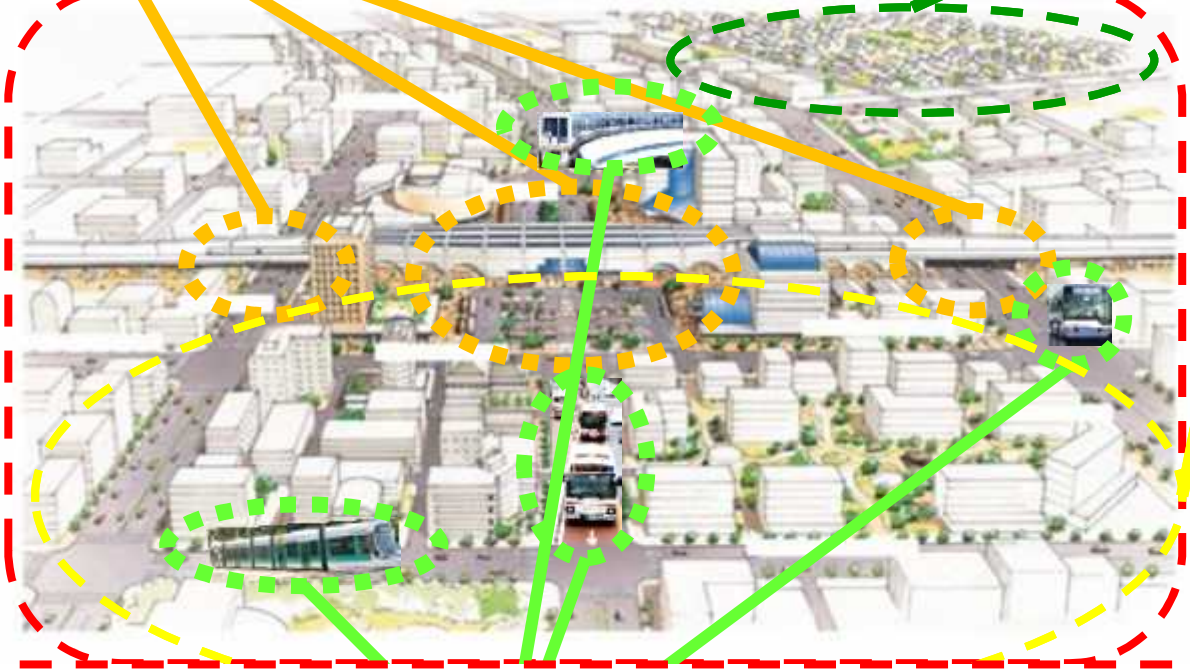
| System Overview | |
|---|---|
| **Speed** | Max 65km/h |
| **Number of Cars** | 73 cars |
| **Passenger Capacity** | 28,500 pphpd * (600 thousand/day) |

* Passengers per hour per direction

# JTPA's Work Fields & Staff

Transport Hub (Station plaza), Crossing removal

Heritage-restored / Environmentally Sustainable Dev.



Overseas Activities

Bicycle, Paratransit, Personal mobility

Integrated Transport Policy, Urban Renewal

Automated Guideway Transit (AGT), Guideway Bus, Light-rail Transit (LRT), Bus-rapid Transit (BRT)

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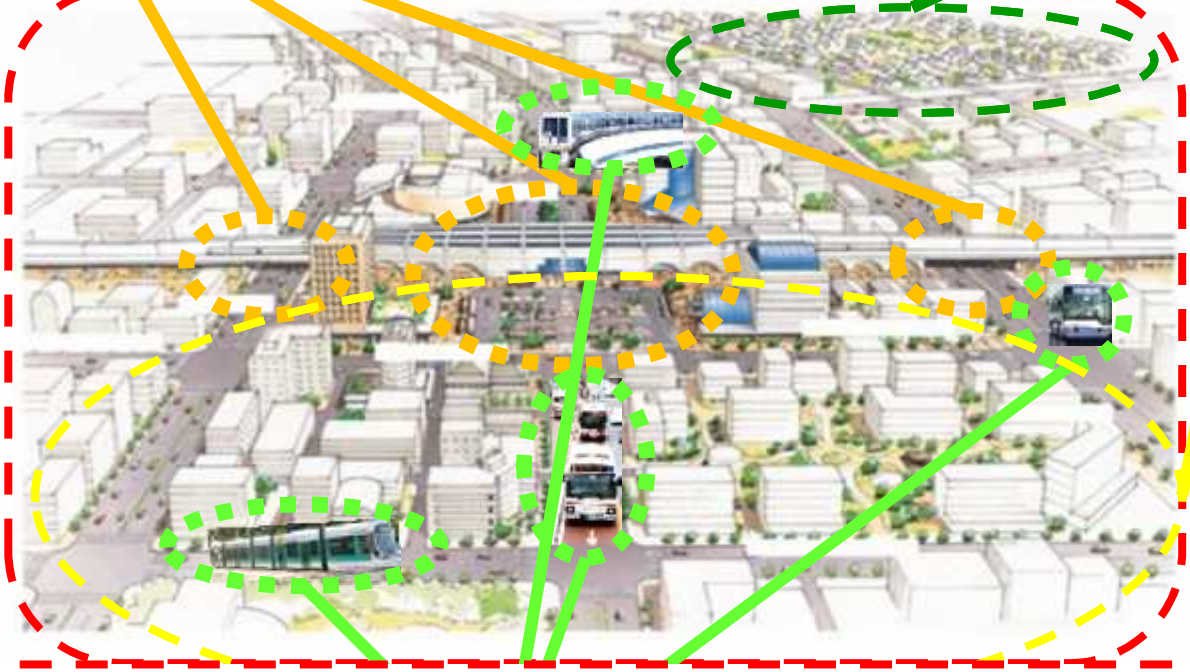

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Bicycle, Paratransit, Personal mobility

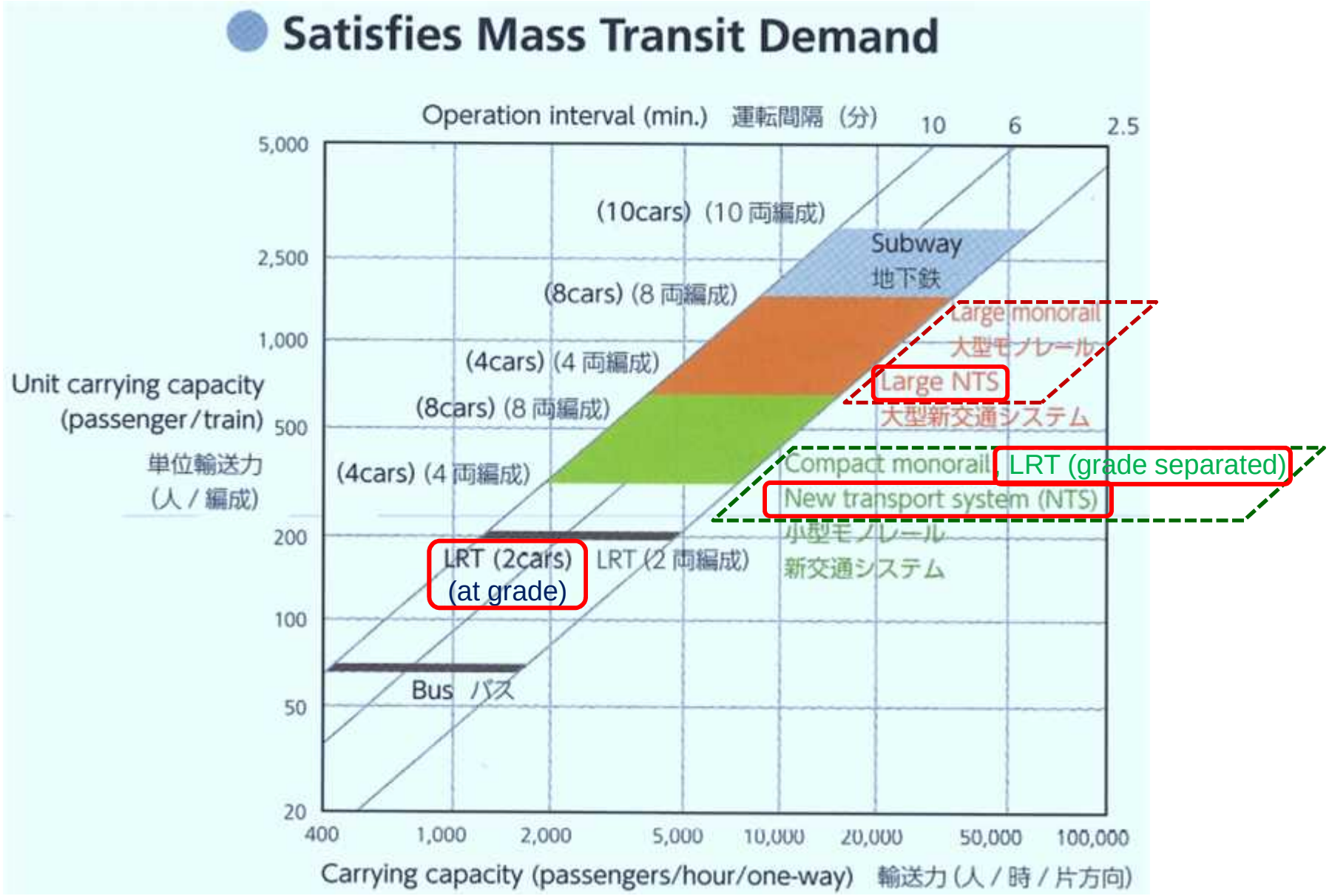
Integrated Transport Policy, Urban Renewal

Automated Guideway Transit (AGT), Guideway Bus, Light-rail Transit (LRT), Bus-rapid Transit (BRT)

# Today's AGENDA

1. Classification of Urban Public Transport Systems (page 5 -)
2. New Transport System = Japan's standardized AGT (page 16 -)
3. Three (3) Typical Schemes for gaining the Development Profit (page 39 -)
4. Transit oriented development (TOD) (page 45 -)
5. Institutional dev. for the project manager (page 56 -)

# Comparison of Transport Capacity




Source: MLIT, 2012

# Competitors for Medium Capacity Transits

## Rubber-tire System

### AGT

**<< Japan >>**

**Mitsubishi H.I.**
**KOBELCO**
**IHI (Niigata Transys)**
**J-TREC**
**Nippon Sharyo**

**vs.**

**<< Overseas >>**

**Bombardier**, Canada
**Siemens**, Germany
**Rotem**, Korea

### Monorail (Straddled type)

**<< Japan >>**

**Hitachi**

**vs.**

**<< Overseas >>**

**Bombardier**, Canada
**SCOMI** , Malaysia
**Changchun Rail Vehicle**, China
**Woojin**, Korea

## Steel-wheel System

### LRT (grade separated)

**<< Japan >>**

**IHI (Niigata Transys)**
**Kinki Sharyou/MHI**
**J-TREC**

**vs.**

**<< Overseas >>**

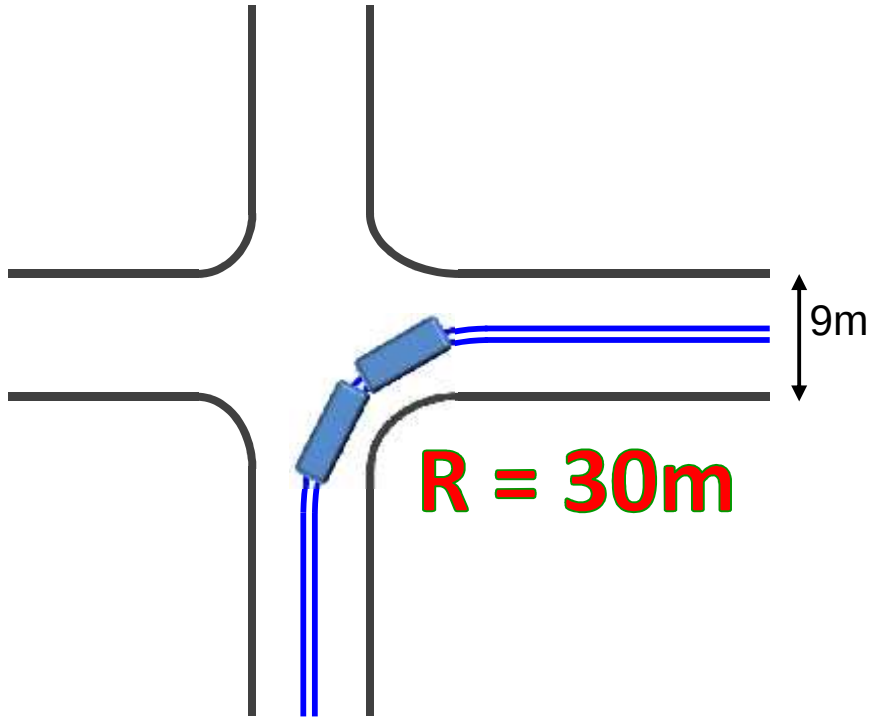
**Bombardier**, Canada
**Siemens**, Germany
**Alstom** , France
**Ansaldobreda**, Italy
**CAF**, Spain

# Summary of the Comparison among Urban Transport Systems

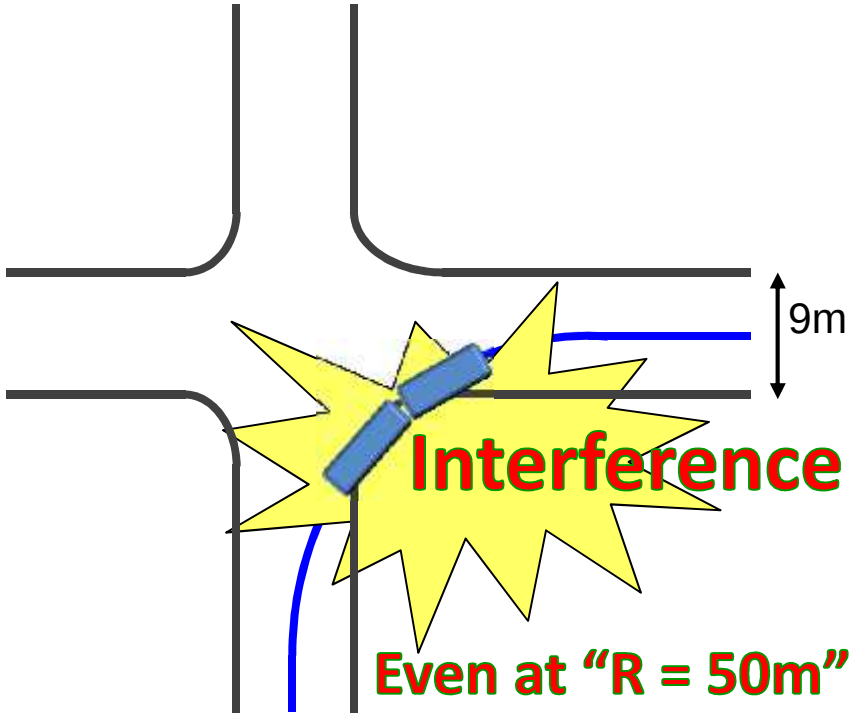
| CONTENTS | | | Mass Transit | | Medium Capacity Transit | | | Small-Medium Cap. Transit |
|---|---|---|---|---|---|---|---|---|
| | | | Ordinal Train | Subway | Monorail (Large) | NTS (Standard, Large) | LRT (grade-separated) | LRT (at grade) |
| 0 | effective alleviation of traffic congestion | | ◎ | ◎ | ○ | ○ | ○/◎ | △ |
| 1 | trassport capacity | | ◎ | ◎ | ○ | ○ | ○ | △ |
| 2a | environment-friendly (power consumption) | | △ | △ | ○ | ◎ | ◎ | ◎ |
| 2b | noise, viblation, swing (left & rigjt) | | △ | △ | ○ | ◎ | △ | △/◎ |
| 3a | ease to turn around | radius (left & right) | △ | △ | △ | ◎ | △ | ○ |
| 3b | | gradient (up-down) | △ | △ | ◎ | ◎ | △ | △/◎ |
| 4 | structure simpleness (girder, OH-catenary) | | △ | △ | △ | ◎ | △ | ○ |
| 5 | life-cycle costs (land/depot, civil, E&M, O&M) | | △ | △ | ○ | ◎ | ○ | ◎ |
| 6 | necessity of land acquisition (line) | | △ | △ | ○ | ◎ | ○ | ○ |
| 7 | easy changing the vehicle configuration | | △ | △ | △ | ◎ | △ | △ |
| 8 | emergency evacuation | | ○ | ○ | ×/△ | ◎ | ○ | ◎ |
| 9 | automated operation (no driver system) | | ○ | ○ | △ | ◎ | △ | × |
| 10 | safer in the road flooding | | ○ | ○ | ○ | ○ | ○ | × |

【Legend】 ◎:excellent/standerdized; ○:good/actual case(s); △:acceptable/possible; ×:difficult/impossoble

# AGT's Small curve radius meets higher flexibility of alignment in Central Business District (CBD)

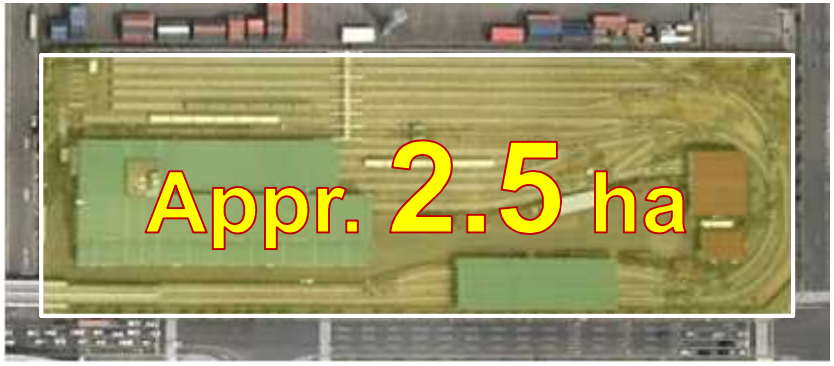



AGT w/ Large Cars




MRT/Monorail

# AGT's Depot Area could be smaller due to its smaller curve radius





**AGT w/ Large Cars** **M R T / Monorail**

***Note: 15 train sets are stored at each depot.***

# Ten (10) Merits of NTS
# 【No. 7】

## Easy to Change the Vehicle Configuration Even within the Daily Operation

| Short range / Long range | Operating Train Configuration | |
|---|---|---|
| | Daily Off-Peak period | Daily Peak period |
| Initial Phase |  Easy change even during operation hour |  |
| Ultimate Phase to Increase the capacity |   |  |

# Compared with : the Monorail

**Once happened:**

- Blackout (Power failure);
- System trouble, Fire; or
- Other accidents/disasters.

# Examples: Railways (1)

| | | |
|---|---|---|
| ordinary railway |  |  |
| guided railway<br>(**N**ew **T**ransport **S**ystem) |  | |
| suspended railway<br>(monorail- type 1) |  | |
| straddled railway<br>(monorail- type 2) |  | |

Railways/Railtracks which ***JTPA*** has carried on.

# Examples: Railways (2)

non-guided electric car (trolley bus)

wire-roped railway

float-typed railway (linear-motor car)

others:

- magnetic-inducted railway (ex. IMTS)

Railways/Railtracks which **JTPA** has carried on.

# Exs: Cablecars & Exclusive railways

| | | |
|---|---|---|
| cablecars | ordinary cablecar (ropeway, gondola) |  |
| | special cablecar (lift) |  |
| exclusive railways | exclusive railway |  |
| | Streetcar |  |
| | Light rail transit (LRT) |  |

Railways/Railtracks which ***JTPA*** has carried on.