Eurailspeed

Parallel Session E.1

Chung, Yong-Chul

Vice-President

Korean Railroad Research Institute, KRRI

Under the patronage of

Organisers

Partners

Media partner

A study of the Korean Maglev development program

speaker Chung, Young – Chul , KRRI

1. Introduction

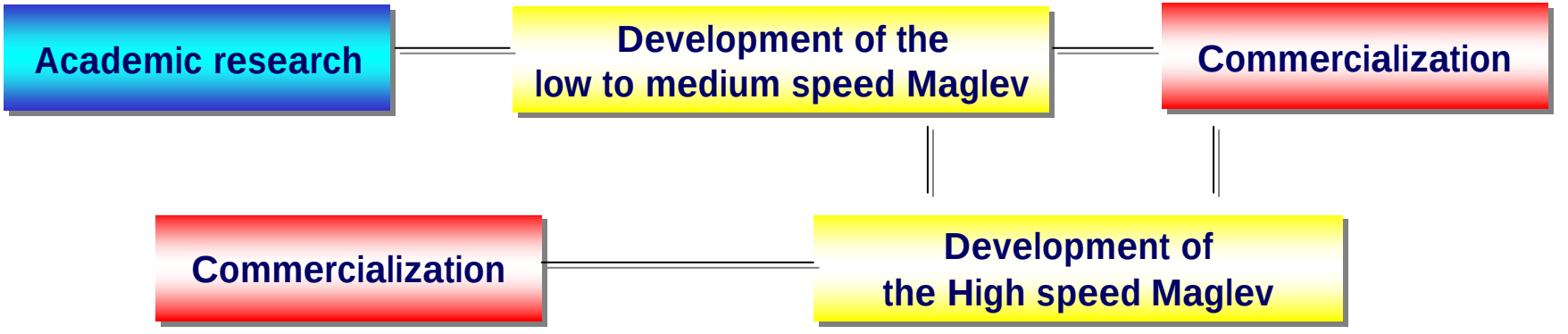
- After a successful opening of the KTX, high speed train between Seoul and Busan and Mokpo(‘04.4.1) and also developing Korea type High Speed Train (G7 350km/h ’04.12) and Maglev (’05. 5).
- Korea is interested in commercial development of Korean high speed train and ,maglev (low to medium speed 110Km/h) more and more.

- The ultimate goal of the Maglev program in Korea is to develop a super high speed Maglev system through basic technology research and low to medium speed Maglev development, until now three Korean Maglev models were designed. Two of them have been developed and the third one is being developed.

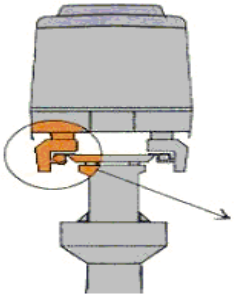
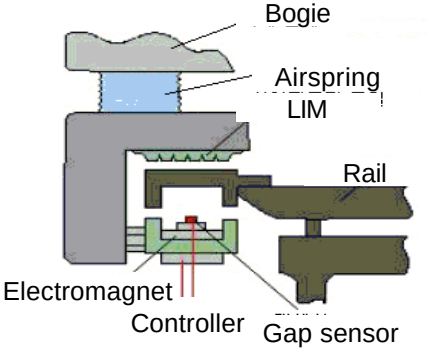
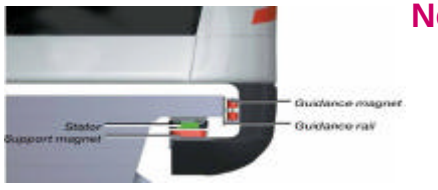
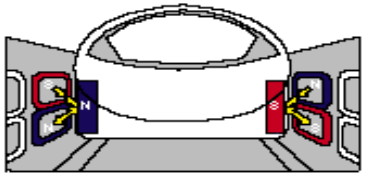
- In this paper, current status of Maglev program in Korea – what has been done so far, future planning and further efforts – is reported.
- In addition, this paper will be helpful to developing korean Maglev and be referenced to a country having an interest in Maglev development.

2.1. Background of the Program

- **Successful Maglev development of Germany & Japan**
  - Germany (1968), Japan (1970)
- **Valuable future generation technology, Innovative transit method**
  - More advantageous than the Wheel-on-rail system
  - Simple system, Increasing speed, Stability, Reducing management cost
- **Alternative system of Korea's high speed train development project.**
  - Feasibility study from Seoul to Busan (300km/h) ; 1984
- **R&D led by universities and private companies in early stage**
- **Korean government has been leading Maglev R&D policy since1989**



2.2. Type of the Maglev system

	Korea	German/Japan
Levitation system	**EMS** **(Electro Magnetic System)** **- German Transrapid**	**EDS** **(Electro Dynamic System)** **-Japan MLX**
Propulsion	**Short stator system** **(Linear Induction Motor)**	**Long Stator system** **(Linear Synchronous motor)** **-Transrapid ,MLX**
Usage	**Medium speed ,Short distance**	**Super high speed, Long distance**
Characteristics	**Levitation Gap : about 10mm** **Noise Level : 65dbA, Vibration : 0.02 g** **Min. Curvature : 50m, Max. Gradient : 7%**	**Levitation Gap : about 100mm for Japan MLX system**
System structure	**Normal Conductor**  Bogie & rail  **T – type**	 **Normal Conductor** **T - type**  **Superconductor** **U - type**

2.3. Brief history of the Program

Early stage Development of basic technology	• **Started R&D in Dec. 1989** • **'93 World Exhibition in Daejeon, Korea (HML-03)** - 3010km (560section),300 thousand people(93days),18 billon won
Development stage Development of useful technology	• **Urban Transit Maglev (UTM-01, 1998)** - National R&D project (KIMM) • **Construction of Maglev test track, 1.3 Km** - Korea Institute of Machinery & Materials (KIMM) - 1994 - 1998, 30000km, 25 billion won
Commercialization stage Development of practical technology	• **Commercialization model with ATO system (UTM-02)** - Development Period : 2003.10 – 2006.9 - 120,000km, 1train with 2carriage (110km/h) - 12.3 billion won, ATP, ATO, ATC

EXPO'93 HML-03

UTM-01

UTM-02

2.4. Future program

Commercialization of the Korean Maglev system

- Period : 2006 – 2010 (5 years)
- R&D Cost : 694 billion korean won (economic effect : 2168 billion won)
  - First stage ; 7 km Double Track
    (Construction & Vehicle manufacturing & R&D cost : 450 billion won)
  - Second stage ; Extention of the first phase project
    (5.7 km, cost : 244 billion won)
- Location of the line : yet to be determined
  (Daejeon youseong, Busan international airport, Sorak mountain area)
- Guideway construction & Reliability/Stability test

❖ Decision of promoting as government leading project (2005. 5)

- National assembly of Ministers related S&T
  (Decision making organization of major national R&D projects)

Commercialization of the low-to-medium Maglev system (2007. 4)

- Daejeon Science museum – EXPO, 1 km, 7.7billion won
- Commercialization model UTM-02
- Low to medium speed Maglev system

Development of the High speed Maglev system

2006 – 2008 Initiated by the Korea Institute of Machinery & Materials (KIMM)

3. Suggestion for further works

- Selection of location for business opportunities and easy progressing of commercialization project
  - Easy guideway construction, making a business profit, popular complaints
- Design of guideway, signal control, operation equipment in view of System Engineering.
- Joint research with professional research institute (KERI, KRRI, KICT)
  - Importance of research for making guideway slim
    (improving a fine view and decreasing construction cost)
  - Research and standardization of parts with a view of stability and reliability
- Need to construct and develop the high speed Maglev system as soon as possible
  - Confirmation of technology achievement in developing high speed Maglev for enhancing global marketing
  - Constructing guideway nearby Seoul, Ilsan-Seoul-Boondang (45km, 3000 billion won), Incheon International Airport - Seoul (55km, 3700 billion won)

4. Conclusion

- Although Korean development plan for Maglev was setting up later than other countries, Korea would succeed its development for commercialization with efficient R&D plan and Maglev is expected to lead the future innovative transport system.