April 20, 2017

Association for the Promotion of Electric Vehicles

Summary of The Activities for The EV Promotion

-To leave the beautiful Earth for our children in the future-

Hitoshi Arima
Commissioner, Association for the Promotion of Electric Vehicles
Self-introduction

Hitoshi Arima
Commissioner, Association for the Promotion of Electric Vehicles

✓ Arima has more than 30 years of experience in the IT industry, starting my professional career from an embedded engineer who was involved in developing factory automation robots and embedded operating systems, and then moved my career to Silicon-Valley based companies as a manager of engineering and business development. Finally, as president, I have succeeded in launching three start-up companies in Japan, SDS, MontaVista Software, and dSPACE.

✓ Now I am an owner/president of Arima Management Design as well as a visiting professor at Nagasaki Institute of Applied Science and an instructor at The University of Tokyo and Kyushu Institute of Technology.

✓ I also contribute to social activities in industrial associations such as Smart System Verification and Validation Technology Association and Association for the Promotion of Electric Vehicles.
APEV : Our Mission

To leave the beautiful Earth for our children in the future

✓ The strong desire that has driven us to establish
✓ Established on June 29, 2010 to promote the use of electric vehicles

Now is the time for us to fulfill our responsibility
towards posterity and to take ongoing action
in order that the future generations,
including our children and grandchildren,
can continue living a healthy life in a rich natural environment

(Mr. Soichiro Fukutake, Honorary Chairman of APEV)

To acquire broad cooperation from people
Throughout various industries, educational institutions and the administration
To exert their influences in all directions.

This will realize a world where many consumers consider electric vehicles, among other candidates for personal transportation and actually select one.
Executives

Honorary Chairman

Soichiro Fukutake
Executive Adviser, Benesse Holdings, Inc

Chairman

Hiroshi Yokokawa
President, Japan Association of Athletics Federations

Chief Commissioner

Nobuhiro Tajima
Representative Chairman and CEO Tajima Motor Corporation

[Commissioners]
Hitoshi Arima: President, Arima Management Design Ltd., Chairman, Yokohama Smart Community
Hiroshi Fujiwara: Representative Director, BroadBand Tower, Inc.
Kohei Kusaka: Professor, School of Engineering, University of Tokyo
Kazunobu Sato: EV Commercialization Advisor, Ehime Industrial Promotion Foundation, Ehime University Visiting Professor, Tokushima College of Technology Visiting Professor
Takahiro Suzuki: Professor, New Industry Creation Hatchery Center, Tohoku University
Toshio Yamashita: CEO, INTERROBANG DESIGN INC., Visiting Professor, Tokyo Metropolitan University

[Counselor]
Hisato Hoshi: Corporate Adviser, Benesse Holdings, Inc.

[Advisers]
Keiko Ihara: Racing driver, Associate Professor of Keio University Graduate school Media design, Asian representative for the FIA
Yoichiro Kawaguchi: Professor, Emerging Design and Informatics Course, University of Tokyo
Yoshihisa Murasawa: Visiting Professor, Ritsumeikan University
Ken Okuyama: Industrial Designer, CEO, Ken Okuyama Design
Tadashi Tateuchi: Automotive critic

[Auditor]
Yusaku Sato: Yusaku Sato, Auditor

(In alphabetical order)
Our Activities

Networking across Various fields for the promotion of EVs
Our Activities

Lectures, symposiums, and seminars organized by APEV

- Sectional (Committee) Meetings
  - About once every three months

- Lectures and symposium
  - About three times a year

- Participation in exhibitions and symposiums
  - Super Micro Mobility Forum (Iwata, Shizuoka),
  - G7 Transport Ministers’ Meeting Pre-Evet as co-organizer (Karuizawa, Nagano)
  - EVS (The International Electric Vehicle Symposium)
  - Asia Pacific Clean Energy Summit and Expo (Hawaii)
  - etc.

- Host events
  - EV Super Micro Mobility Design Contest for International Students
  - TEAM APEV Pikes Peak EV Challenge
List of Members (as of the end of August 2016)

Regular membership: total of 83 Corporations/Groups

Japanese companies (In alphabetical order)
- Benesse Holdings, Inc., Dentsu Inc., Hino Motors, Ltd., Hitachi, Ltd., Japan Post Co., Ltd.,
- Takaoka Toko Co., Ltd., Toshiba Corp., Toyota Motor Corp., Yaskawa Electric Corp.

Foreign companies (Notation by country)
- Nokia Solutions and Networks Co., Ltd. (Finland), BMW Group Company (Germany),
- Dassault Systems Corporation (France), dSpace Japan K.K. (Germany),
- Volkswagen Group Japan Co., Ltd. (Germany),
- Ericsson Japan K.K. (Sweden), Tesla Motors, Inc. (US)

Special membership: total of 125
Supporting membership: total of 47

Advisory administration
Ministry of Economy, Trade and Industry, Ministry of Land, Infrastructure, Transport and Tourism, Kanto District Transport Bureau

We regularly update our official website. (http://www.apev.jp/news/en/member.html)
EV Promotion Activities

Model Project Deployment in cooperation among domestic and overseas Government – Private Enterprise – Media

- **in 2010** Nagasaki EV&ITS Project
- **in 2013** Teshima Mobility Project
- **in 2014** Hawaii-Maui EV Promotion Project
- **in 2015** Echigo-Tumari Art Triennale 2015 EV Project

- Ribbon-cutting ceremony of the Echigo-Tumari Art Triennale 2015 EV sharing business at Japanese spring inn
- Geothermal binary power generation system by utilizing hot spring
- Customized Official Car (BMW i3) for the Echigo-Tumari Art Triennale 2015
G7 Transport Ministers’ Meeting in Karuizawa, Nagano pref.

- **Pre-Event as a co-organizer @Karuizawa Kazakoshi Park, on September 4, 2016**

- **Exhibition for the G7 Transport Ministers @Karuizawa Prince Hotel, on September 23-25, 2016**
EV Mobility Design Contest for International Students 2017

To propose a design of the future mobility which maximize the potential of zero-emission EV and to show the ways how such future mobility will be involved in the society.
EV Mobility Design Contest for International Students 2017

Contents of assignment:
1. Description of users, infrastructure, packaging, and practicality of the new technology. The actual usage scene of the future mobility should be taken account. It can be presented by means of texts, figures, or graphs, as needed.
2. Sketch including the usage scene: Hand-drawing permitted

Participations:
Participants shall be students and 18 years old or older as of April 2017. They can form a team of two or more members up to six. The types of the school do not matter and multiple teams from one school are also accepted. Entries are free of charge.

How to apply: See Website <http://www.spev.jp/contest/en/>

Contact: EV Design Contest Secretary-General Association for the Promotion of Electric Vehicles (APEV)
Tel: +81-50-3735-8325 E-mail: contest@spev.jp Website: http://www.spev.jp/contest/en/

Host: The Association for the Promotion of Electric Vehicles (APEV)
Supporters: (tentative, in alphabetical order) Graduate School of Interdisciplinary Information Studies, University of Tokyo / Japan Automobile Manufacturers Association, Inc. (JAMA) / Ministry of Economy, Trade and Industry of Japan / Ministry of Land, Infrastructure, Transport and Tourism of Japan / Ministry of the Environment of Japan / Tokyo Metropolitan Government
Sponsor companies: Benesse Holdings, Inc. / Bosch Corporation / Car Design Academy / Honda R&D Co., Ltd. / HHI Transport Machinery Co., Ltd. / Nissan Motor Co., Ltd. / NTN Corporation / Renesas Electronics Corporation / Yamaha Motor Co., Ltd.
Mobility has always been changing its form with society in history. Current environment/energy issues, including global warming, have promoted electrification of cars. Problems, such as traffic congestion, depopulation, and aging society, have triggered the new technology including automated driving. Hence, the usage and design of cars will drastically change from now on.

In this era of change, the Association for the Promotion of Electric Vehicles (APEV) has organized “EV Super Micro Mobility Design Contest for International Students” since 2013, to offer opportunities for the young people who will lead the next generation to design and suggest the state of the future. In the third contest to be held this year, the target is not restricted to the super micro mobility but expanded to electric vehicles in general. I expect to see a wide variety of proposals, including the concept and scheme of the mobility society in the future and new approaches to the environment issues. I also feel that the contest itself is reaching a new level with international screening members, adequate to the purpose of the contest.

Moreover, one of the characteristics of this contest is the workshops rich in contents. Participants will most likely be able to make further development in their design and proposal through them. Entries are anticipated to show the world the new proposals with the imagination of the designs. I look forward to many motivated applications.
Toyota Hybrid Prius released in December 1997... marked the beginning of an era of next-generation, environmentally friendly vehicles

Japanese auto-manufacturers have started the mass production of electric vehicles, such as the Mitsubishi i-MiEV, and the Nissan LEAF, ahead of other global competitors

In addition, the use of fuel cell vehicles (FCV) is also beginning to spread widely.
Japanese EV Market (2/2)

- Toyota “Concept-愛 i”, a concept EV, displayed in CES2017... producing a new relationship between cars and human beings with its proactive intelligent communication system.

- Honda “Neuv” also presented in CES2017... having artificial intelligence with “emotion engine”, reading how drivers are like, in order to assist safe drive. Honda has a close relationship with Softbank in terms of co-developing the intelligence.

- There will be a lot of new social experiments with EV and auto-pilot driving system, leading by the Japanese government.
The Japanese EV/PHV Market has been going flat for the recent years in comparison with the sharp growth of the US and Chinese market.

The Japanese government is boosting EV/PHV and thinking through an aggressive policy goal with EV/PHV’s 20-30% share out of newly-sold vehicles in 2030.

The government expects EV to work effectively as emergency batteries at the time of natural disaster as well as reduce CO2 emission.

Policy issues in Japan

The Japanese government recognizes that major policy issues still exist in order to achieve the goal in 2030.

- **Vehicle:**
  - sustained subsidies, possibility of tax incentives as well as reducing vehicle costs by carmakers
  - investment in developing more powerful, more efficient batteries
  - policies in creating secondhand EV/PHV vehicles market and setting up appropriate regulations compared to international ones, etc

- **Infrastructure:**
  - policies of installing more battery chargers in public space, newly-built houses, apartments/condominiums, workplaces
  - promoting development of higher power battery chargers, etc

- **Others:**
  - leveraging V2X functions (ex. Virtual Power Plan), contributing to international standardization, collaborating more with local governments, etc

Keywords: Digital Twin

- Digital twin means to reproduce events in the physical world related to factories and products in real time on a digital basis. It is a method that makes it easy to control and manage real factories by building simulation spaces that imitate the real world as if the twins and the factories actually manufactured on the system and the products to be shipped.

- It is an important concept in next-generation manufacturing, and it is regarded as an important technology supporting IIC and Industrial 4.0.
Building Information Modeling (BIM) is a system that constructs an integrated three-dimensional model of buildings in order to efficiently and effectively perform from the design of the building to the construction and maintenance. It also has functions to link with various analysis systems.

It is also done to output a structure analysis model from BIM software. The analysis method continues to evolve reflecting the latest research results. Analysis tools include packaged commercial products and those developed by the construction company on their own.

The Ministry of Land, Infrastructure, Transport and Tourism announces the "BIM Guidelines" to be applied to the design work and construction of the Government building maintenance business since FY 2014. We are aiming at popularization and productivity improvement by defining the use purpose of BIM, how to make BIM model, degree of detail and so on.

Conceptual diagram centered on BIM model (architectural three-dimensional model)

BIM model: Building information model that combines three-dimensional shape information created on a computer, as well as attribute information of buildings such as names and areas of rooms etc., specifications / performance of materials and members, finishing etc.

Source: Architectural institute paper "BIM collaboration sensing platform to realize smart building city" Noritoshi Kurata, Hitoshi Arima
New use of BIM
Platform for integrating BIM data and VR technology

BIM, modeling system A system that can cooperate with each other FUZOR

Designed by VR technology

Source: Architectural institute paper "BIM collaboration sensing platform to realize smart building city" Noritoshi Kurata, Hitoshi Arima
VR · AR is utilized in automobile development

- Application of VR technology is progressing in the field of automobile development. Ford Corporation is working on practical use of AR (augmented reality) lab, FiVE (Ford's immersive vehicle environment) combining CAD data and VR created for automobile design.
- It is possible to simulate an appropriate arrangement in the case of performing various switch operations in the interior of the vehicle.
- Instead of mere CAD data, you can check the vehicle design from stereoscopic view from exterior to interior by wearing a head mounted display.
Collaboration of construction and automobile development

- Automatic parking of cars, realize the ability to get in from the entrance of the building smoothly to an automatically driven car. To that end, collaborative design of building and automobile is required.
- It is necessary to combine building CAD and CAD data of automobile design, and further perform energy simulation such as non-contact charging, charging from storage battery and so on.
- As the next step, it is necessary for the building industry and the automobile industry to fuse together to create an environment in which the design environment and tools are standardized in the industry and competed appropriately.

Cooperative design image of building CAD and mechanical CAD
Source: Architectural institute paper "BIM collaboration sensing platform to realize smart building city" Noritoshi Kurata, Hitoshi Arima
Innovation proposal

- Optimize simulation of EV charging and actual charging condition
- Building and mobility are developed by cooperative simulation using digital three-dimensional data, and optimum control of actual operation.
- Digital model and real data are used for all of the life cycle from development to operation.
- Application fields will expand
  - Real time optimum control based on various sensors
  - Predictive control using die learning technique