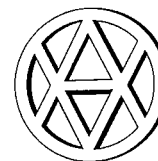


The Fifth International Symposium on Linear Drives for Industry Applications
LDIA2005 Kobe-Awaji, Timetable

Sunday, 25, September, 2005	
18:00-20:00	Registration : <i>Registration Counter, 2F</i>
18:00-20:00	Welcome Party : <i>Reception Hall (B), 2F</i>
Monday, 26, September, 2005	
8:30-18:00	Registration, <i>Registration Counter, 2F</i>
	Room A, Main Hall, 2F Room B, Amphitheater, 1F
9:00- 9:20	Opening Ceremony
9:20-10:40	Keynote Speeches
10:40-11:00	Break
11:00-12:40	Oral 1 [A26A1] Micromachine Oral 2 [B26A1] Analysis
12:40-13:40	Lunch
13:40-15:40	Poster Session 1 (<i>Lobby, B1F</i>) [L26P1] Electromagnetic linear motors and actuators I [L26P2] Control technologies for linear drives I [L26P3] Non-electromagnetic linear motors and actuators [L26P4] Analyses of electromagnetic field and force field [L26P5] Materials [L26P6] Subsystems for linear drives [L26P7] Related topics and new technologies [L26P8] Office & home automation
15:40-16:00	Break
16:00-17:40	Oral 3 [A26P1] Linear Drive Application Oral 4 [B26P1] Multidimensional Drive
17:50-18:20	A classical puppet play "Awaji Ningyo Jyoruri", <i>Event Hall, B1F</i>
18:30-20:30	Banquet, <i>The Plant Museum of Miracle Planet</i>
Tuesday, 27, September, 2005	
8:30-15:40	Registration, <i>Registration Counter, 2F</i>
	Room A, Main Hall, 2F Room B, Amphitheater, 1F
9:00-10:40	Oral 5 [A27A1] Linear Motor & Actuator I Oral 6 [B27A1] Levitation I
10:40-11:00	Break
11:00-12:20	Oral 7 [A27A2] Linear Motor & Actuator II Oral 8 [B27A2] Levitation II
12:20-13:20	Lunch
13:20-15:20	Poster Session 2 (<i>Lobby, B1F</i>) [L27P1] Electromagnetic linear motors and actuators II [L27P2] Control technologies for linear drives II [L27P3] Levitation technologies [L27P4] Linear Drive Applications [L27P5] Transportation [L27P6] Factory automation and machine tools
15:20-15:40	Break
15:40-17:00	Oral 9 [A27P1] Control Oral 10 [B27P1] Actuator & Sensor
17:10-17:20	Closing Remarks
Wednesday, 28, September, 2005	
9:00-17:00	Technical tour



The Fifth International Symposium
on
Linear Drives
for Industry Applications

LDIA 2005
Kobe - Awaji

September 25-28, 2005,
Kobe-Awaji, Hyogo, Japan

Sponsored by :
Industry Applications Society, The Institute of Electrical Engineers of Japan

In cooperation with:
The Japan Society of Mechanical Engineers
The Japan Society of Applied Electromagnetics and Mechanics
The Japan Society for Precision Engineering
Industry Applications Society Japan Chapter, IEEE
Hyogo Prefecture

Supported by :
The Nikkan Kogyo Shimbun, Ltd.
Kobe University

OBJECTIVES

The Fifth International Symposium on Linear Drives for Industry Applications (LDIA2005) will provide a forum for the discussion of present research and development activities and future prospects related to the linear drives for industry applications. Although linear drive systems have spread to applications in industry, there still remain many issues to be solved. This symposium will contribute to finding these solutions and the further development of linear drive technology.

TOPICS

- 00 Trend and new development of linear drives (survey)
- 10 Electromagnetic linear motors and actuators
 - 11 linear motors
 - 12 linear actuators
 - 13 nano-, micro-actuators
 - 14 multi-dimensional linear drives
- 20 Non-electromagnetic linear motors and actuators
 - 21 linear motors
 - 22 linear actuators
 - 23 nano-, micro-actuators
 - 24 multi-dimensional linear drives
 - 25 bio-actuators
- 30 Control technologies for linear drives
 - 31 linear drive and motor control
 - 32 control theory
 - 33 applications of new control theory
 - 34 modeling and identification
- 40 Levitation technologies
 - 41 magnetic levitation for linear drives
 - 42 magnetic suspension for motor revolution
 - 43 electric field levitation
 - 44 control strategies
 - 45 novel levitation control scheme
- 50 Subsystem for linear drives
 - 51 bearings
 - 52 power sources and power conversion
 - 53 sensors and measurement systems
- 60 Applications of linear drives and levitation technologies
 - 61 transportations
 - 62 factory automation and machine tools
 - 63 office automation
 - 64 robotics

- 65 home and medical applications
- 70 Analyses of electromagnetic field and force field
 - 71 numerical analyses
 - 72 analyses of coupled system
 - 73 visualization
 - 74 dynamics
- 80 Materials
 - 81 permanent magnet
 - 82 superconductor
 - 83 piezo device
 - 84 magnetic materials
 - 85 special design of force elements
- 90 Other related topics and new technologies

PROGRAM

- Sept. 25 Registration, Welcome Party
- Sept. 26 Opening Ceremony, Keynote Speeches, Technical Sessions, Banquet
- Sept. 27 Technical Sessions, Closing Remarks
- Sept. 28 Technical Tour

VENUE

The Symposium will be held at the Hyogo Prefectural "Awaji Yumebutai" International Conference Center^{*1}, Awaji Island, Hyogo, Japan. Awaji Island, the island of flowers, is connected to Kobe City by the world's longest suspension bridge Akashi-Kaikyo Bridge. Travel time from Kansai International Airport to the Conference Center is less than two hours by limousine bus. Frequent bus services are available between the Conference Center and JR Maiko or San-no-miya stations, downtown Kobe City, in 30 to 40 minutes.

The world's cultural heritage "Himeji Castle" is about one hour trip by bus and train. Kyoto is about one hour and half trip by bus and train.

The 2005 World Exposition^{*2}, "Nature's Wisdom", Aichi, Japan will be held from March 25 to September 25, 2005, near by Nagoya City. The linear induction motor driven electromagnetically suspended people mover system, "Linimo"^{*3}, will be in service to connect Nagoya City and Expo site.

*1: http://www.yumebutai.org/conf_e/

*2: <http://www-0.expo2005.or.jp/en/>

*3: <http://www.linimo.jp/> (in Japanese)

LANGUAGE

The official language of the Symposium is English, which will be used for all printed materials, presentations and discussions.

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	S. Ohashi	Kansai University, Japan
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	T. Sugiura	Keio University, Japan
	H. Wakiwaka	Shinshu University, Japan

M. Watada Musashi Institute of Technology, Japan
T. Watanabe FDK Corp., Japan
T. Yano National Institute of Advanced Industrial
Science and Technology, Japan

TECHNICAL TOUR

[Date & time]

September 28th Wednesday 9:00-17:00

The technical tour is planned to visit maintenance yard of linear metro, the Municipal Subway, Kobe City and the World's Heritage, Himeji-Castle.

[Schedule]

9:00 Depart from The Westin Awaji Island Resort and Conference Center by bus
10:30 The World's Heritage, Himeji-Castle
12:00 Lunch at a restaurant in a Japanese garden nearby the castle.
14:30 The Misaki train depot, the Municipal Subway, Kobe City.
17:00 JR San-no-miya station.
17:10 JR Shin-Kobe Station, Shinkansen bullet train.

[Fee]

JPY 7,000 for a person

[Maximum capacity]

40 people

When the applicant becomes 40 people, the application for the tour will be closed.

[Reservation]

Reservation should be made through LDIA2005 homepage.

ACCOMMODATION

The Westin Awaji Island Resort and Conference Center will provide ocean front deluxe twin rooms to the conference attendees and their accompany persons, with valuable conference rate. Information about other hotels within one hour trip by bus from the conference site, will be provided through the LDIA2005 Home Page.

DEADLINES

Receipt of abstracts	January 31, 2005
Notification of acceptance	March 15, 2005
Receipt of full papers	June 30, 2005

LDIA2005 SECRETARIAT

Professor T. Azukizawa
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Phone & Facsimile : +81-78-431-6280
E-mail: ldia05@maritime.kobe-u.ac.jp

TECHNICAL PROGRAM

Sunday, Sept. 25, 18:00-20:00 Welcome Party (Reception Hall B, 2F)

Monday, Sept. 26, 9:00-9:20 Opening Ceremony (Main Hall)

Chairperson: Prof. T. Azukizawa, *Kobe University, Japan*
Prof. K. Ohnishi, *President, Industry Applications Society, IEEJ, Japan*
Prof. H. Ohsaki, *Chairperson, Organizing Committee, LDIA2005, Japan*
Mr. K. Takano, *Director General, Awaji Yumebutai International Conference Center, Hyogo Prefecture, Japan*

Monday, Sept. 26, 9:20-10:00 Keynote Speech I (Main Hall)

Chairperson: H. Ohsaki, *The University of Tokyo, Japan*
A26K-1 Levitation Linear Motors for Precision Positioning, D. Trumper, *Massachusetts Institute of Technology, USA*

Monday, Sept. 26, 10:00-10:40 Keynote Speech II (Main Hall)

Chairperson: D. Ebihara, *Musashi Institute of Technology, Japan*
A26K-2 Evolution from MEMS-based Linear Drives to Bio-based Nano Drives, H. Fujita, *The University of Tokyo, Japan*

Monday, Sept. 26, 11:00-12:40 Micromachine (Oral: Main Hall)

Co-Chairperson: D. Collard, *Institute d'Electronique de Micro Electronique et de Nanotechnologie, France*
Co-Chairperson: H. Fujita, *The University of Tokyo, Japan*
A26A1-1 3D Numerical Model of Subcutaneous Insulin Micro-Pump Infusion System, I. S. Stefanini, M. Markovic, A. Cassat, Y. Perriard, *Ecole Polytechnique Fédérale de Lausanne, Switzerland*
A26A1-2 Design and Simulation of Voice Coil Motors for Micro-contact Imprint, P. J. Wang, K. J. Tseng, B. H. Lin, C. H. Liu, *National Tsing Hua University, Taiwan*, F. Chang, M. T. Chiang, *ITRI, Taiwan*
A26A1-3 Electrostatic Controlled Linear Inchworm Actuator for Precise Step and Parallel Motion, S. Konishi, A. Oshima, N. Kinoshita, I. Kumagaya, T. Kishi, *Ritsumeikan University, Japan*
A26A1-4 Micro-machined Actuators for Friction Driven Linear Micro-motors, B. Legrand, L. Buchaillot, D. Collard, *Institut d'Electronique, de Microélectronique et de Nanotechnologie, France*
A26A1-5 A Numerical Study on Suspension of Molecules by Microcantilever Probe, T. Hikihara, K. Yamasue, *Kyoto University, Japan*

Monday, Sept. 26, 11:00-12:40 Analysis (Oral: Amphitheater)

Co-Chairperson: D. Howe, *University of Sheffield, UK*
Co-Chairperson: S. Ohashi, *Kansai University, Japan*
B26A1-1 A Novel High Performance Linear Magnetic Gear, K. Atallah, J. Wang, S. Mezani, D. Howe, *The University of Sheffield, UK*
B26A1-2 Dynamic Analysis of Vacuum Interrupter with Linear Actuator, T. Nakagawa, *Mitsubishi Electric Corporation, Japan*, K. Muramatsu, K. Koda, *Saga University, Japan*
B26A1-3 Simulation of Linear Permanent Magnet Brushless DC Motor, L. Deliang, *Xi'an Jiaotong University, China*, L. Junyong, *Naval University of Engineering, China*
B26A1-4 Harmonic Balance Hybrid Finite Element-boundary Element Method Including Time Periodic Movement, B. Rezaealam, S. Yamada, *Kanazawa University, Japan*, J. Faiz, *University of Tehran, Iran*
B26A1-5 A Novel Network Topological Method for Thermal Analysis of PM Linear Motor, Y. J. Liu, C. Tang, S. Y. Ho, *ASM Assembly Automation Ltd., Hong Kong*

Monday, Sept. 26, 13:40-15:40 Electromagnetic Linear Motors and Actuators I (Poster)

Co-Chairperson: H. Ohsaki, *The University of Tokyo, Japan*
Co-Chairperson: T. Koseki, *The University of Tokyo, Japan*
L26P1-1 The Reliability Test for Linear Induction Motors, Y. Fang, Y. Xiao, Y. Y. Ye, *Zhejiang University, China*, G. Lin, F. Wang, *Shanghai Maglev Transportation Development Co., Ltd., China*
L26P1-2 A Method to Calculate the Speed Characteristics of Linear Induction Motors Using Operational Impedances, S. Yamamoto, T. Ara, *Polytechnic University, Japan*
L26P1-3 Thrust Characteristics of Linear Oscillatory Actuator for Liquid Pump and Its Effect to Vibration, N. Misron, K. C. Wong, N. Mariun, *Universiti Putra Malaysia, Malaysia*, H. Wakiwaka, *Shinshu University, Japan*, Y. Hiramama, *Institute of Professional Engineers, Japan*
L26P1-4 A Study of Novel Transverse Flux Linear Motor with High Power Density, J. Y. Lee, J. P. Hong, *Changwon National University, Korea*, J. H. Jang, D. H. Kang, *Korea Electrotechnology Research Institute, Korea*
L26P1-5 The Examination of the High Speed Drive and the Stability of Surface Motor, D. Misu, H. Dohmeki, M. Watada, S. Torii, D. Ebihara, *Musashi Institute of Technology, Japan*, Y. Aoyama, K. Ohashi, *Shin-Etsu Chemical Co., Ltd., Japan*
L26P1-6 An Advanced Model for a Linear Tubular Switched Reluctance Stepping Motor, K. Ben Saad, L. E. Amraoui, *Ecole Nationale d'ingénieurs de Tunis, Tunisie*, F. Gillon, *Ecole Centrale de Lille, France*, B. Ben Salah, M. Benrejeb, *Ecole Nationale d'ingénieurs de Tunis, Tunisie*, P. Brochet, *Ecole Centrale de Lille, France*
L26P1-7 Circle Diagrams of an Oscillating Synchronous Linear Motor, O. Roubíček, *MECHATRONIKA Praha, Czech Republic*, J. Peřina, *Technical University, Czech Republic*
L26P1-8 Design of a Modular Tubular Permanent Magnet Generator for a Free-Piston Energy Converter, J. Wang, D. Howe, *University of Sheffield, UK*
L26P1-9 Lateral Force of a Linear Synchronous Reluctance Motor, K. Ogawa, *Oita University, Japan*
L26P1-10 Electrical Time Constant Reduction of Two-phase Moving-coil LSM, T. Watanabe, K. Homma, *FDK Corporation, Japan*

- L26P1-11 Optimization of Slotless-type PMLSM for High Precision Driving, S. I. Kim, J. P. Hong, *Changwon National University, Korea*, Y. K. Kim, *Samsung Electronics Co. Ltd., Korea*, H. Nam, *LG Electronics Co. Ltd., Korea*, H. I. Cho, *OTIS-LG Elevator Company, Korea*
- L26P1-12 Design and Control of Improved Dual Servo VCM, H. K. Lee, J. H. Oh, D. C. Lee, B. I. Kwon, *Hanyang University, Korea*

Monday, Sept. 26, 13:40-15:40 Control Technologies for Linear Drives I (Poster)

- Co-Chairperson: J. P. Yonet, *Institute National Polytechnique de Grenoble, France*
 Co-Chairperson: T. Namerikawa, *Nagaoka University of Technology, Japan*
- L26P2-1 Simultaneous Motion and Normal Forces Control of Flat Permanent Magnet Linear Synchronous Motors Employed as Actuators, G. Martínez, M. Martínez-Iturralde, M. Castelli, A. García Rico, J. Flórez, *TECNUN (University of Navarra), Spain*
- L26P2-2 Non-Sinusoidal Electromotive Force Compensation of a PMLSM with Multiple-Frequency Resonant Controller, G. Remy, J. Zeng, P. J. Barre, P. Degobert, J. P. Hautier, *ENSAM Lille (EEA), France*
- L26P2-3 Coordinated Position Control for Double LSMs in Conveying System, L. Shi, J. Yang, Y. Li, S. Xu, *Chinese Academy of Sciences, China*
- L26P2-4 Efficiency-Optimized Speed Control for PM-LSM Applicable to Transient State under Consideration of Iron Core Losses, N. Takayama, Y. Ito, S. Fukuda, *Hokkaido University, Japan*
- L26P2-5 Simultaneous High Precision Control of the Position and an Oscillatory Mode of a Vacuum Air Bearing Linear Drive, P. A. Stadler, *University of Applied Sciences, Switzerland*, S. J. Dodds, *University of East London, UK*, H. G. Wild, *University of Applied Sciences, Switzerland*
- L26P2-6 Simple and Robust Indirect Thrust Control for Positioning of Linear Induction Motors, M. Martínez-Iturralde, G. Martínez, M. Castelli, A. García Rico, J. Flórez, *TECNUN (University of Navarra), Spain*
- L26P2-7 Direct Force Control of Linear Permanent Magnet Synchronous Motors, J. Faiz, I. Tabatabaei-Ardakani, S. H. Mohseni-Zoonozi, *University of Tehran, Iran*
- L26P2-8 Analysis of Motor Driver Uncertainties in Linear Permanent Magnet Motor Control Systems, W. C. Gan, M. S. W. Tam, K. K. C. Chan, G. P. Widdowson, *ASM Assembly Automation Ltd., Hong Kong*

Monday, Sept. 26, 13:40-15:40 Non-electromagnetic Linear Motors and Actuators (Poster)

- Chairperson: K. Oka, *Kochi University of Technology, Japan*
- L26P3-1 Prediction of Static Thrust Characteristics of a Linear Solenoid by Using Response Surface Methodology, M. Nirei, Y. Takizawa, *Nagano National College of Technology, Japan*
- L26P3-2 Design of the Stator for a Novel Traveling Wave Type Linear Ultrasonic Motor, H. W. Tang, M. S. Tsai, M. C. Tsai, *National Cheng Kung University, Taiwan*
- L26P3-3 Development of a Linear Microconveyer for Microfactory, T. Yanagi, M. Komori, *Kyushu Institute of Technology, Japan*

Monday, Sept. 26, 13:40-15:40 Analyses of Electromagnetic Field and Force Field (Poster)

- Co-Chairperson: T. Morizane, *Osaka Institute of Technology, Japan*
 Co-Chairperson: M. Tsukima, *Mitsubishi Electric Corp., Japan*
- L26P4-1 Variable Reluctance Linear Actuator Dynamics Analysis Based on Co-energy Maps for Control Optimization, A. Espirito Santo, M. R. A. Calado, C. M. P. Cabrita, *University of Beira Interior, Portugal*
- L26P4-2 Shape Optimization of Teeth Structure in Tubular-Type Linear Generator, J. W. Lim, H. Y. Choi, H. K. Jung, *Seoul National University, Korea*, S. K. Hong, *Hoseo University, Korea*, C. G. Lee, *Dong-Eui University, Korea*
- L26P4-3 Design Optimization of Air-Core Linear Permanent Magnet Synchronous Motors for Improved Performance and Cost, S. Vaez-Zadeh, A. Hassanpour Isfahani, *University of Tehran, Iran*, M. Moallem, *Isfahan University of Technology, Iran*
- L26P4-4 Analysis of Reciprocating Self-Excited Induction Generator Using Harmonic Balance Finite Element Method, J. Faiz, *University of Tehran, Iran*, B. Rezaeealam, S. Yamada, *Kanazawa University, Japan*
- L26P4-5 Modeling of Flux Density Distribution in Linear PMS Motors for Design Applications, S. Vaez-Zadeh, A. Hassanpour, *University of Tehran, Iran*
- L26P4-6 Analysis of High Speed Linear Induction Motors with Slotted Secondary, M. Mirzayee, M. Mirsalim, *Amirkabir University of Technology, Iran*, J. Faiz, *University of Tehran, Iran*, M. Ghodsi, *The University of Tokyo, Japan*
- L26P4-7 Analysis of Linear Induction Motors for HSST and Linear Metro Using Finite Difference Method, Y. Nozaki, T. Koseki, *The University of Tokyo, Japan*, E. Masada, *Tokyo University of Science, Japan*
- L26P4-8 An Improved Unified Analytical Method for PMLSM and Comparison in FEM, X. Wang, S. Yuan, F. Yu, F. Wang, *Henan Polytechnic University, China*
- L26P4-9 Finite-Element Analysis of Non-Sinusoidal Electromotive Force in a Permanent Magnet Linear Synchronous Motor, G. Remy, *Ecole Nationale Supérieure d'Arts et Métiers, France*, A. Tounzi, *Université des Sciences et Techniques de Lille, France*, P. J. Barre, *Ecole Nationale Supérieure d'Arts et Métiers, France*, F. Piriou, *Université des Sciences et Techniques de Lille, France*
- L26P4-10 Linear Motor's Cogging Minimization Using Quality Engineering and Finite Element Method, M. Ohto, Y. Miyamoto, Y. Tsutsui, *Yaskawa Electric Corp., Japan*
- L26P4-11 Induction Heating Calculation in Consideration of Moving and Forming of Heated Body, T. Yamada, *Nittetsu Plant Designing Corp., Japan*, K. Fujisaki, *Nippon Steel Corp., Japan*
- L26P4-12 Dynamic Performance of Electromechanical Shakers - Application of Duality, E. S. Hamdi, *Chalmers University of Technology, Sweden*, M. A. Al-Yadoumi, *Sana'a University, Republic of Yemen*
- L26P4-13 Calculation of Reactive Linear Synchronous Motor Transient Performance, L. Deliang, C. Shikun, *Xi'an Jiaotong University, China*
- L26P4-14 A Three Phase Linear Step Actuator Magnetic-Electric-Mechanic Coupled Modeling, W. Missaoui, L. E. Amraoui, M. Benrejeb, *Ecole Nationale d'Ingénieurs de Tunis, Tunisie*, F. Gillon, P. Brochet, *Ecole Centrale de Lille, France*

Monday, Sept. 26, 13:40-15:40 Materials (Poster)

Chairperson: T. Watanabe, *FDK Cooperation, Japan*

- L26P5-1 Development of a Soft Magnetic Composite Core for a Stirling Cooler Linear Motor, L. O. Pennander, G. Nord, *Höganäs AB, Sweden*, K. Maezawa, M. Saito, *Twinbird Corporation, Japan*
- L26P5-2 Magnetic Characteristic of the Arrangement Bulk HTS Sample on Some Permanent Magnet Arrays, H. Suzuki, A. Ito, *Fukushima National College of Technology, Japan*

Monday, Sept. 26, 13:40-15:40 Subsystems for Linear Drives (Poster)

Chairperson: S. Ohashi, *Kansai University, Japan*

- L26P6-1 Sensors for Displacements and Vibrations, B. Z. Kaplan, *Ben-Gurion University of the Negev, Israel*, U. Suissa, *Sami Shamoon College of Engineering, Israel*
- L26P6-2 Pull-in Thrust Characteristic Measurement of the Small Linear Synchronous Motor Using Pneumatic Loads, K. Seki, K. Shimogawa, H. Wakiwaka, *Shinshu University, Japan*, H. Yajima, N. Fujiwara, *SMC Corporation, Japan*

Monday, Sept. 26, 13:40-15:40 Related Topics and New Technologies (Poster)

Chairperson: S. Ohashi, *Kansai University, Japan*

- L26P7-1 A CMOS Rotary Encoder System Using Magnetic Sensor Arrays, T. Takahashi, *NTN Corporation, Japan*, K. Nakano, S. Kawahito, *Shizuoka University, Japan*
- L26P7-2 Basic Study of Linear Generator Configuration for Wave Power Generation, T. Matsushita, M. Sanada, S. Morimoto, Y. Takeda, *Osaka Prefecture University, Japan*
- L26P7-3 A Conceptual Design of Linear Actuator for Fish Robot, F. Zuo, S. Yamamoto, T. Azukizawa, *Kobe University, Japan*

Monday, Sept. 26, 13:40-15:40 Office & Home Automation (Poster)

Chairperson: K. Hirata, *Osaka University, Japan*

- L26P8-1 Design, Construction and Control of a High Performance XY Positioner, M. Castelli, M. Martínez-Iturralde, G. Martínez, A. García Rico, J. Florez, *TECNUN (University of Navarra), Spain*
- L26P8-2 The Development of Linear Synchronous Motor for Living Applications, K. Maruyama, Y. Kim, M. Watada, S. Torii, H. Dohmeki, D. Ebihara, *Musashi Institute of Technology, Japan*

Monday, Sept. 26, 16:00-17:40 Linear Drive Application (Oral: Main Hall)

Co-Chairperson: A. Cassat, *EPFL-STI-IPR-LAI, Switzerland*

Co-Chairperson: T. Namerikawa, *Nagaoka University of Technology, Japan*

- A26P1-1 Steering Guidance Control in SLIM Drives of Air-Suspended Hybrid LM Vehicle, K. Yoshida, *Kyushu University, Japan*, K. Oshima, M. Suganuma, *Nippon Otis Elevator Company, Japan*, T. Yoshida, H. Takami, *Kyushu University, Japan*, T. Kawai, *Nippon Otis Elevator Company, Japan*
- A26P1-2 A Tubular Permanent Magnet Machine Equipped with Homopolar Windings, J. Wang, D. Howe, *University of Sheffield, UK*

A26P1-3 Dynamic Characteristics of the Superconducting Maglev under Unusual Particular Operation, Y. Takeuchi, A. Yamanaka, J. Kitano, T. Nakanishi, Y. Mine, *Central Japan Railway Company, Japan*

A26P1-4 SWISSMETRO: Polarized Linear Motors Combined with Levitation Actuators, A. Cassat, *EPFL-STI-IPR-LAI, Switzerland*, C. Espanet, *University of Franche-Comité, France*, V. Bourquin, *Numexia, Switzerland*, P. Hagmann, *EPFL-STI-ISE-LIN, Switzerland*, M. Jufer, *EPFL-STI-IPR-LAI, Switzerland*

A26P1-5 General Atomics Urban Maglev Test Track Status, H. Gurol, R. W. Baldi, *General Atomics, USA*

Monday, Sept. 26, 16:00-17:40 Multidimensional Drive (Oral: Amphitheater)

Co-Chairperson: T. Yano, *AIST, Japan*

Co-Chairperson: S. Torii, *Musashi Institute of Technology, Japan*

B26P1-1 Development of a Spherical Motor Type Laser Tracker for the Portable 3D Position Measurement System, T. Yano, T. Takatuji, S. Osawa, *National Institute of Advanced Industrial Science and Technology, Japan*, Y. Motomura, T. Itabe, T. Suzuki, *Yasukawa Electric Co. Ltd., Japan*

B26P1-2 Development of an Arrayed Multi-Degree-of-Freedom Ultrasonic Motor, K. Otokawa, *Keio University, Japan*, K. Takemura, *Tokyo Institute of Technology, Japan*, T. Maeno, *Keio University, Japan*

B26P1-3 Magnetic Levitated 2D Fast Drive, I. Etxaniz, A. Izpizua, M. San Martin, J. Arana, *Fundacion Tekniker, Spain*

B26P1-4 Development of Cylindrical Two-Dimensional Linear Oscillatory Actuator, Y. Honda, S. Torii, D. Ebihara, *Musashi Institute of Technology, Japan*, Y. Hasegawa, *Matsushita Electric Works, Ltd., Japan*, K. Hirata, *Osaka University, Japan*

B26P1-5 Positioning Characteristics of a Coreless Surface Motor Using Halbach Permanent Magnet Array, Y. Ueda, H. Ohsaki, *The University of Tokyo, Japan*

Monday, Sept. 26, 17:50-18:20 A classical puppet play "Awaji Ningyo Jyoruri" (Event Hall, B1F)

Monday, Sept. 26, 18:30-20:30 Banquet (The Plant Museum of Miracle Planet)

Tuesday, Sept. 27, 9:00-10:40 Linear Motor & Actuator I (Oral: Main Hall)

Co-Chairperson: H. K. Jung, *Seoul National University, Korea*

Co-Chairperson: N. Maki, *Tokai University, Japan*

A27A1-1 Linear or Rocking Actuators for Camless Systems? J. P. Yonnet, *LEG, Lab d'Electrotechnique de Grenoble, France*, C. Fageon, *ITlink System, France*, C. Baldi, *PSA Peugeot Citroën, France*

A27A1-2 Study of Split Armatures and Related End Structures of Cylindrical Linear Synchronous Motors, A. Iwata, T. Lee, N. Maki, *Tokai University, Japan*

A27A1-3 Static Thrust Analysis of a Moving Magnet Linear Oscillatory Actuator for Vibration Cancel System, T. Mizuno, Y. Bu, M. Ohkubo, F. Tsuchiya, *Shinshu University, Japan*, H. Yamada, *Doctoral International Collaboration Institute, Japan*

A27A1-4 Design of the Transverse Flux Linear Motor with the Integrated Contactless Power Supply, J. M. Kim, D. H. Kang, *Korea Electrotechnology Research Institute, Korea*, S. J. Jung, *LG INNOTEK, Korea*, D. J. Bang, *SHINSUNG ENG Institute of Technology, Korea*

A27A1-5 High Acceleration Applications: Design Optimization and Comparison between Different Toothless Motors, S. Chevailler, A. Cassat, M. Jufer, *Ecole Polytechnique Fédérale de Lausanne, Switzerland*

Tuesday, Sept. 27, 9:00-10:40 Levitation I (Oral: Amphitheater)

Co-Chairperson: I. K. Kim, *General Atomics, USA*

Co-Chairperson: M. Morishita, *Toshiba Corp., Japan*

B27A1-1 Optimal Design Strategy for a Novel Linear Electromechanical Actuator, A. Lebedev, E. Lomonova, *Eindhoven University of Technology, The Netherlands*, D. Laro, *Delft University of Technology, The Netherlands*, A. Vandenput, *Eindhoven University of Technology, The Netherlands*

B27A1-2 Magnetic Force Responses in a Bearingless Induction Motor with a Squirrel Cage Rotor, T. Hiromi, A. Chiba, *Tokyo University of Science, Japan*, T. Fukao, *Musashi Institute of Technology, Japan*

B27A1-3 Air Gap Disturbance Attenuation of Magnetic Levitation Systems Using Discrete Kalman Filter, H. K. Sung, J. M. Jho, B. S. Kim, D. S. Kimm, *Korea Institute of Machinery & Materials, Korea*

B27A1-4 The Self-Gap-Detecting Electromagnetic Suspension System with Robustness against Variation of Coil Resistance, M. Morishita, H. Itoh, *Toshiba Corp., Japan*

B27A1-5 Robust H_∞ DIA Control of Levitated Steel Plates, T. Namerikawa, D. Mizutani, *Nagaoka University of Technology, Japan*

Tuesday, Sept. 27, 11:00-12:20 Linear Motor & Actuator II (Oral: Main Hall)

Co-Chairperson: D. Trumper, *Massachusetts Institute of Technology, USA*

Co-Chairperson: J. Kitano, *Central Japan Railway Company, Japan*

A27A2-1 Sensor-less Combined Vertical and Lateral Magnetic Damper by Using Linear Generator for EDS Maglev, T. Murai, Y. Sakamoto, *Central Japan Railway Company, Japan*

A27A2-2 A Novel Concept of a Transverse Flux Linear Free-Piston Generator, A. Cosic, C. Sadarangani, F. Carlsson, *Royal Institute of Technology, Sweden*

A27A2-3 Development of Flat-type Linear Generator for Free-Piston Engine, H. Y. Choi, J. W. Lim, H. K. Jung, *Seoul National University, Korea*, S. K. Hong, *Hoseo University, Korea*, D. H. Choi, H. Lim, *Hyosung Co., Korea*

A27A2-4 Control of a Surface Acoustic Wave Motor Using PID Controller, T. Suzuki, M. K. Kurosawa, *Tokyo Institute of Technology, Japan*, K. Asai, *Matsushita Electric Industrial Co., Ltd., Japan*

Tuesday, Sept. 27, 11:00-12:20 Levitation II (Oral: Amphitheater)

Co-Chairperson: D. Doll, *General Atomics, USA*

Co-Chairperson: M. Komori, *Kyushu Inst. of Technology, Japan*

B27A2-1 Dynamic Test for General Atomics Urban Maglev Test System, I. K. Kim, D. Doll, *General Atomics, USA*

B27A2-2 Prototype of Self-sensing Magnetic Bearing for Liquid Nitrogen Pump, S. Eguchi, T. Okuhata, M. Komori, *Kyushu Institute of Technology, Japan*

B27A2-3 3 Degrees of Freedom Fuzzy Model Based Nonlinear Control of Triple Configuration of U-Type Hybrid Electromagnets, K. Erkan, T. Koseki, *The University of Tokyo, Japan*

B27A2-4 Preliminary Investigations on a Diamagnetically Levitated Linear Conveyor, F. Barrot, *Ecole Polytechnique Fédérale de Lausanne, Switzerland*, D. Chapuis, T. Bosgiraud, B. Löhr, L. Sache, R. Moser, H. Bleuler, *Eidgenössische Materialprüfungs- und Forschungsanstalt, Switzerland*

Tuesday, Sept. 27, 13:20-15:20 Electromagnetic Linear Motors and Actuators II (Poster)

Co-Chairperson: D. H. Kang, *KERI, Korea*

Co-Chairperson: M. Nirei, *Nagano National College of Technology, Japan*

L27P1-1 Motor Characteristics of Moving-Iron Linear Oscillatory Actuator Basis on New Magnetic Circuit, Y. Muraguchi, T. Fukunaga, H. Nakagawa, *Shinko Electric Co. Ltd, Japan*

L27P1-2 Characteristics of Linear Induction Motor with Magnet Rotator Type of Compensator, N. Fujii, Y. Ito, T. Yoshihara, *Kyushu University, Japan*

L27P1-3 Linear Motor with Functions of Propulsion and Wireless Power Collection for Urban Transit, N. Fujii, *Kyushu University, Japan*, T. Mizuma, *National Traffic Safety & Environment Laboratory, Japan*

L27P1-4 Development and Characteristic Analysis of New Type Actuator, Electro Magnetic Driven Force Actuator Applicable to High Voltage Circuit Breaker, J. H. Kang, D. K. Shin, H. K. Jung, *Seoul National University, Korea*, K. H. Kim, W. Y. Lee, *Korea Electrotechnology Research Institute, Korea*, J. S. Chun, *Techno-Park, Korea*

L27P1-5 Very Compact Actuators for Camless System, C. Chillet, J. P. Yonnet, *LEG, Laboratoire d'Electrotechnique de Grenoble, France*, C. Fageon, *ITlink System, France*, C. Baldi, *PSA Peugeot Citroën, France*

L27P1-6 Proposal of Linear Oscillatory Actuator Using DC Motor, Y. Hasegawa, *Matsushita Electric Works, Ltd., Japan*, K. Hirata, *Osaka University, Japan*, T. Yamaguchi, Y. Kawase, K. Shamoto, H. Kodama, *Gifu University, Japan*

L27P1-7 Static Response of Linear Actuator With Transverse Flux Linear Motor, B. C. Woo, D. K. Hong, D. H. Kang, J. M. Kim, *Korea Electrotechnology Research Institute, Korea*

L27P1-8 Direct-Drive Linear Electromechanical Actuator for Gearshift Control in Automotive Transmissions, A. Turner, K. Ramsay, *Ricardo UK, UK*, R. Clark, D. Howe, *University of Sheffield, UK*

L27P1-9 Design of Tubular-type Linear Generator for Free-Piston Engine, H. Y. Choi, J. W. Lim, H. K. Jung, *Seoul National University, Korea*, S. K. Hong, *Hoseo University, Korea*, D. H. Cho, *Hyosung Co., Korea*

L27P1-10 Design and Research on a Cylindrical Moving-iron Linear Actuator for Reciprocating Applications, M. Inoue, M. Kakuda, S. Hara, *Mitsubishi Electric Corporation, Japan*

L27P1-11 Linear Electromagnetic Actuators in High Response Injection Nozzles Using Magnetic Field Analysis, T. Keduka, M. Kodani, H. Wakiwaka, *Shinshu University, Japan*, K. Matsumoto, N. Saito, *Marktec Corporation, Japan*

Tuesday, Sept. 27, 13:20-15:20 Control Technologies for Linear Drives II (Poster)

Chairperson: M. Sanada, *Osaka Prefecture University, Japan*

L27P2-1 Adaptive Backstepping Sliding-Mode Control Using RBF Network for Two-Axis Motion Control System, F. J. Lin, P. H. Shen, *National Dong Hwa University, Taiwan*

- L27P2-2 Design and Implementation of a Load Observer for Linear Servo Systems, C. W. Cheng, *Industrial Technology Research Institute, Taiwan*, M. C. Tsai, *National Cheng Kung University, Taiwan*
- L27P2-3 Position Control of Linear Induction Motor with Cage-type Secondary Using Direct Thrust Control and IP Controller, K. M. Kim, S. C. Park, *Dongyang University, Korea*
- L27P2-4 Suitability of Various Force Control Techniques for a Modular-stator Linear Synchronous Motor, C. Lines, R. Cruise, B. Wigdorowitz, C. Pritchard, *University of the Witwatersrand, South Africa*
- L27P2-5 Characteristic Investigation of the Discontinuous Permanent Magnet Linear Synchronous Motor by Constant Load Angle Control, Y. Kim, K. Suzuki, M. Watada, S. Torii, H. Dohmeki, D. Ebihara, *Musashi Institute of Technology, Japan*

Tuesday, Sept. 27, 13:20-15:20 Levitation Technologies (Poster)

Co-Chairperson: A. Chiba, *Tokyo University of Science, Japan*

Co-Chairperson: T. Murai, *Central Japan Railway Company, Japan*

- L27P3-1 Development of a Levitation/Propulsion Module for a Magnetically Levitated Conveyor Vehicle, M. Leßmann, J. Van Goethem, K. Hameyer, *RWTH Aachen University, Germany*
- L27P3-2 Convey System Using High Temperature Bulk Superconductor, M. Ghodsi, T. Ueno, T. Higuchi, *The University of Tokyo, Japan*, H. Hirano, *Shin Nippon Steel Co. Ltd., Japan*
- L27P3-3 H ∞ DIA Control of a Magnetic Bearing Considering Rotor Unbalance, H. Seto, T. Namerikawa, *Nagaoka University of Technology, Japan*
- L27P3-4 Force Study of Moving Magnet-type Linear Oscillatory Actuator, Q. Lu, Y. Y. Ye, *Zhejiang University, China*, H. Chen, *Hangzhou Tongchi Ltd., China*
- L27P3-5 Dynamic Characteristics of Controlled-PM Maglev Systems, T. Liu, H. Wang Z. Xu, S. Xu, *Graduate School of Chinese Academy of Science, China*, N. Jin, *Chinese Academy of Science, China*
- L27P3-6 Performance Analysis of Passive Electrodynamic Suspension Systems, S. Vaez-Zadeh, S. Ramtin, *University of Tehran, Iran*
- L27P3-7 The Design Manual of Voltage-Controlled and Current-Controlled Observer in Sensorless Magnetic Levitation System of Steel Plate, K. Tada, S. Torii, *Musashi Institute of Technology, Japan*
- L27P3-8 Propulsion Method for the Magnetically Levitated Hybrid Conveyance System, D. Dodo, S. Ohashi, *Kansai University, Japan*
- L27P3-9 Inverter-Driven Dynamic Characteristics of the Amphibious Linear Motor Maglev Vehicle ME02, K. Yoshida, M. E. Nemr, *Kyushu University, Japan*
- L27P3-10 A Study on Lightweight Hybrid Magnet Using Divided Iron Cores and Permanent Magnets for Magnetically Levitated Vehicle, T. Kakinoki, H. Yamaguchi, Y. Jifuku, *Sojo University, Japan*, T. Nomiyama, *Shinko Electric Co., Ltd, Japan*, K. Shinohara, *Kagoshima University, Japan*
- L27P3-11 Simulation of Controller Characteristics Applied to Magnetic Levitation for an X-Y Linear Synchronous Motor, N. Inubushi, S. Inui, Y. Ohira, *Nihon University, Japan*
- L27P3-12 A Study on Switching Control of Magnetically Suspended and Carried System Based on Hybrid System Theory, T. Hikihara, Y. Furukawa, *Kyoto University, Japan*
- L27P3-13 Comparison of the Lift and Guidance Performance of the Two Iron-magnetic Guideways, with and without Side Rims, Interacting with an HTc Superconductor, G. D'Ovidio, F. Crisi, A. Navarra, G. Lanzara, *University of L'Aquila, Italy*

- L27P3-14 Study on Static Stability Problem of a Magnetic Levitation Transport System Using the Mechanism of Induced Repulsive Force, N. Kawada, S. Morii, T. Aoi, *Mitsubishi Heavy Industries Ltd., Japan*
- L27P3-15 Linear Induction Motor Control for Simultaneous Propulsion and Levitation of an Aluminium Plate, M. Castelli, M. Martínez-Iturralde, G. Martínez, A. García Rico, J. Florez, *TECNUN (University of Navarra), Spain*
- L27P3-16 Possibility of a Stable Levitation in a System Composed of Two Permanent Magnets and Diamagnetic Materials without Any Control, T. Yokoyama, K. Ohashi, *Shin-Etsu Chemical Co. Ltd., Japan*

Tuesday, Sept. 27, 13:20-15:20 Linear Drive Applications (Poster)

Chairperson: E. Hamdi, *Chalmers University of Technology, Sweden*

- L27P4-1 Electromagnetic Actuator Driving by Secondary Current from Current Transformer, M. Tsukima, T. Takeuchi, H. Yoshiyasu, *Mitsubishi Electric Corporation, Japan*

Tuesday, Sept. 27, 13:20-15:20 Transportation (Poster)

Co-Chairperson: T. Koseki, *The University of Tokyo, Japan*

Co-Chairperson: T. Higuchi, *Nagasaki University, Japan*

- L27P5-1 Research of the Elevator Driven by Twin Linear Induction Motor, Y. Y. Ye, J. Shi, *Zhejiang University, China*, H. Chen, *Hangzhou Tongchi Ltd., China*
- L27P5-2 Control of a LIM-Driven Elevator Door, Y. Zhou, J. X. Shen, Y. Y. Ye, *Zhejiang University, China*, Z. Cao, *Nantong Zhongyao Machines and Electrics Co Ltd., T. X. Cai, Shanghai University, China*
- L27P5-3 Operational Strategies for a Free Piston Energy Converter, J. Hansson, M. Leksell, F. Carlsson, C. Sadarangani, *KTH, Royal Institute of Technology, Sweden*
- L27P5-4 Elastic Vibration Characteristics of Superconducting Maglev Vehicles, S. Bando, H. Ohsaki, *The University of Tokyo, Japan*
- L27P5-5 Control System Design of Superconducting Linear Driver for Electromagnetic Launch, R. Li, Y. Peng, L. Zhao, C. Sha, J. Ling, *Chinese Academy of Sciences, China*, T. Yang, T. Yang, *Harbin Tech-Full Industry Co. Ltd., China*
- L27P5-6 Comparison of Measurements and Calculations of a DC Linear Actuator Designed for Railway Applications, B. Funieru, A. Binder, *Technische Universität Darmstadt, Germany*
- L27P5-7 Convoy Operation of Linear Motor Driven Railway Vehicles, C. Henke, H. Vöcking, J. Böcker, Fröhleke, A. Trächtler, *University of Paderborn, Germany*
- L27P5-8 Levitation and Propulsion Control of Magnetic Levitated Vehicle Application Using LSRM, H. K. Sung, J. M. Jho, H. J. Cho, M. H. Yu, J. M. Lee, *Korea Institute of Machinery & Materials, Korea*

Tuesday, Sept. 27, 13:20-15:20 Factory Automation and Machine Tools (Poster)

Chairperson: T. Watanabe, *FDK Cooperation, Japan*

- L27P6-1 The Application of Linear Motor in a Novel Laying Alloy Powder Machine, M. X. Huang, Y. Y. Ye, *Zhejiang University, China*
- L27P6-2 Design of A Linear Servo System for the Vertical Axis of High Speed Electric Discharge Machining, M. F. Hsieh, W. S. Yao, M. C. Wu, *National Cheng Kung University, Taiwan*

- L27P6-3 Study on Shape Control and Vibration Absorber of Strip in Steel Process Line, S. Morii, N. Nagai, A. Inoue, *Mitsubishi Heavy Industries, Ltd, Japan*, H. Fujioka, Y. Teramoto, *Mitsubishi-Hitachi Metals Machinery, Inc., Japan*
- L27P6-4 Development of Solder Bump Surface Trimming Equipment Using the Linear Oscillatory Actuator, A. Hiratsuka, J. Onozaki, H. Ando, T. Kimura, Y. Kano, *Tamura Corporation, Japan*

Tuesday, Sept. 27, 15:40-17:00 Control (Oral: Main Hall)

- Co-Chairperson: J. Oyama, *Nagasaki University, Japan*
 Co-Chairperson: T. Namerikawa, *Nagaoka University of Technology, Japan*
- A27P1-1 Adaptive Control of LSM for Ropeless Elevator by Using ACLF, T. Sakamoto, I. Yamamura, *Kyushu Institute of Technology, Japan*, B. Sarkar, *G. S. Institute of Technology & Science, India*
- A27P1-2 A Spherical Linear Motor as Direct Drive of an Airborne Optical Infrared Telescope, M. Anders, *MACCON GmbH, Germany*, A. Binder, *Darmstadt University of Technology, Germany*, M. Suess, *MAN Technologie, Germany*
- A27P1-3 Modeling of a Linear Synchronous Motor with Half-Wave Rectified Self Excitation Using Circuit Simulator, T. Hirayama, J. Oyama, T. Higuchi, T. Abe, *Nagasaki University, Japan*
- A27P1-4 Identification of Force Functions for Permanent Magnet Linear Synchronous Motors, C. Röhrig, *University of Applied Sciences Dortmund, Germany*

Tuesday, Sept. 27, 15:40-17:00 Actuator and Sensor (Oral: Amphitheater)

- Co-Chairperson: P. Brochet, *Ecole Centrale de Lille, France*
 Co-Chairperson: H. Wakiwaka, *Shinshu University, Japan*
- B27P1-1 A Development of Eddy Current Position Sensor for a Linear Oscillatory Actuator, A. Maruyama, T. H. Kim, J. Higaki, T. Takeuchi, M. Morita, *Mitsubishi Electric Corp., Japan*
- B27P1-2 Design and Analysis of Permanent Magnet Latching Actuators for Electromechanical Valve Actuation Systems for a Wide Operating Temperature Range, J. Rens, R. E. Clark, A. Turner, G. W. Jewell, D. Howe, *The University of Sheffield, UK*
- B27P1-3 Magnetostrictive/Piezoelectric Materials Composite for Linear Drive, T. Ueno, T. Higuchi, *The University of Tokyo, Japan*
- B27P1-4 Noncontact Spinning Mechanism Using Linearly Actuated Magnets, K. Oka, Y. Fujiwara, L. Chen, T. S. Cui, *Kochi University of Technology, Japan*

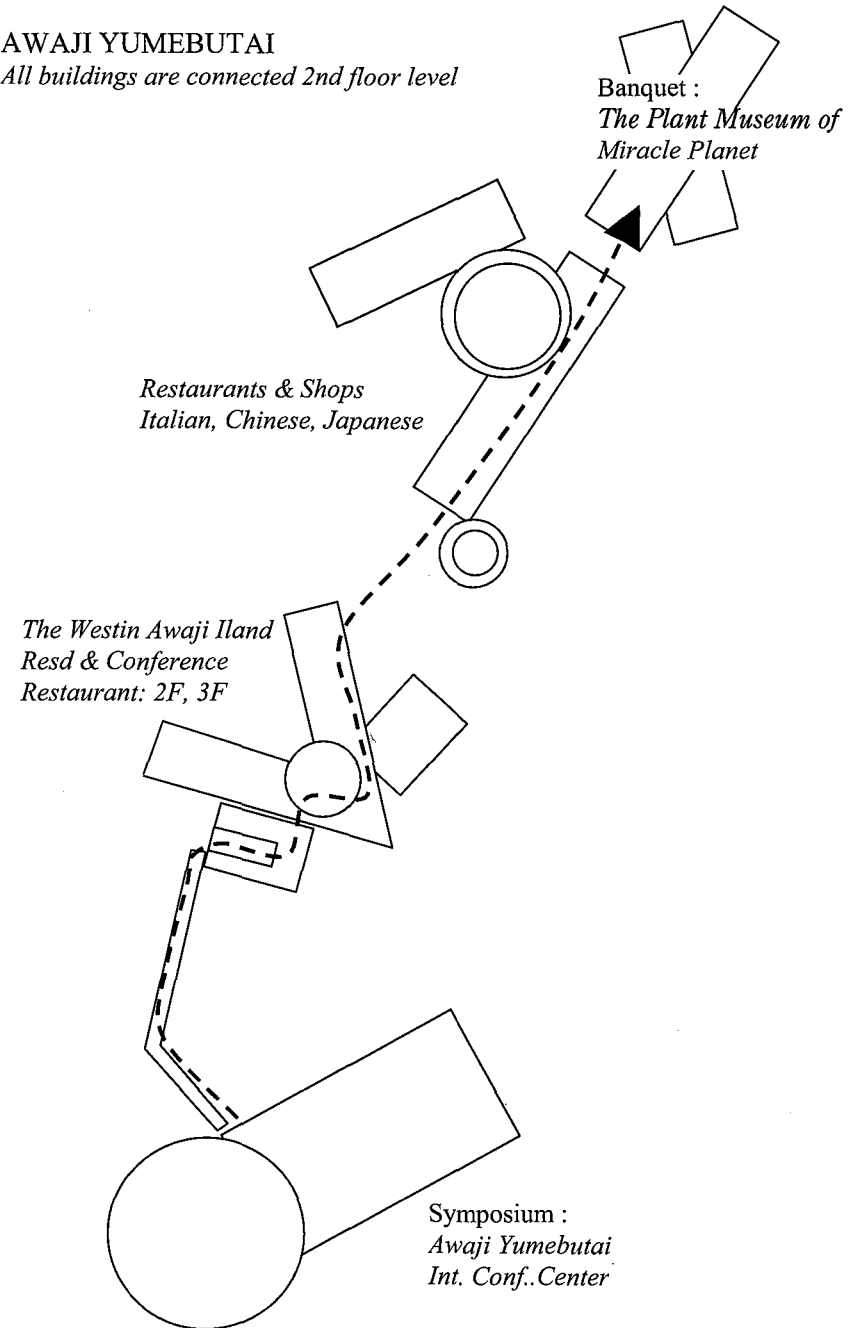
Tuesday, Sept. 27, 17:00-17:15 Closing Ceremony (Main Hall)

Chairperson: T. Koseki, *The University of Tokyo, Japan*

Wednesday, Sept. 28, 9:00-17:00 Technical Tour

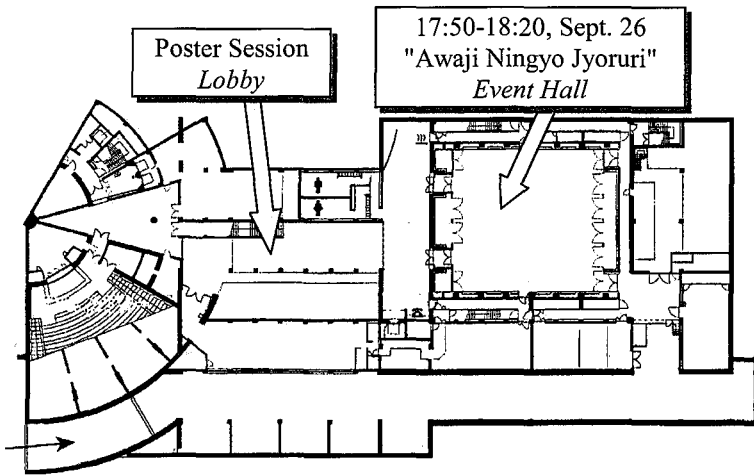
AWAJI YUMEBUTAI

All buildings are connected 2nd floor level

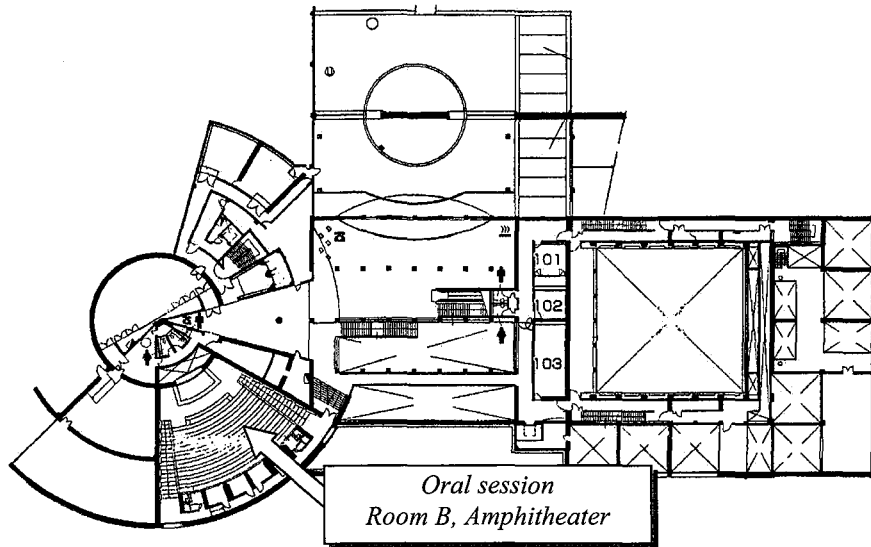


FLOOR LAYOUT

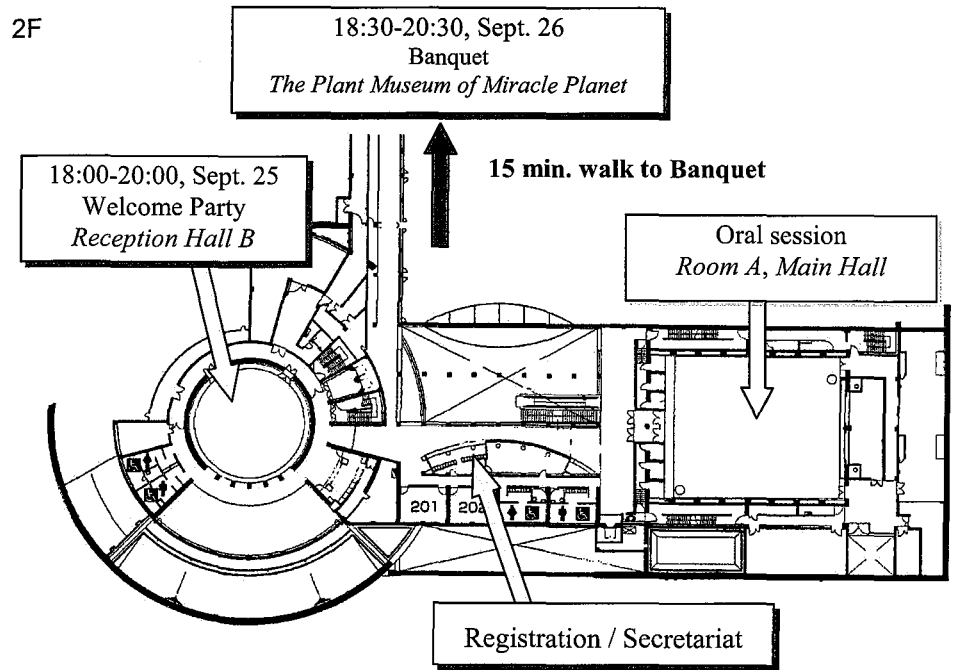
B1F



1F



2F



3F

