Nov. 2013

Next-Generation Advanced Mobility System

-Promotional activities supporting local industries-

Prof. Fumihiko Hasegawa,
Deputy Director
New Industry Creation Hatchery Center,
Tohoku University

Mission Statement, Tohoku Univ.

「研究第一主義」
“Research First”

Prof. Honda, Founder of IMR
Pioneer of Metallurgy & Magnetism

Best Education can be found on
the front lines of Advanced Researches

「門戸開放」
“Open-Door to the World”


Dr. Kuroda


Dr. Makita


Dr. Tange

1913, Entered TU
As First Female University
Students in Japan

The Cradle of Optical
Communication, 1964

「実学尊重」
“Practice-Oriented Research and Education”

Contribution to Society through
the Active Use of Innovative Research Outcome

Number of Students, Tohoku Univ.

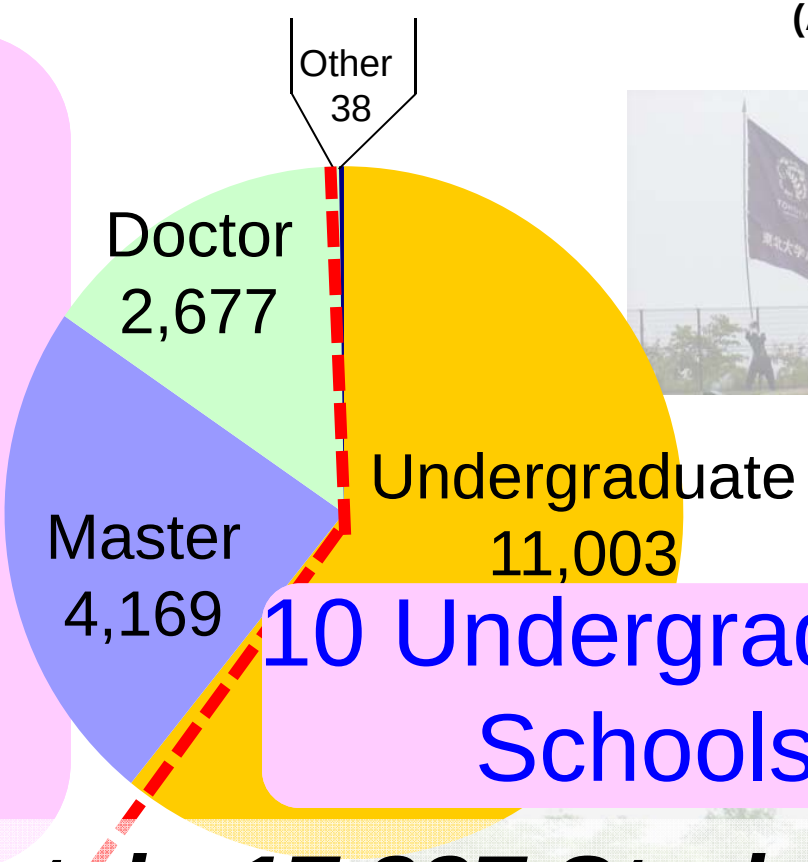
半年後に設立したのが、大規模インキュベーションセンターである「みやぎ復興パーク」です。津波で流出した福祉施設や工場の操業再開、など

(As of May, 2013)

6 Research Institutes

- Materials Research
- Development, Aging and Cancer
- Fluid Science
- Electrical Communication
- Advanced Materials
- **IRIDeS, Est. 2012**

16 Graduate Schools



10 Undergraduate Schools

Graduate Students: 38%

Total ; 17,887 Students

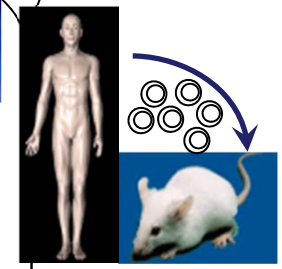
Including 1,436 International Students,

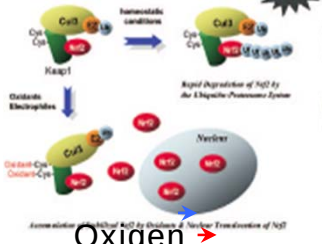
3,116 Faculty Members

+ 1,587 International Researchers,

Competitive Fields of Tohoku University

Life Sciences



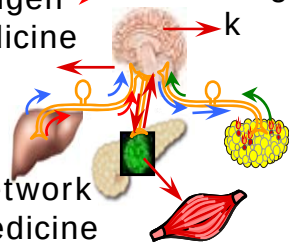


Oxigen Medicine

Medical Megabank

'Supra' immunodeficient NOG mice

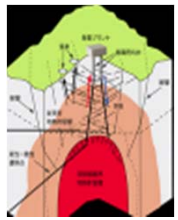
Muse Cell



Network Medicine

Environment

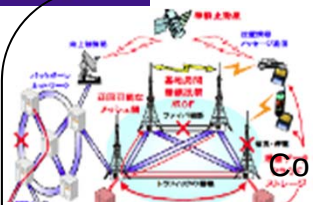
Biofuel



Geothermal

Canola Project, Desalination

Disaster Science




Optical Communication

Communication Network

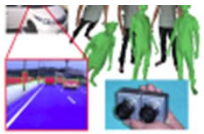
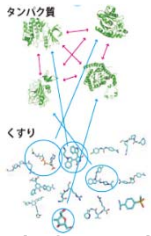


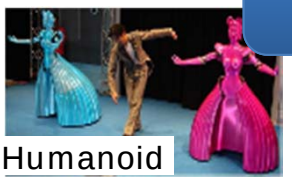
Image Recognition



Bioinfomatics

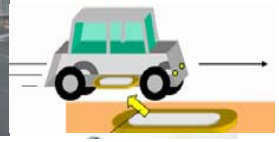
Information & Communications

Tohoku University

Humanoid

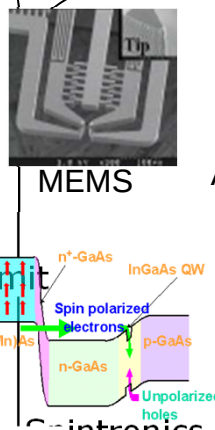
EV



Contactless Power Transmit


Vehicles for Disaster & Critical Cond.

Robotics

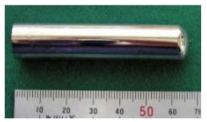


Spintronics Devices

3D Semiconductor

MEMS

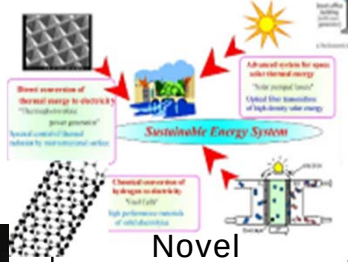
Amorphous



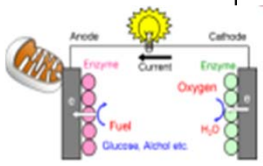
Glassy Alloys

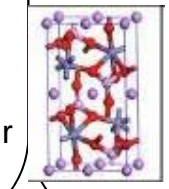
NanoTech & Materials

Smart Grid

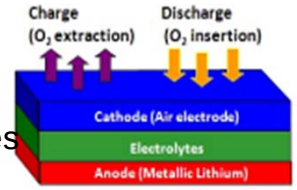


Novel Solar Cell





Novel Batteries



Energy

New Industry Creation Hatchery Center, NICHe:

Partnership between Industry and University

NICHe Main Building

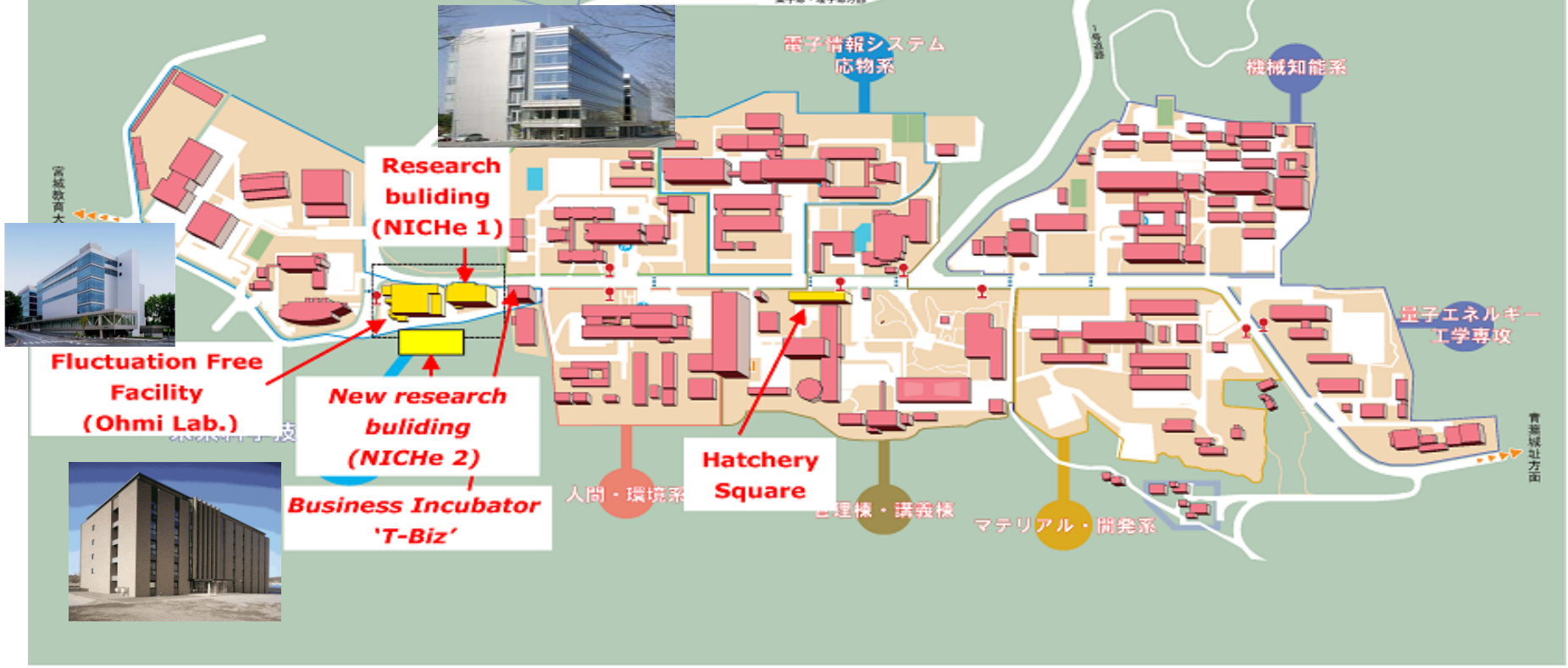
Fluctuation Free Facility *

NICHe Building, Annex

Fluctuation Free Facility: FFF, Clean Rooms for Innovative Semiconductor Manufacturing System

NICHe in AOBAYAMA Campus

<Address>
6-6-10 Aoba Aramaki Aobaku Sendai
Miyagi 980-8579 JAPAN



About NICHe

Partnership between Industry and University

Established in 1998

Planning & Management of Collaborative Research Projects to Provide Solutions for Industry & Society

20 Research Projects
JPY 2.9B Budget with 232 staff, including 156 Researchers,
as of Oct. 1st, 2013

NICHe Guideline for Projects

1, World Leading Research
2, Predetermined Period, 3 to 5 Years Typical
3, Needs Oriented & Large-Sized Project
with Industry & Government
4, External Funding

Missions of NICHe, R&D and Industrialization

Advanced R&D to Create New Industry

Innovative R&D to Strengthen Key Industry

Leading - Edge R&D for Tohoku Univ. Start-Ups

Mission Proposal & Continuous Accomplishment

Attract Private Sector to the Region

New Employment Opportunity in Local community

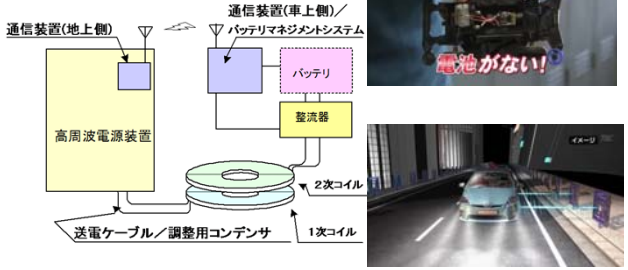
Advanced Mobility System Research

Demonstration in Aobayama

Miyagi Reconstruction Park

Driving Simulator

Contactless Power Transmission



Robotics

Autonomous Driving

EV: Passenger, Transit Bus, Bike

New Integrated Research at Tohoku Univ.

Innovation Tech. Research Group toward Low-Carbon Society
Basic Research

Intelligent Information System Research Center, IIS
Applied Research

Since 2008 Spring

Next Generation Mobility System Research Group

Prototyping, Demonstration & Evaluation

Integration of Basic Research at TU, from
Mechanical, Electrical, Electronics, Information, Material, Chemical, Civil Engineering to Economics etc.

Development of Safer & More Eco-friendly Mobility System

Proposal: Logistics & Energy Management System from a viewpoint of Mobility

Key Words

1, Low Carbon Emission Tech.: Lightweight, pneumatic resistance, Friction, energy saving
2, Safety Function: Visibility, Display, Sensing Tech., Autonomous Driving, Traffic Control
3, Power Train: Ultra Efficient Powertrain System, Internal Combustion Engine, HCCI, HV, EV)
4, Manufacturing Technology: Welding, Robotics, Design, Material

Collaboration

Local Businesses

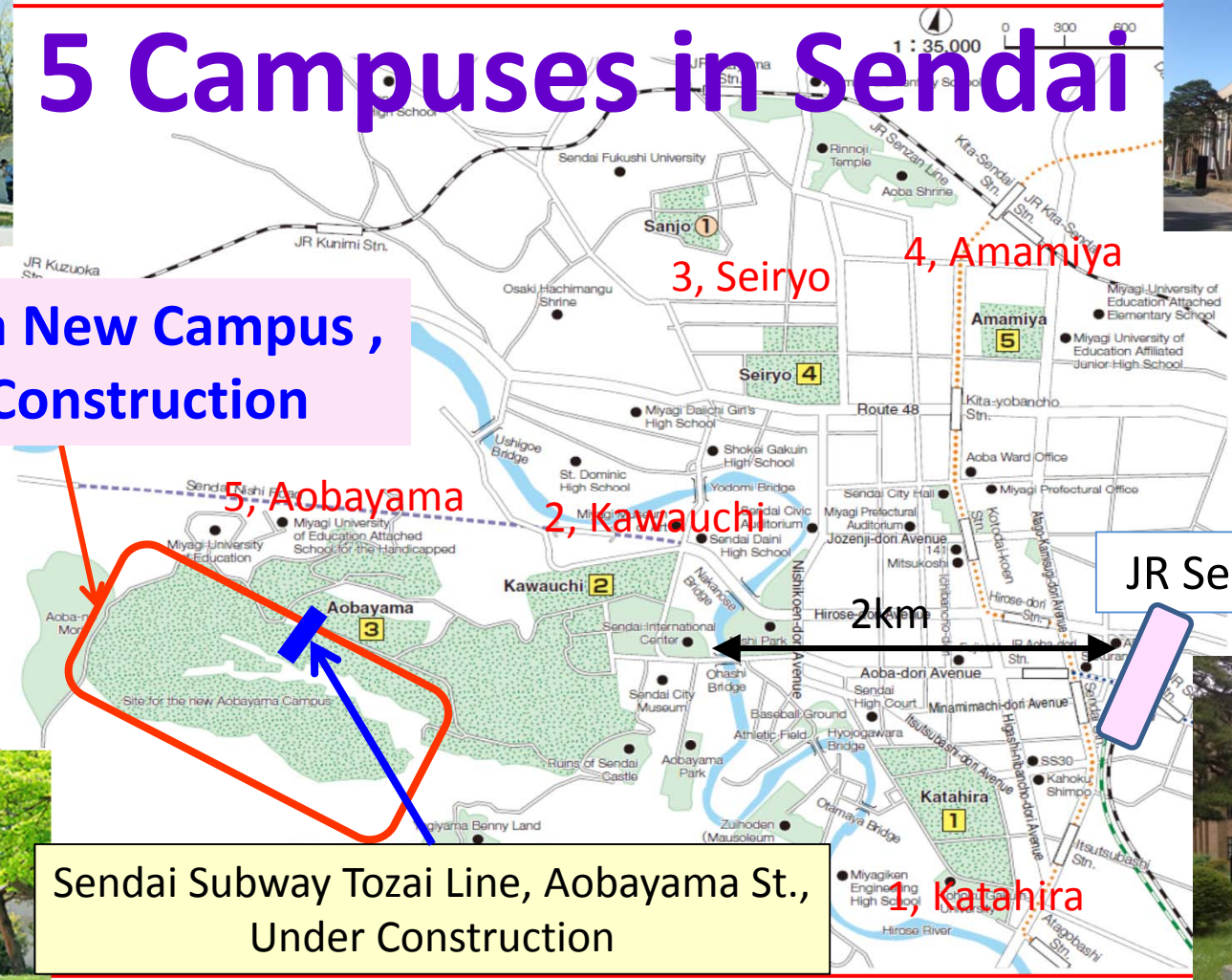
Improve

Establish Integrated Center of Excellence for Next Generation Mobility System

Mobility in Aobayama New Campus, Tohoku University

5 Campuses in Sendai

Aobayama New Campus , Under Construction



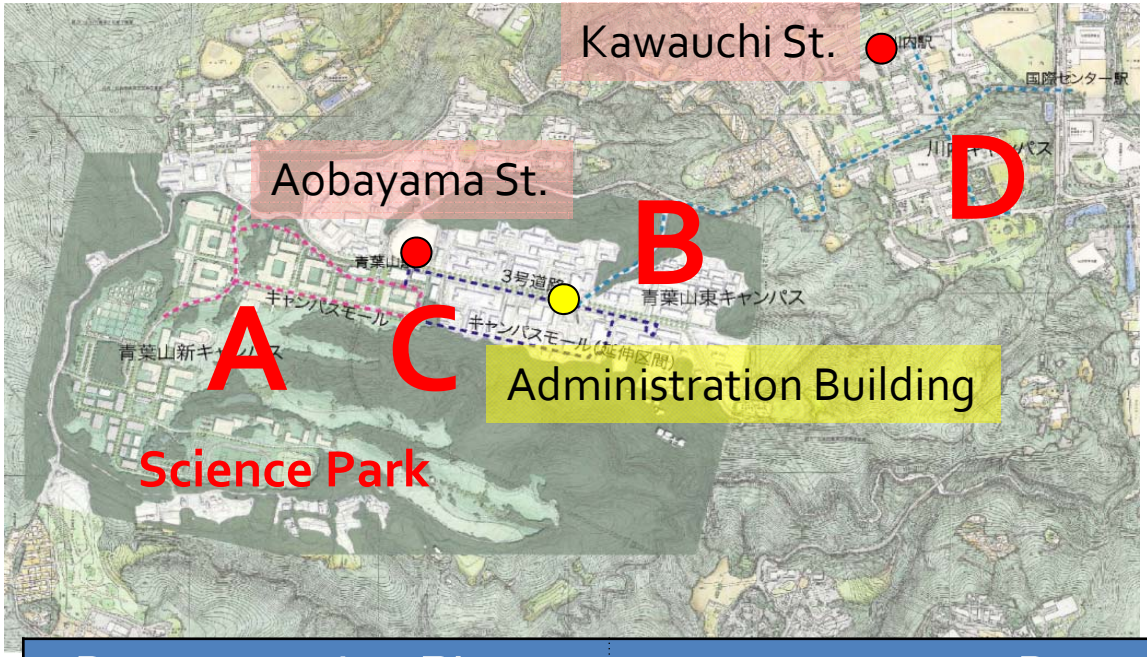
JR Sendai St.

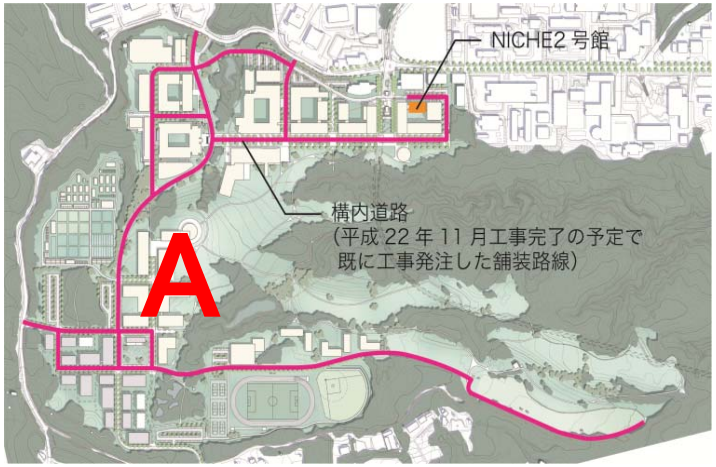
Sendai Subway Tozai Line, Aobayama St., Under Construction

Aobayama New Campus & Subway Tozai Line

Up to 10 thousands Commuter, Only One Subway Station

No Transportation in New & Existing Aobayama Campus





Demonstration Phase	Demonstration Area
2013FY ~ Vehcle Development	Campus Mall Zone, Aobayama New Campus [A]
~2015 FY Pilot Study 1	[A] Aobayama, New Campus & East Zone [B] Determine the best way to the Mobility in Aobayama
Pilot Study 2	[C] [D] Aobayama & Kawauchi Stations and Other Campuses

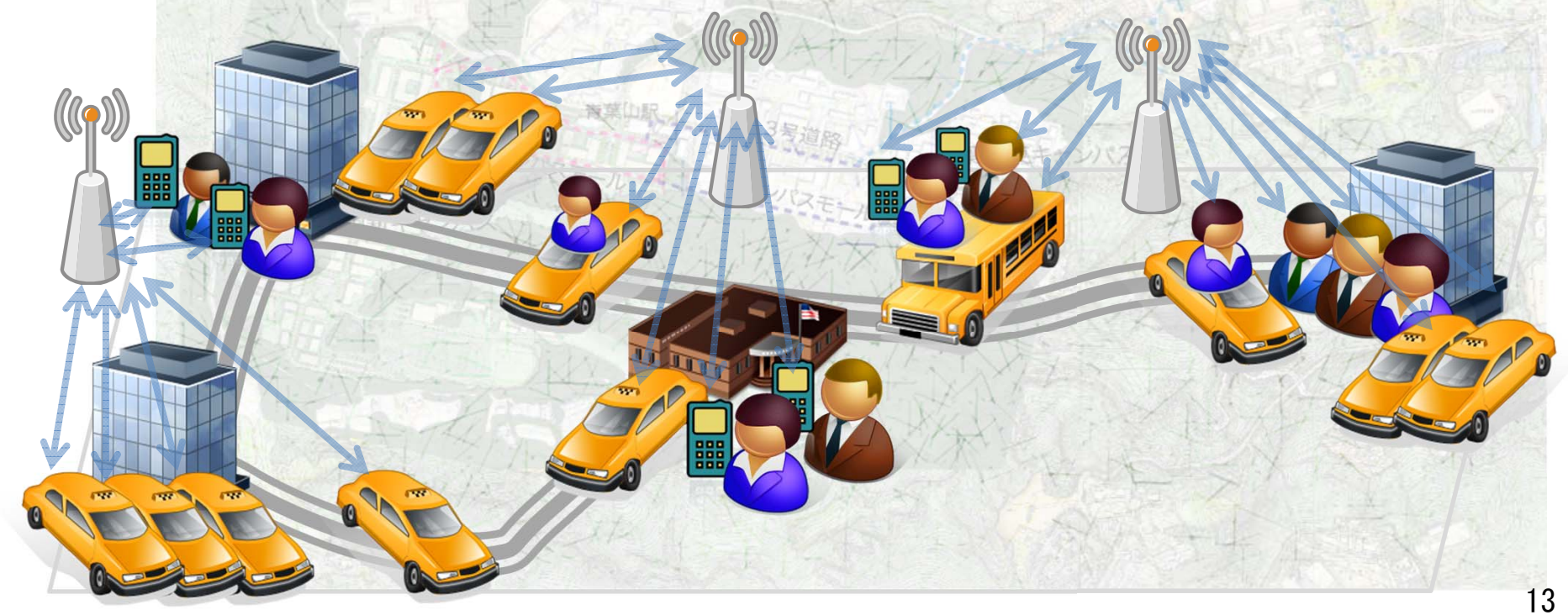
Subway Station:
As a Hub for Next Generation Mobility

E-Bus, EV Sharing and Management

Bike Sharing

Co-creating Optimum Mobility with Community

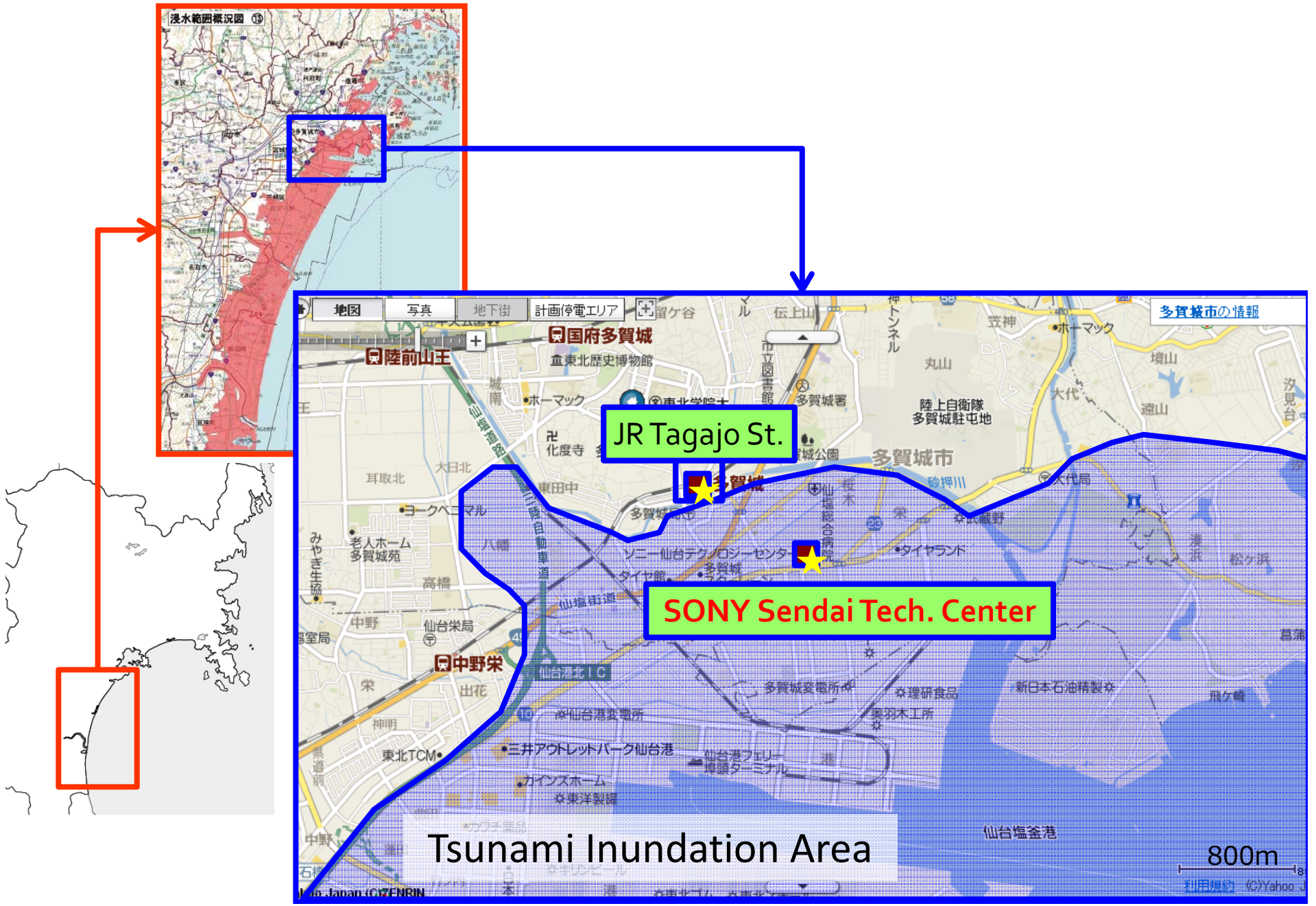
Experience of Advanced Mobility



Contribution to Local Community

1, Miyagi Fukko, Reconstraction Park
2, Traffic Control, Safety, User-friendly
3, Evacuation at the time of disaster or Emergencies
4, Energy Supply in the Event of Electric Outage

Tsunami Devastated Area, March 11, 2011



Miyagi Fukko, Reconstruction Park

Industry – University - Government Collaboration Hub for Regeneration of Local Industry from the Disaster, est. Apr. 2011

Some of the Tsunami Exposed Buildings at SONY Sendai Tech. Center are Rented to Local Industry, Government, Academic Institution etc.

Total Floor Space: 39,000m^2, Free of Charge for 10 Years

Restoration Support : Office, Factory, Warehouse etc. for Affected Local Companies

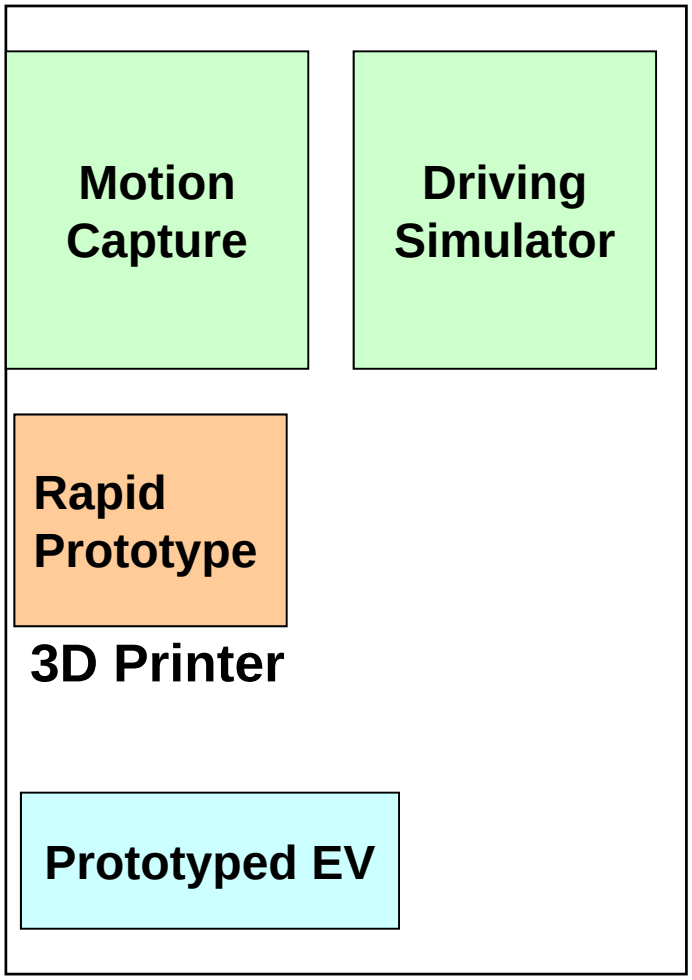
Support Reconstruction Activity : Prototyping and Demonstration for Industry – University - Government Collaboration

Established from the Cooperation of Miyagi Prefectural Government, Sendai City, Tohoku Economic Federation & Tohoku Univ.

Prototype, Demonstration & Evaluation for Semiconductor, Next-Generation Mobility, Robotics, etc. through Collaboration of Major/Local Companies & Tohoku Univ.

Shared Use Large-Size Instruments Installed

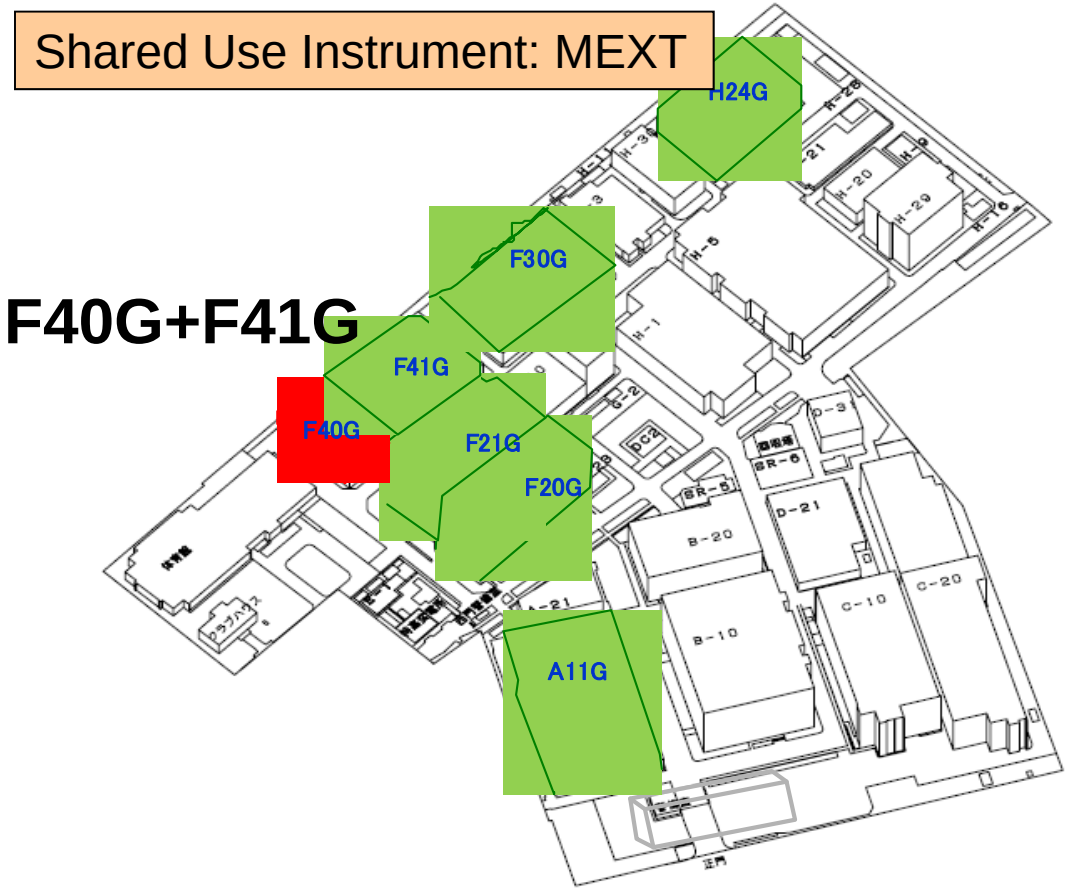
Hub for Collaborative Research Activity for Next-Generation Mobility in Devastated Area



1st Floor, F40

Shared Use Instrument : METI

Shared Use Instrument: MEXT



Miyagi Fukko, Reconstruction Park

Autonomous Urban Traffic by Small Size EV

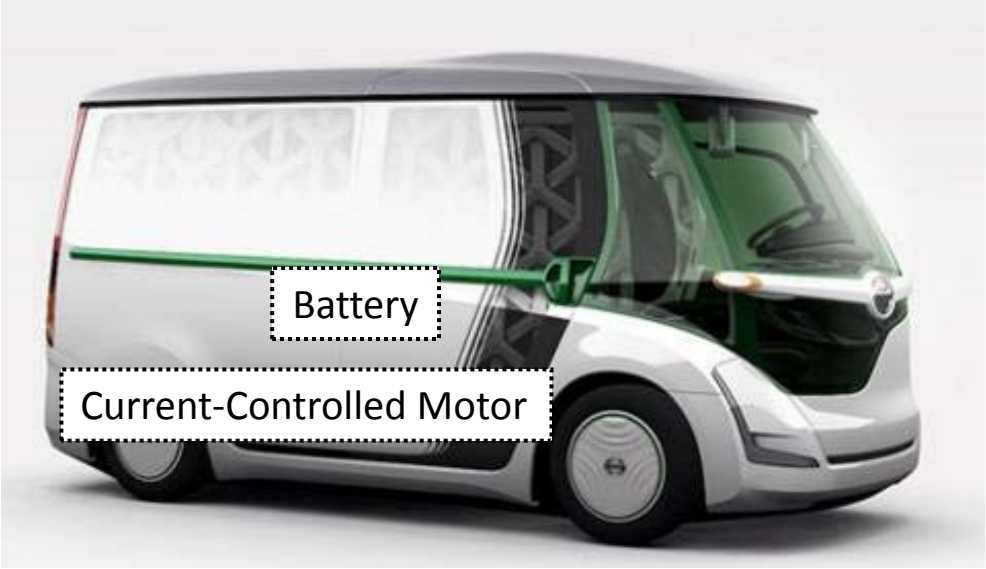
Automated Next-Generation Mobility in Urban and Tsunami Devastated Costal Area

Photo 1

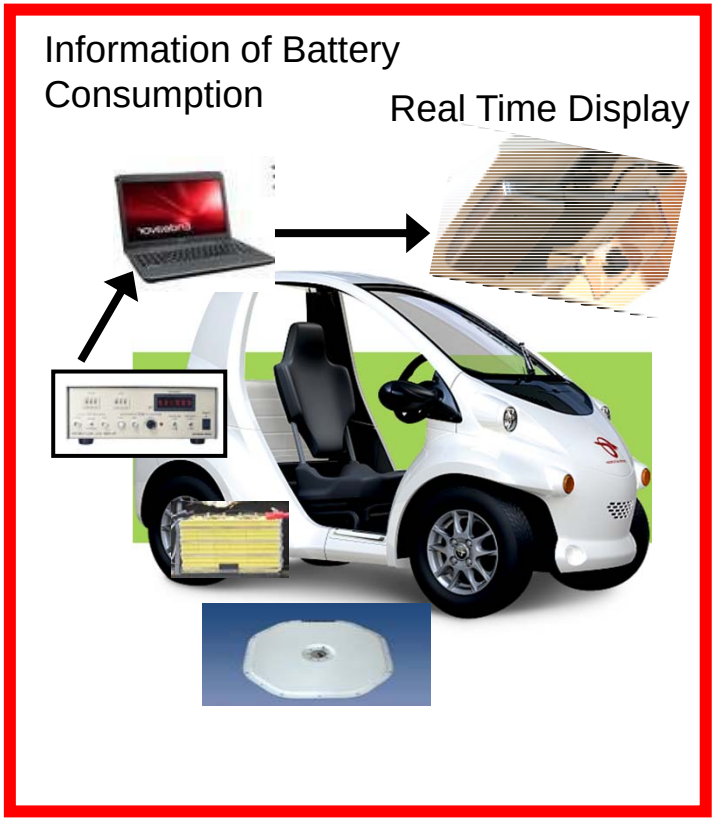
Photo 2

EV for Energy Management;

Energy Combined with Mobility



E-Bus



Small Size EV for Demonstration

R&D: Human Behavior Analysis at Advanced Mobility

Simulator Development for Human Behavior Analysis in the time of Disaster
Investigation and Modeling of Mobility Capability of Elderly Citizens

Human Activity Capability Survey including Elderly Citizens in Normal Time and Disaster

Energy Mobility Vehicle, Definition : Vehicles controlled by Energy Management System, ex. Personal EV or E-Bus

EV

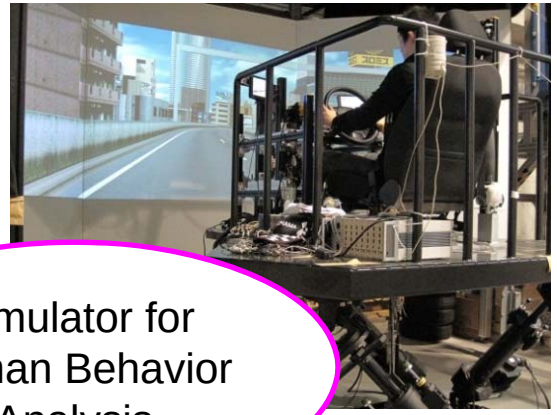
Elderly Drivers

Energy Mobility

E-Bus

Simulator for Human Behavior Analysis

Driving Simulator



Virtual Traffic Space

Simulate Human Behavior in Normal time and Disaster

For Disaster Prevention and Mitigation

Should Evacuate on Foot, Some by Car without Thinking, Others Have to by Car

-> Provide Optimum Information Through Traffic Simulation and Earthquake Drills,

Assessment of Feeding Station and Road Construction for Efficient Evacuation from Disaster

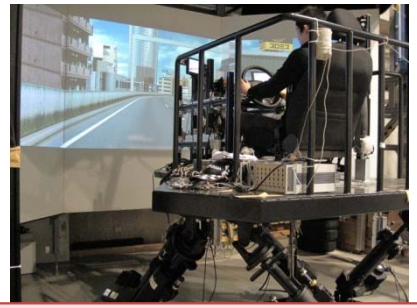
-> Contribution for Disaster Mitigation Town

Utilize EV and Large Amount of Secondary Battery in the time of Disaster

-> Contribution to Optimum Distribution of Electricity

Demonstration of “Energy Mobility Management”

Miyagi Fukko, Reconstruction Park



“Energy Mobility **Simulator**”

ITS

Traffic Simulator

Pedestrian Information

Road Information

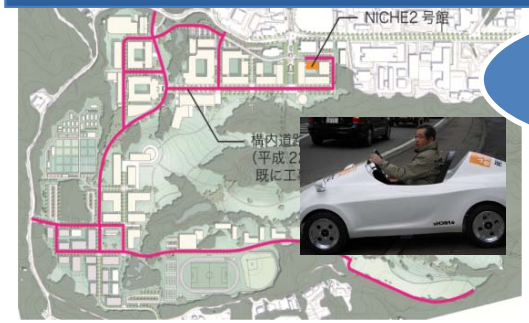
Vehicle Sensor Information

“Energy Mobility Management System”

Smart Energy Information Mnagement

Traffic Information

Demonstration of Traffic System



Aobayama Campus

“Energy Mobility”

EV, E-Bus

Coastal region

Total Energy management

Power Supply to Emergency Vehicles

Wireless Charging Station