

LDIA 2007

TECHNICAL PROGRAM

THE 6TH INTERNATIONAL SYMPOSIUM ON LINEAR DRIVES FOR INDUSTRIAL APPLICATIONS

September 16-19, 2007, Lille, France

In cooperation with:

Société de l'Electricité, de l'Electronique et des Technologies de l'Information et de la Communication, SEE

The Institute of Electrical Engineers of Japan, IEEJ

Région Nord-Pas de Calais

Sponsored by:

Ansoft

Cedrat Group

Cedrat Technologies

Dassault Aviation

Etel Motion Technologies

Magnetfabrik Scharmberg

Philips Applied Technologies

Vector Fields

Supported by:

Ecole Centrale de Lille

Ecole Nationale Supérieur d'Arts et Métiers

Université des Sciences et Technologies de Lille

Laboratoire d'Electrotechnique et d'Electronique de Puissance, L2EP

Program Overview

Sunday, September 16 th					
18:00-20:00	Registration & Welcome Party <i>Registration</i>				
Monday, September 17 th					
8:30-9:00	Registration				
9:00-9:20	Opening Ceremony <i>Main Hall</i> Chairperson: Prof. E. CRAYE, Ecole Centrale de Lille Co-Chairperson: I.SHAHROUR, Université des Sciences et Techniques de Lille				
09:20-10:00	Keynote Speeches 1 <i>Main Hall</i> Status of Linear Drives and Subsystems Chairperson: D.EBIHARA, Co-Chairperson: J.P.YONNET				
10:00-11:00	Poster Session 1 & Coffee Break <i>Showroom</i> New Technologies and Applications Chairperson: W.R.CANDERS, Co-Chairperson: H.K.JUNG				
11:00-12:40	<table border="0" style="width: 100%;"> <tr> <td style="width: 50%;">Oral Session 1 <i>Main Hall</i></td> <td style="width: 50%;">Oral Session 2 <i>Amphitheater</i></td> </tr> <tr> <td>Analyses of Electromagnetic and Force Fields I Chairperson: F.EASTHAM Co-Chairperson: A.CASSAT</td> <td>Applications Of Linear Drives And Levitation Technologies Chairperson: H.OHSAKI Co-Chairperson: M.TOUNZI</td> </tr> </table>	Oral Session 1 <i>Main Hall</i>	Oral Session 2 <i>Amphitheater</i>	Analyses of Electromagnetic and Force Fields I Chairperson: F.EASTHAM Co-Chairperson: A.CASSAT	Applications Of Linear Drives And Levitation Technologies Chairperson: H.OHSAKI Co-Chairperson: M.TOUNZI
Oral Session 1 <i>Main Hall</i>	Oral Session 2 <i>Amphitheater</i>				
Analyses of Electromagnetic and Force Fields I Chairperson: F.EASTHAM Co-Chairperson: A.CASSAT	Applications Of Linear Drives And Levitation Technologies Chairperson: H.OHSAKI Co-Chairperson: M.TOUNZI				
12:40-14:30	Lunch				
14:30-15:30	<table border="0" style="width: 100%;"> <tr> <td style="width: 50%;">Oral Session 3 <i>Main Hall</i></td> <td style="width: 50%;">Oral Session 4 <i>Amphitheater</i></td> </tr> <tr> <td>Control Technologies For Linear Drives I Chairperson: D.HOWE Co-Chairperson: P.BROCHET</td> <td>Electromagnetic Linear Motors And Control Technologies Chairperson: J.GIERAS Co-Chairperson: R.CLARK</td> </tr> </table>	Oral Session 3 <i>Main Hall</i>	Oral Session 4 <i>Amphitheater</i>	Control Technologies For Linear Drives I Chairperson: D.HOWE Co-Chairperson: P.BROCHET	Electromagnetic Linear Motors And Control Technologies Chairperson: J.GIERAS Co-Chairperson: R.CLARK
Oral Session 3 <i>Main Hall</i>	Oral Session 4 <i>Amphitheater</i>				
Control Technologies For Linear Drives I Chairperson: D.HOWE Co-Chairperson: P.BROCHET	Electromagnetic Linear Motors And Control Technologies Chairperson: J.GIERAS Co-Chairperson: R.CLARK				
15:30-16:30	Poster Session 2 & Coffee Break <i>Showroom</i> Levitation and Control Chairperson: I.K.KIM, Co-Chairperson: C.ESPANET				
16:30-17:30	<table border="0" style="width: 100%;"> <tr> <td style="width: 50%;">Oral Session 5 <i>Main Hall</i></td> <td style="width: 50%;">Oral Session 6 <i>Amphitheater</i></td> </tr> <tr> <td>Electromagnetic linear motors and actuators I Chairperson: T.AZUKIZAWA Co-Chairperson: E.LOMONOVA</td> <td>Levitation Technologies Chairperson: Y.Y.YE Co-Chairperson: P.BROCHET</td> </tr> </table>	Oral Session 5 <i>Main Hall</i>	Oral Session 6 <i>Amphitheater</i>	Electromagnetic linear motors and actuators I Chairperson: T.AZUKIZAWA Co-Chairperson: E.LOMONOVA	Levitation Technologies Chairperson: Y.Y.YE Co-Chairperson: P.BROCHET
Oral Session 5 <i>Main Hall</i>	Oral Session 6 <i>Amphitheater</i>				
Electromagnetic linear motors and actuators I Chairperson: T.AZUKIZAWA Co-Chairperson: E.LOMONOVA	Levitation Technologies Chairperson: Y.Y.YE Co-Chairperson: P.BROCHET				
18:30-19:30	Visit of Vieux Lille <i>Departure from the Registration</i>				
20:00-22:00	Conference Dinner <i>Restaurant Le jardin du Cloître</i>				

Tuesday, September 18th

9:00-10:10	Keynote Speeches 2 Planar Actuator Technology Chairperson: Y.Y.YE, Co-Chairperson: T.AZUKIZAWA	<i>Main Hall</i>				
10:10-11:10	Poster Session 3 & Coffee Break Electromagnetic Fields Chairperson: J.GIERAS, Co-Chairperson: F.GILLON	<i>Showroom</i>				
11:10-12:30	<table border="0" style="width: 100%;"> <tr> <td style="width: 50%; vertical-align: top;">Oral Session 7 Analyses of Electromagnetic and Force Fields II Chairperson: W.R.CANDERS Co-Chairperson: F.EASTHAM</td> <td style="width: 10%; text-align: center; vertical-align: top;"><i>Main Hall</i></td> <td style="width: 50%; vertical-align: top;">Oral Session 8 Control Technologies for Linear Drives II Chairperson: A.CASSAT Co-Chairperson: H.K.JUNG</td> <td style="width: 10%; text-align: right; vertical-align: top;"><i>Amphitheater</i></td> </tr> </table>	Oral Session 7 Analyses of Electromagnetic and Force Fields II Chairperson: W.R.CANDERS Co-Chairperson: F.EASTHAM	<i>Main Hall</i>	Oral Session 8 Control Technologies for Linear Drives II Chairperson: A.CASSAT Co-Chairperson: H.K.JUNG	<i>Amphitheater</i>	
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Oral Session 9 Electromagnetic Linear Actuators and New Technologies Chairperson: A.J.A.VANDENPUT Co-Chairperson: I.K.KIM	<i>Main Hall</i>	Oral Session 10 Electromagnetic Linear Motors And Actuators II Chairperson: H.OSHAKI Co-Chairperson: E.LOMONOVA	<i>Amphitheater</i>			
15:20-16:20	Poster Session 4 & Coffee Break Motors and Actuators Chairperson: R.CLARK, Co-Chairperson: M.TOUNZI	<i>Showroom</i>				
16:20-17:20	<table border="0" style="width: 100%;"> <tr> <td style="width: 50%; vertical-align: top;">Oral Session 11 Contact less Linear Motors Chairperson: D.EBIHARA Co-Chairperson: P.BROCHET</td> <td style="width: 10%; text-align: center; vertical-align: top;"><i>Main Hall</i></td> <td style="width: 50%; vertical-align: top;">Oral Session 12 Control and New Technologies Chairperson: D.HOWE Co-Chairperson: J.P.YONNET</td> <td style="width: 10%; text-align: right; vertical-align: top;"><i>Amphitheater</i></td> </tr> </table>	Oral Session 11 Contact less Linear Motors Chairperson: D.EBIHARA Co-Chairperson: P.BROCHET	<i>Main Hall</i>	Oral Session 12 Control and New Technologies Chairperson: D.HOWE Co-Chairperson: J.P.YONNET	<i>Amphitheater</i>	
Oral Session 11 Contact less Linear Motors Chairperson: D.EBIHARA Co-Chairperson: P.BROCHET	<i>Main Hall</i>	Oral Session 12 Control and New Technologies Chairperson: D.HOWE Co-Chairperson: J.P.YONNET	<i>Amphitheater</i>			
17:20-17:40	Closing Session Chairperson : Prof. P. BROCHET, LDIA 2007, Organizing Committee Prof. D. EBIHARA, LDIA International Steering Committee Prof; D.HOWE, LDIA International Steering Committee Prof. J.P.YONNET, LDIA 2007 Programme Committee	<i>Main Hall</i>				

Wednesday, September 19th

8:00-16:00	Technical Tour CEDRAT Formations	<i>Departure from the Registration</i> <i>Salle AMPERE</i>
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Technical Program

Sunday, Sept. 16, 18:00-20:00 Registration & Welcome Party

Monday, Sept. 17, 8:30-9:00 Registration *Registration Hall*

Monday, Sept. 17, 9:00-9:20 Opening Ceremony **Main Hall**

Chairperson : Prof. E. CRAYE, *Ecole Centrale de Lille*
Prof. I. SHAHROUR, *Université des Sciences et Techniques de Lille*
Prof. D. EBIHARA, *LDIA International Steering Committee*
Prof. J.P.YONNET, *LDIA 2007 Programme Committee*
Prof. P. BROCHET, *LDIA 2007 Organizing Committee*

Monday, Sept. 17, 09:20-10:00, Keynote Speech 1 *Main Hall*

Status of Linear Drives

Chairperson: D.EBIHARA, *Toyoko Gakuen Women's College, Japan*
Co-Chairperson: J.P.YONNET, *CNRS-G2ELAB-ENSIEG*

KS1. Status and new development of linear drives and subsystems

Nicolas CORSI, Ralph COLEMA, Denis PIAGET, *ETEL SA, Switzerland,*

Monday, Sept. 17, 10:00-11:00, Poster Session 1 *Showroom*

New Technologies and Applications

Chairperson: W.R.CANDERS, *TU Braunschweig, Germany*
Co-Chairperson: H.K.JUNG, *Seoul National University, Korea*

PS1.1 Output Power Improvement of PM-LSG for Wave Power Generation by Halbach Permanent Magnet Array

Kenta HATAKENAKA, Masayuki SANADA, Shigeo MORIMOTO, Osaka Prefecture University, Japan

PS1.2 The Self-gap-detecting Electromagnetic Suspension with Coil Resistance Evaluator

Mimpei MORISHITA, Hiroaki ITOH, Toshiba Corp., Japan

- PS1.3 Application of Disc Permanent Magnet Linear Synchronous Motor in Novel Oil-pumping Machines**
HUANG Ming-xing, YE Yun-yue, FAN Cheng-zhi, Zhejiang University, China, Tim CLANC, Sydney University of Technology, Australia
- PS1.4 Large High Performance Linear Drive with High Overload Capability and Very Small Thrust Ripple**
W.-R. CANDERS, P. HOFFMANN, H. MOSEBACH, G. TAREILUS, Technical University Braunschweig, Germany
- PS1.5 Electric Field Sensors and the Related Linear Actuators**
Ben-Zion KAPLAN, Ben-Gurion University of the Negev, Uri SUISSA, Sami Shamoon Academic College, Israel
- PS1.6 Design and Verification Tests of the Linear Synchronous Motor for the General Atomics Urban Maglev**
In-Kun KIM, Phil JETER, Bogdan BOROWY, General Atomics, USA
- PS1.7 Development of a Self-Excited Linear Induction Generator for Free-Piston Generator**
Behrooz REZAEALAM, Lorestan University, Iran, Sotoshi YAMADA, Kanazawa University, Japan
- PS1.8 The limit potential of linear actuators in valves propulsion**
Cédric BERNEZ, Hamid BEN AHMED, Mohamed GABSI, Michel LECRIVAIN, SATIE Laboratory, ENS Cachan, France
- PS1.9 Flexible Electro-rheological Microvalve (FERV) Based on SU-8 Cantilever Structures and its Application to Microactuators**
Joon-wan KIM, Kazuhiro YOSHIDA, Kumiko KOUDA, Shinichi YOKOTA Precision and Intelligence Laboratory, Tokyo Institute of Technology, Japan
- PS1.10 ECF Micro Artificial Muscle Actuator and its Application to Micro Robot Arm**
Kenjiro TAKEMURA, Shinichi YOKOTA, Precision and Intelligence Laboratory, Tokyo Institute of Technology, Kazuya EDAMURA, New Technology Management, Japan
- PS1.11 Linear Transverse Flux Motor for Conveyors**
Dan-Cristian POPA, Vasile IANCU, Loránd SZABÓ, Technical University of Cluj-Napoca, Romania
- PS1.12 Analysis of Propulsion Force of The Vibrating Fin Propulsion System Using Linear Actuator**
Ken-ichi Maegaito, Fei ZUO, Mingyu TONG, Shigehiro YAMAMOTO, Treuo AZUKIZAWA, Kobe University, Japan

PS1.13 Influence of a high dynamic dual-drive gantry stage mechanical coupling on its performances

*Julien GOMAND, Raphaël CARPENTIER, Xavier KESTELYN and P.-J. BARRE
Laboratory of Electrical Engineering and Power electronics of Lille, ENSAM Lille,
France*

Monday, Sept. 17, 11:00-12:40, Oral Session 1

Main Hall

Analyses of Electromagnetic and Force Fields I

Chairperson: F.EASTHAM, *University of Bath, United Kingdom*

Co-Chairperson: A.CASSAT, *EPFL, Switzerland*

OS1.1 Analysis and Tests of an Electromechanical Energy Harvesting Oscillating Device

*Jacek F. GIERAS, Applied Research, Hamilton Sundstrand Aerospace, Jae-Hyuk OH,
Mihai HUZMEZAN, United Technologies Research Center, U.S.A*

OS1.2 A Modified Magnetic Equivalent Circuit Method for Calculating the Motional Eddy Current

*Hooshang Gholizad, Amirkabir University of Technology, Iran, Bogdan Funieru,
Andreas Binder, TU Darmstadt, Germany, Mojtaba Mirsalim, Amirkabir University of
Technology*

OS1.3 Electromagnetic and Thermal Analysis of a Small Permanent-Magnet Tubular Machine

*Ioana-Cornelia VESE, Fabrizio MARIGNETTI, Roberto DI STEFANO, Mircea M.
RADULESCU, Technical University of Cluj-Napoca, Romania,*

OS1.4 Electromagnetic Computations of High Speed Single-Sided Linear Induction Machines Using a Modified Method

Mehran Mirzaei, Seyed Ehsan Abdollahi, Amirkabir University of Technology, Iran

OS1.5 Analytical prediction of eddy current loss in ring magnets and support tube of tubular permanent magnet machines

Jie CHAI, Jiabin WANG, David HOWE, The University of Sheffield, UK

Monday, Sept. 17, 11:00-12:40, Oral Session 2

Amphitheater

Applications of Linear Drives and Levitation Technologies

Chairperson: H.OHSAKI, *the University of Tokyo, Japan*

Co-Chairperson: M.TOUNZI, *USTL-L2EP, France*

OS2.1 Controller Design of Linear Synchronous Motor for General Atomics Urban Maglev

Bogdan S. Borowy, Husam Gurol, In-Kun Kim, General Atomics, USA

OS2.2 Dual-drive gantry stage decoupling control based on a coupling model

Julien GOMAND, Xavier KESTELYN, Richard BEAREE, P.-J. BARRE, Laboratory of Electrical Engineering and Power electronics of Lille, ENSAM Lille, France

OS2.3 Torque Perturbations and Dynamic Stiffness of Linear Motors for Grinding Machines

Jeff MOSCROP, Phil COMMINS, Chris COOK, University of Wollongong, Australia

OS2.4 Development of Electromagnetically Actuated Vacuum Circuit Breaker for 72kV rated Low Pressured Dry Air Insulated Switchgear

Tae-Hyun KIM, Mitsuru TSUKIMA, Akihiko MARUYAMA, Tadahiro YOSHIDA, Kazushi HARUNA, Tomotaka YANO, Toshihiro MATSUNAGA, Kazuaki IMAMURA, Masahiro ARIOKA, Toshie TAKEUCHI, Mitsubishi Electric Corporation, Japan

OS2.5 Systematic Research of All the Configurations of Linear Polarized Actuators for “Camless” Systems

Jean-Paul YONNET, Laboratoire de Génie Electrique de Grenoble (G2E Lab), France

Monday, Sept. 17, 14:30-15:30, Oral Session 3,

Main Hall

Control Technologies for Linear Drives I

Chairperson: D.HOWE, *University of Sheffield, United Kingdom*

Co-Chairperson: P.BROCHET, *Ecole centrale de Lille, France*

OS3.1 Contact-free Linear Drive Technique by using the Edge Shape Effect of Diamagnetic Graphite Plate

Haruhiko SUZUKI, Minoru KANKE, Atsushi SUZUKI, Atsushi ITO, Fukushima National College of Technology, Japan

OS3.2 Contactless planar actuator with manipulator - Experimental setup for control

Michal GAJDUŠEK, Jeroen de BOEIJ, Ad DAMEN, Paul van den BOSCH, Eindhoven University of Technology, The Netherlands

**OS3.3 Dynamic of Passive Guidance Forces of Polarized Linear Motors
Application to Swissmetro MAGLEV**

Alain CASSAT, Ecole Polytechnique Fédérale de Lausanne, Switzerland, Christophe ESPANET, Laboratory of Research in Electrical Engineering and System, University of Franche-Comté, Vincent BOURQUIN, Yves PERRIARD, Ecole Polytechnique Fédérale de Lausanne

Monday, Sept. 17, 14:30-15:30, Oral Session 4,

Amphitheater

Electromagnetic linear motors and control technologies

Chairperson: J.GIERAS, *Hamilton Sundstrand Aerospace, USA*

Co-Chairperson: R.CLARK, *University of Sheffield, United Kingdom*

OS4.1 Modeling of Disturbance Forces of a x-y Manipulator on a Floating Platform

Bastiaan ZUURENDONK_, Jeroen DE BOEIJ, Maarten STEINBUCH, Elena LOMONOVA, Eindhoven University of Technology, The Netherlands

OS4.2 The Positional Detection System for the Surface Motor using Halbach-type Permanent Magnets

Junichi TSUCHIYA, Keiichiro YASUDA, Tokyo Metropolitan University, Japan

OS4.3 Dynamic Vector Model for Linear Induction Motors considering the Primary Winding Asymmetries

Javier POZA, Ana Julia ESCALADA, University of Mondragon, Spain, Sergio LURI, IKERLAN Mondragon, Spain, Antonio GONZALEZ, ORONA, Spain

Monday, Sept. 17, 15:30-16:30, Poster Session 2,

Showroom

Levitation and Control

Chairperson: I.K.KIM, *General Atomics, USA*

Co-Chairperson: C.ESPANET, *UTBM-L2ES, France*

PS2.1 Study of the Position Detection for Tubular PMLSM by Linear Hall-Effect Sensors

Xiao Liu, Yunyue Ye, Zhuo Zheng, Zhejiang University, China

PS2.2 Direct Thrust Control of Linear Induction Motor Considering End Effects

Ke WANG Chinese Academy of Science, Liming SHI, Yaohua LI, Graduate School of Chinese Academy of Science, China

- PS2.3 Traction and power supply system of a long-stator linear synchronous-motor arranged by multiple sections for experimental maglev train**
Haijun DONG, Yunyue YE, Chengzhi FAN, Zhejiang University, CHINA
- PS2.4 Linear Motor Coils as Brake Actuators for Multi-Car Elevators**
Sandor MARKON, Fujitec Co., Ltd. Japan, Yasuhiro KOMATSU, Akitomo YAMANAKA, Ritsumeikan University, Japan, Ahmet ONAT, Ender KAZAN, Sabanci University, Turkey
- PS2.5 Tubular switched reluctance stepping motor position**
Kamel BEN SAAD, Mohamed BENREJEB, Ecole Nationale d'Ingénieurs de Tunis (ENIT), Tunisia, Pascal BROCHET, Laboratoire d'Electrotechnique et d'Electronique de Puissance (L2EP), France
- PS2.6 Eliminating Hysteresis Effect of a Force Actuator for a Profiler Design with PI Compensation**
Jium-Ming LIN, Jiea-Chie LIN, Chung-Hua University, Taiwan
- PS2.7 Flexible Motion Control of a Linear Synchronous Actuator with an Artificial Stiffness and Damping Factor for a Humanoid Robot**
Hiroyuki FUKUSHO, Takafumi KOSEKI, The University of Tokyo, Hwang-Joong KIM, Hitachi Ltd., Japan
- PS2.8 Feasibility Study of a Magnetic Top As a Magnetic Bearing**
Teruo AZUKIZAWA, Naomasa MATSUO, Kobe University, Japan
- PS2.9 Parameter Identification for Vector Control in Combined Levitation-and-Propulsion SLIM**
Liming SHI, Jinwei HE, Chinese Academy of Science, Beijing, China
- PS2.10 An Equivalent Circuit Model to Assist Vector Control of a Linear Induction Motor for Urban Transportation System Considering End-effect**
Yuichiro NOZAKI, The University of Tokyo, Terufumi YAMAGUCHI, THE NIPPON SIGNAL CO. LTD, Takafumi KOSEKI, The University of Tokyo, Japan
- PS2.11 Integrated Control Method for Linear Motor Driven Container Crane System**
Yuki TANIGUCHI, Sangbaek AN, Hongkun WANG, Shigehiro YAMAMOTO and Teruo AZUKIZAWA, Kobe University, Japan
- PS2.12 Noncontact Manipulation Using Linear PM Drive Mechanism – Rotation Control for Spherical Object –**
Koichi OKA, Yusuke FUJIWARA, Kochi University of Technology, JAPAN

PS2.13 Examination of the velocity ripple decreasing method for a short stroke slotless linear synchronous motor

Masayuki FUKUNAGA, Yong-Jae KIM, Masaya WATADA, Musashi Institute of Technology, Japan

PS2.14 Control of a PM linear actuator using Hall effect sensors

Guillaume KREBS, Abdelmounaim TOUNZI, Laboratoire d'Electrotechnique et d'Electronique de Puissance (L2EP), France, Brecht PAUWELS, Dirk WILLEMOT, Psicontrol mechatronics N.V., Belgium, Francis PIRIOU, L2EP, France

PS2.15 Efficient solution for accurate microstepping using linear switched reluctance step actuator

Lilia EL AMRAOUI OUNI, ENIT, Tunisia, Frédéric GILLON, L2EP, France, Mohamed BENREJEB, ENIT, Pascal BROCHET, L2EP

PS2.16 Positioning System for Sensorless Linear DC Motor

M. Norhisam, H. Ezril, F. Azhar, M. Senan, Universiti Putra Malaysia, Malaysia, H. Wakiwaka, Shinshu University, Japan, M. Nirei, Nagano National College of Technology, Japan

Monday, Sept. 17, 16:30-17:30, Oral Session 5,

Main Hall

Electromagnetic linear motors and actuators I

Chairperson: T.AZUKIZAWA, *Kobe University, Japan*

Co-Chairperson: E.LOMONOVA, *Eindhoven University of Technology, The Netherlands*

OS5.1 Analysis of Linear Resonant Actuator Driven by DC Brush Motor Considering Contact Resistance between Brush and Commutator

*Tadashi YAMAGUCHI, Yoshihiro KAWASE, Satoshi SUZUKI, Gifu University, Japan
Katsuhiko HIRATA, Osaka University, Japan, Tomohiro OTA, Yuya HASEGAWA,
Matsushita Electric Works, Ltd., Japan*

OS5.2 Integration of the Inverters with the Segmented Stators in Long Stator Permanent Magnet Linear Synchronous Motor Drives

*A.BANERJEE, Indian Institute of Technology Kharagpur, India, R.LEIDHOLD,
R.BENAVIDES, P.MUTSCHLER, Technische Universität Darmstadt, Germany*

OS5.3 Development of a Multi Pole Spherical Synchronous Motor

*Tomoaki YANO, National Institute of Advanced Industrial Science and Technology,
Japan, Yoshiaki KUBOTA, Toru SHIKAYAMA, Takeo SUZUKI, Yasukawa Electric
Corporation, Japan*

Monday, Sept. 17, 16:30-17:30, Oral Session 6,

Amphitheater

Levitation Technologies

Chairperson: Y.Y.YE, *Zhejiang University, China*

Co-Chairperson: P.BROCHET, *Ecole Centrale de Lille-L2EP, France*

OS6.1 The use of concentrated windings for offset double stator linear induction motors

J.F Eastham, T Cox, H.C Lai, University of Bath, UK , J Proverbs, Force Engineering Ltd, UK

OS6.2 Commutation of a Magnetically Levitated Planar Actuator with Moving-Magnets

C.M.M. van LIEROP, J.W. JANSEN, E.A. LOMONOVA, A.A.H. DAMEN, P.P.J. van den BOSCH and A.J.A. VANDENPUT, Eindhoven University of Technology, The Netherlands

OS6.3 Proposals for the use of Magnetic Guideways for Vertical Transportation Systems

Benedikt SCHMÜLLING, Marc LESSMANN, Michael VAN DER GIET, Kay HAMEYER, RWTH Aachen University, Germany

Monday, Sept. 17, 18:30-19:30, Visit of Vieux Lille,

Departure from the Registration Desk

A guided walk from the Tourism Office to the Conference restaurant will allow discovering and understanding the beauty of the historic part of the city.

Monday, Sept. 17, 20:00-22:00, Conference Diner,

Restaurant le Jardin du Cloître, Hôtel Couvent des Minimes, 17, Quai de Wault

Tuesday, Sept. 18, 9:00-10:10, Keynote Speech 2,

Amphitheater

Planar Actuator Technology

Chairperson: Y.Y.YE, *Zhejiang University, China*

Co-Chairperson: T.AZUKIZAWA, *Kobe University, Japan*

KS2.1 Towards Planar Drives for Lithography

John COMPTEER, Dept. Mechatronics Technologies, Philips Applied Technologies, The Netherlands

KS2.2 Moving Magnet Multi-DOF Planar Actuator Technology with Contactless Energy and Data Transfer

J.W. JANSEN, C.M.M. van LIEROP, J. de BOEIJ, E.A. LOMONOVA, J. L. DUARTE, A.J.A. VANDENPUT, Eindhoven University of Technology, the Netherlands

Tuesday, Sept. 18, 10:10-11:10, Poster Session 3,

Showroom

Electromagnetic Fields

Chairperson: J.GIERAS, *Hamilton Sundstrand Aerospace, USA*

Co-Chairperson: F.GILLON, *Ecole Centrale de Lille-L2EP, France*

PS3.1 Single-sided Linear Induction Motor Equivalent Circuit Model

Wei XU, Yaohua LI, Wang Ke, Jinqi REN, Guangsheng SUN, Nengqiang JIN, Longchen TAN, Chinese Academy of Sciences, P.R.China

PS3.2 Design Optimization of Slotless Linear Synchronous Motors with Permanent Magnets

Kazumasa ITO, Kouki NAKA, Mitsubishi Electric, Japan

PS3.3 Investigation of short-rotor linear induction motors using finite element modelling

T.COX, Force Engineering Ltd, UK, J.F.EASTHAM, Dr H C LAI, University of Bath, UK, J.PROVERBS, Force Engineering Ltd, UK

PS3.4 Cogging torque calculations for a novel concept of a Transverse Flux Linear Free-Piston Generator

Alija COSIC, Chandur SADARANGANI, Royal Institute of Technology, SWEDEN

- PS3.5 Influence of Pole Shape in Linear Switch Reluctance Actuator Performance**
ESPÍRITO SANTO A., CALADO M. R., CABRITA C. M., University of Beira Interior, Portugal
- PS3.6 Efficiency of the linear electric drive of engine valves**
Sigitas KUDARAUSKAS, S. Kudarauskas personal enterprise, Lithuania, Rimantas DIDZIOKAS, Klaipeda University, Lithuania
- PS3.7 Mechanical Modelling of Active Magnetic Bearings' Rotor Using Finite Element Method**
Jean-Philippe LECOINTE, Université d'Artois, France, Boštjan POLAJZER, University of Maribor, Slovenia, Jean-François BRUDNY, Université d'Artois, France, Drago DOLINAR, University of Maribor, Slovenia
- PS3.8 Design and Analysis of Tubular Type Linear Generator for Free-Piston Engine**
Jaewon LIM, Ho-Yong CHOI, Young-Wook KIM, Seoul National University, Sun-Ki HONG, Hoseo University, Sang-Yong JUNG, Dong-A University, Heesoo LIM, Si-Deok OH, Hyosung Co. Ltd., Hyun-Kyo Jung, Seoul National University, Korea
- PS3.9 Finite Element Analysis of a PMLSM (part 1)- Meshing techniques and thrust computations -**
Ghislain REMY, Guillaume KREBS, Abdelmounaïm TOUNZI, Pierre-Jean BARRE, Laboratoire d'Electrotechnique et d'Electronique de Puissance de Lille (L2EP)
- PS3.10 Finite Element Analysis of a PMLSM (part 2)- Cogging force and end-effect force calculations -**
Ghislain REMY, Guillaume KREBS, Abdelmounaïm TOUNZI, Pierre-Jean BARRE, Laboratoire d'Electrotechnique et d'Electronique de Puissance de Lille (L2EP)
- PS3.11 Modelling Approaches of a Linear Induction Motors**
Med Ali NASR KHOIDJA, Boujemâa BEN SALAH, Ecole National d'Ingénieurs de Tunis (ENIT), Tunis, Pascal BROCHET, Laboratoire d'Electrotechnique et d'Electronique de Puissance de Lille (L2EP)
- PS3.12 Dynamic Simulation of the Transverse Flux Machine without and with Permanent Magnet Excitation**
J.W. Kim, J.H. Chang, J.Y. Lee, S.U. Chung, D.H. Kang, Korea Electrotechnology Research Institute(KERI), Korea, Dragos O. Kisck, University POLITEHNICA of Bucharest, Romania

Tuesday, Sept. 18, 11:10-12:30, Oral Session 7,

Main Hall

Analyses of Electromagnetic and Force Fields II

Chairperson: W.R.CANDERS, *TU Braunschweig, Germany*

Co-Chairperson: F.EASTHAM, *University of Bath, United Kingdom*

OS7.1 Direct-Drive Electromechanical Actuation System for Control of Gearshifts in Automated Transmissions

Andrew TURNER, Keith RAMSAY, Jonathan WHEALS, Ricardo UK, Richard CLARK, David HOWE, University of Sheffield, UK

OS7.2 Novel linear PM valve actuator: FE design and dynamic model

I.BOLDEA, S.AGARLITA, L.TUTELEA, University Politehnica Timisoara, Romania, F.MARIGNETTI, University of Cassino, Italy

OS7.3 Electromagnetic and Thermal Design of a Novel U-shaped Permanent Magnet Linear Actuator

Peter KRECHTING, Tecnotion BV, Dirk ENGELEN, Elena LOMONOVA, André VANDENPUT, Eindhoven University of Technology, the Netherlands

OS7.4 Analysis of a short-stroke, single-phase tubular permanent magnet actuator for reciprocating compressors

Taib IBRAHIM, Jiabin WANG and David HOWE, The University of Sheffield, UK

Tuesday, Sept. 18, 11:10-12:30, Oral Session 8,

Amphitheater

Control Technologies for Linear Drives II

Chairperson: A.CASSAT, *EPFL, Switzerland*

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

OS8.1 Control Techniques to Compensate Detent Forces in Segmented Long Stator Linear Motors

Rodrigo BENAVIDES, Peter MUTSCHLER, Darmstadt University of Technology, Germany

OS8.2 Nonlinear control for linear motors with friction - Application to an inverted pendulum system

Samer RIACHY, Thierry FLOQUET, Jean-Pierre RICHARD, Laboratoire d'Automatique, de Genie Informatique et Signal(LAGIS), France

OS8.3 Inverter control of low speed Linear Induction Motors

Stephen COLYER, Jeff PROVERBS, Alan FOSTER, Force Engineering Ltd, UK

OS8.4 Implementation of Sensorless Methods in Segmented Long Stator Synchronous Linear Motors

Roberto LEIDHOLD, Peter MUTSCHLER, Darmstadt University of Technology, Germany

Tuesday, Sept. 18, 14:20-15:20, Oral Session 9,

Main Hall

Electromagnetic Linear Actuators and New Technologies

Chairperson: A.J.A.VANDENPUT, *Eindhoven University of Technology, The Netherlands*

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

OS9.1 Large Yaw Motion Control of a Planar Actuator for Two-dimensional Drive

Yasuhito UEDA, Hiroyuki OHSAKI, The University of Tokyo, Japan

OS9.2 3 DOF mini-conveyor for μ -factories

Nabil BENCHEIKH, Christine PRELLE, Frédéric LAMARQUE, Université de Technologie de Compiègne, France

OS9.3 Proposal of a Spherical Resonant Actuator

Yuya HASEGAWA, Tadashi YAMAMOTO, Katsuhiko HIRATA, Osaka University, Japan, Yoshio MITSUTAKE, Tomohiro OTA, Matsushita Electric Works, Ltd., Japan

Tuesday, Sept. 18, 14:20-15:20, Oral Session 10,

Amphitheater

Electromagnetic Linear Motors and Actuators II

Chairperson: H.OHSAKI, *the University of Tokyo, Japan*

Co-Chairperson: E.LOMONOVA, *Eindhoven University of Technology, The Netherlands*

OS10.1 Comparisons of magnetic behaviours of SR and PM tubular three-phase synchronous linear actuators

Wadhah MISSAOUI1, Lilia El AMRAOUI OUNI, Ecole Nationale d'Ingénieurs de Tunis (ENIT), Tunisia, Frederic GILLON, Laboratoire d'Electrotechnique et d'Electronique de Puissance de Lille (L2EP), France, Mohamed BENREJEB (ENIT), Pascal BROCHET, L2EP

OS10.2 FEA Modelling of a Novel Tubular Linear Generator

Joseph EUGENE, Clive LEWIS, CONVERTEAM Ltd, UK, Chris RILEY, Neil DALCHAU, Alex MICHAELIDES, Vector Fields Ltd, UK

OS10.3 Development of tubular moving-iron linear oscillatory actuator

Atsuki ISHIZUKA, Susumu TORII, Musashi Institute of Technology, Japan

Tuesday, Sept. 18, 15:20-16:20, Poster Session 4,

Showroom

Motors and Actuators

Chairperson: R.CLARK, *University of Sheffield, United Kingdom*

Co-Chairperson: M.TOUNZI, *USTL-L2EP, France*

PS4.1 Optimal Design of a High-Speed Linear Synchronous Motor by using Simulation-based DOE and FEM

Hyung-Woo LEE, Korea Railroad Research Institute, Korea, Sung Gu LEE, Hanyang University, Korea, Sam-Young KWON, Korea Railroad Research Institute, Ju LEE, Hanyang University, Hyun-June PARK, Korea Railroad Research Institute

PS4.2 A Single Phase Equivalent Circuit of LIM Considering Unbalanced Input Currents

Tatsumi UTSUMI, Isao YAMAGUCHI, Tokai University, Japan

PS4.3 Multi-airgap direct drive linear actuator for an aeronautical application.

N. Ziegler, Messier-Dowty SA, France, D.Matt, J.Jac, P. Enrici, Université Montpellier 2, France, G.Balducci, Messier-Dowty SA.

PS4.4 Performance Analysis of New Linear Actuator for Android Employing 3D Finite Element Method

Masayuki MISHIMA, Katsuhiko HIRATA, Hiroshi ISHIGURO, Osaka University, Japan

PS4.5 High Temperature Permanent Magnet Actuator for Fail-Safe Applications

Bart GYSEN, Eindhoven University of Technology, Netherlands, Sarah GIBSON, Richard CLARK, Geraint JEWELL, University of Sheffield, UK

PS4.6 State-Controlled Electromagnetic Shaker for Trajectory Tracking

Marcus HERRMANN, Heinz ULBRICH, Technische Universität München, Germany

PS4.7 Coupled Circuits Model of Linear Induction Launchers Fed by Generator

Youcef BENCHEIKH, Youcef OUAZIR, USTHB Alger, Algeria, Rachid IBTIOUEN, ENP Alger, Algeria

PS4.8 Design of Ironless Synchronous Linear Motor with Permanent Magnet and Experimental Verification of Field Distribution for Drive with High Resolution of Position

Jozef KUČHTA, Marek FRANKO, Martin HRASKO, Miroslav FULIER, Electrotechnical Research and Projection Company, Slovakia

PS4.9 Comparative Study on Different Variable Reluctance Linear Machine Structures (With/Without Permanent Magnets)

Loránd SZABÓ, Ioan-Adrian VIOREL, Mircea RUBA, Dan-Cristian POPA, Technical University of Cluj, Romania,

PS4.10 Moving Coil or Moving Iron Controllable Actuators: How to make the good choice.

Frank CLAEYSSEN, Gregory MAGNAC, Fabrice MARION, François BARILLOT, Patrick MENEROUD, Gilles PATIENT, Cedrat Technologies, France

PS4.11 Starting Mode Analysis of Tubular-type Linear Generator for Free-Piston Engine with Dynamic Characteristics

Kim YOUNG-WOOK, Jaewon LIM, Ho-Yong CHOI, Seoul National University, Korea, Sun-Ki HONG, Hoseo University, Korea, Heesoo LIM, Si-Deok OH, Hyosung Co. Ltd., Korea, Hyun-Kyo JUNG, Seoul National University

PS4.12 3D Analysis of New Type of Switchgear for High Voltage Gas Circuit Breaker: Electromagnetic Force driving Actuator

Sang-Min CHOI, Jong-Ho KANG, and Hyun-Kyo JUNG, Seoul National University, Korea

PS4.13 Optimal Design of the Ropeless Hoist Driven by Multi-segmented primary PMLSM using an Improved Niche Genetic Algorithm

Shiying YUAN, Xiaozhuo XU, Xudong WANG, Henan Polytechnic University, China

Tuesday, Sept. 18, 16:20-17:20, Oral Session 11,

Main Hall

Contact less Linear Motors

Chairperson: D.EBIHARA, *Toyoko Gakuen Women's College, Japan*

Co-Chairperson: P.BROCHET, *Ecole Centrale de Lille, France*

OS11.1 General Atomics Urban Maglev: Moving Towards Demonstration

Husam GUROL, Robert W. BALDI, Phil JETER, In-Kun KIM, and Bogdan BOROWY, General Atomics, USA,

OS11.2 Propulsion Characteristics Model of the Magnetically Levitated System with Two Phase Linear Motor

Shigeharu SUZUKI, Shunsuke OHASHI, Kansai University, Japan

OS11.3 Contactless Linear Electromechanical Actuator: Experimental Verification of the Improved Design

Anton LEBEDEV, Eindhoven University of Technology, The Netherlands, Dipali THAKKAR, Dick LARO, Delft University of Technology, The Netherlands, Elena LOMONOVA, Andre VANDENPUT, Eindhoven University of Technology

Tuesday, Sept. 18, 16:20-17:20, Oral Session 12,

Amphitheater

Control and New Technologies

Chairperson: D.HOWE, *University of Sheffield, United Kingdom*

Co-Chairperson: J.P.YONNET, *CNRS-G2ELAB-ENSIEG*

OS12.1 Modeling of A Single Phase Drive Surface Acoustic Wave Motor

Masaki OKANO, Minoru Kuribayashi KUROSAWA, Tokyo Institute of Technology, Japan

OS12.2 Development of a Single Phase Drive-type Ultrasonic Linear Motor

Shih-Wei HSIAO, Cheng-Wei CHEN, Wu-Sung YAO, Mi-Ching TSAI, National Cheng Kung University, Taiwan

OS12.3 Development of a Linear Actuator Cell Using Piezoelectric and Magnetic Effects

Adão DELEHELLE, Bertrand NOGAREDE, LAPLACE, France

Tuesday, Sept. 18, 17:20-17:40, Closing Session,

Main Hall

Closing remarks and announcement of LDIA 2009

Chairperson: P.BROCHET, *LDIA 2007 Organizing Committee*

Prof. D. EBIHARA, *LDIA International Steering Committee*

Prof; D.HOWE, *LDIA International Steering Committee*

Prof. J.P.YONNET, *LDIA 2007 Programme Committee*

Prof. H.K.JUNG, *LDIA 2009 Organizing Committee*

Wednesday, Sept. 19, 8:00-16:30, Technical Tour

Registration Desk

Wednesday, Sept. 19, 8:00-16:30, CEDRAT Formations

Salle AMPERE

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C. Sadarangani (KTH, Sweden)

A. Vandenput (TU Eindhoven, Netherlands)

Lunch Time

There are many restaurants near the Symposium. Here are some that we selected from their price and service speed.

*We recommend you to go by metro in the town centre near the metro station '**Gare Lille Flandres**' or '**Rihour**'.*

At the proximity of '**Gare Lille Flandres**', you can find:

- **FLUNCH**, 16, rue de Tournai. A Self service with good quality French food. You can see what you choose. Good ratio Price/quality.
- **LES BRASSEURS**, 18 ,place de la Gare. Typical food from the Northern and Eastern of France. Home brewed bier. Nice place
- **BUFFALO GRILL**, 5 place de la Gare. For those who prefer meat.

At the proximity of 'Rihour', you can find:

- **HIPPOPOTAMUS**, 2, rue Faidherbe. Good meat.
- **BRASSERIE FLORE**, 11, place Rihour.
- **BRASSERIE DE LA PAIX**, 25, place Rihour

In these 3 restaurants you will find also good typical French foods and specialities from the Northern of France.

You can also find by yourself in the streets in the vicinity of these two metro stations.

Bon appétit!