Introduction of JARI

Takeshi Ishiyama
General Manager
General Administration Division
Japan Automobile Research Institute
1. **Outline**

1) JARI vision in 2020
   JARI will challenge advanced research, and contribute to motorized society in the world.

2) Number of personnel: 351 (As of April 1, 2012)

3) Business scale in 2011
   - Income: 77 million US dollars (6.1 billion JPY)
   - Number of test & research projects: 377 in total
     - Public projects: 58
     - JAMA projects: 69
     - Private projects: 225
     - Independent research projects: 25

4) Publications and presentations
   - Domestic: 129
   - International: 24
2. Organization

(As of April 2012)

Chairman of Councilors
Chairman of the Board
President
Managing Director

Senior Executive Director
Executive Director

Auditor

Energy and Environment Research Division
FC-EV Research Division
Safety Research Division
ITS Research Division
Robot Implementation Division
Research Planning and Administration Division
General Administration Division
Public Relations Department
JNX Center
Registration Body
STC Administration Department
Advanced Research Department
Global Networking
Strategic Planning and Management Department
3. History of JARI

- Apr. 1961: Former Automobile High-Speed Proving Ground Foundation founded
- Oct. 1964: Former high-speed oval testing track completed and entered service
- Apr. 1969: Original institute reorganized into the Japan Automobile Research Institute (JARI)
- Aug. 1976: Japan Electric Vehicle Association (JEVA) founded
- Sep. 1979: Association of Electronic Technology for Automotive Traffic and Driving (JSK) founded
- Jul. 2003: Three organizations integrated to form the new JARI
  JEVA: Japan Electric Vehicle Association
  JSK: Association of Electronic Technology for Automotive Traffic and Driving
  JARI: Japan Automobile Research Institute
- Oct. 2005: Shirosato Test Center completed and entered service
  (Location: Shirosato town, Ibaraki Prefecture)
The high-speed proving ground allowed Japanese car manufacturers to begin experiments into speed, noise, stability, etc., which led to the beginning of motorization in Japan.
4. Trends in the number of employees

[Bar chart showing the number of employees from 2004 to 2012, with years on the x-axis and number of employees on the y-axis, ranging from 200 to 450.]
5. Changes in Income

![Bar chart showing changes in income from 2004 to 2011.

- Income (million US dollars)

Legend:
- Donation
- JAMA
- Government
- Private company
- Subsidy
- Rent

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6. Percentage of Each Customer for Research Activity Income

(2011FY)
7. Role of JARI

- Contribution to policy making

**Government**
- METI
  - Industrial promotion policy
  - Energy saving policy
  - Standardization policy, etc
- MLIT
  - Road traffic policy
  - Technical regulations
  - International harmonization
- Environment Agency
  - Environmental policy
  - Regulations
- Police Agency
  - Training of investigation of traffic accidents

**Industry**
- Automobile
- Electricity / Electric power
- Communication

**Academy**
- JSAE / JSME, etc
- Universities
- Research institutes

JARI

Role to connect government and industry
- Promotion of international standardization activities
- Assessment tests of new products and new technologies for common issues in the industry
- Release of the results
- Collaboration research

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8. Contribution to government

Contribution to policy making

Research results with high reliability concerning vehicle technology have been provided by JARI as a neutral organization.

1) Influence of diesel emissions on carcinogenicity
2) Environmental prediction by atmospheric simulation
3) Fuel consumption evaluation methods of heavy-duty diesel trucks and buses
4) Fuel consumption evaluation methods of four-wheel drive vehicles and HEVs
5) Standardization of fuel cells
6) Evaluation methods of automotive safety
7) Safety evaluation methods of life support robots
9. Contribution to automotive industry

Common problem solutions for the automotive industry

Technical standards and guidelines concerning efficiency improvement, standardization, and test methods are decided.

1) Promotion of Global Technical Regulations (GTR) of examination methods for emission, noise, safety, etc.
2) Impact biomechanics research
3) Research of drive recorders
4) Fuel quality investigation
5) Development and proposal of examination methods for new technology and tightening regulations
10. Cooperation with countries in Asia

- Technological exchanges
- Holding seminars
- Round table discussions
- Training business

Seminar in Indonesia

Round table

JICA Group Training
11. Research and testing activities

① Environment / Energy

- New fuel
- Hazardous air pollutants
- Health effects
- Air quality / Environmental simulations
- Advanced power train systems
- Ultra-fine particles
- Road traffic noise

Simulated distributions of regional ozone (O₃) and nitrogen dioxide (NO₂)

Exhaust gas emission test
Hydrogen & Fuel Cells / Fuel Cell Vehicles, Hybrid Electric Vehicles, Battery Electric Vehicles

- Performance & safety evaluation
- Standardization
- Highly efficient batteries

Hydrogen and Fuel Cell Vehicle Safety Evaluation Test Facility (Hy-SEF)

JARI standard cell

Vehicle fire testing
3. **ITS**

- Energy ITS
- Smart vehicle network
- Probe-car information system
- Base strengthening of electronic technology
- Standardization
- ISO26262

Areas of ITS research at JARI

Development scenario for ISO 26262-compliant electronic systems
Development of energy-saving ITS technologies

R&D for autonomous driving and platooning

80km/h  Platoon of three trucks  Following distance: 4m

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Active safety

- Driver support system
- Elderly drivers
- Vehicle dynamics

- Human machine interface
- Lighting / Visibility

Rear-end collision
Crossing vehicles accident
Accidents in blind curves
Pedestrian accidents
Accidents between pedestrians and right-turning vehicles
Lane-change accidents

Driving simulator

Accidents between vehicles turning right and those traveling straight

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Crash safety

- Occupant protection
- Impact biomechanics

- Pedestrian protection
- Traffic accident analysis

Collision Test
(Upper: Frontal crash, Lower: Side impact crash)

Cervical muscle model for human neck
Safety evaluation of life support robots

The overall approach of robot safety verification
- Execution of tests & research
- Installation of test organization for verification
- Installation of certifying organization
- Promotion of standardization and investigation

Project began in 2009

A center for robot safety examination will be constructed in JARI in the future.
Thank you for your attention!!

If you have any comments and questions, please feel free to contact me: Takeshi Ishiyama. mailto: tisiyama@jari.or.jp
Tel: +81-29-856-1112
ESV collision experiment for the public in 1973

- Reports on the result at an international conference in 1976.
- JARI came to be known internationally.
Completion of wind tunnel for actual cars in 1976

This wind tunnel was the pilot plant in Japan. For the first time, the automotive industry could collectively use such a facility.
Prompt work on health effect research of diesel exhaust emissions by tests using animals
Development of ceramic gas turbine from 1990 to 1999

Lead to the joint development of the advanced technology
The three organizations integrated to form the new JARI in July 2003

- **Japan Automobile Research Institute**: Overall research and examination concerning vehicles
- **Japan Electric Vehicle Association**: Promotion and set of standards and criteria for low-pollution vehicles
- **Association of Electric Technology for Automobile Traffic and Driving**: Promotion and conduction of research and development in ITS
Shirosato Test Center
(Entered service: Oct. 2005)

- Slippery test track
  - Length: 1,410m
  - Width: 50m

- Steering & handling test ground
  - Radius: 80m
  - Area: 81,115m²

- High sped oval track
  - Length: 5,500m
  - Width: 12m

- Handling & braking test track
  - Length: 1,500m
  - Width: 50m

- Multi purpose test track
  - Length: 1,500m
  - Width: 20m

- Slippery test track
  - Length: 1,410m
  - Width: 50m

- Multi purpose test track
  - Length: 1,500m
  - Width: 20m

- Dirt track area
  - Area: 33,000m²

- Peripheral oval road
  - Length: 5,694m
  - Width: 7m

- Operation area

- Gross area: 302ha

Aerial View of Shirosato Test Center

Hydrogen and Fuel Cell Vehicle Safety Evaluation Test Facility (Hy-SEF)

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