



Oct. 2014

Next-Generation Advanced Mobility System

- Promotional activities
supporting local industries -



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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

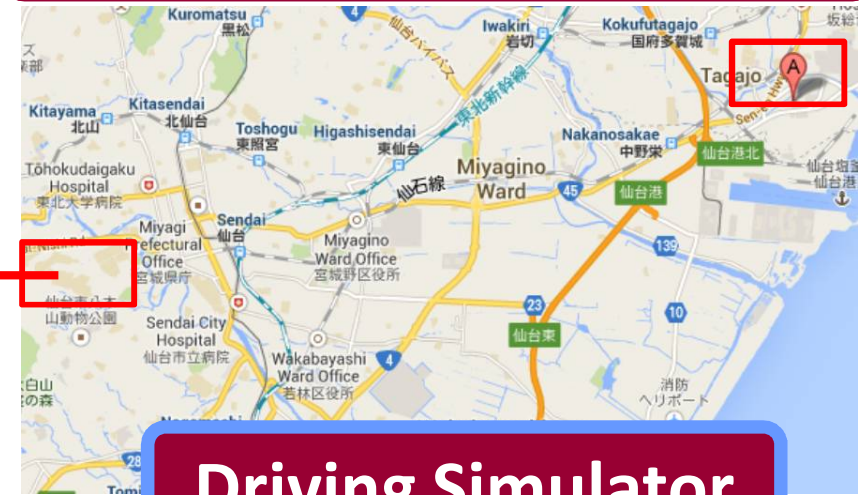
- 1, World Leading Research
- 2, Predetermined Period, 3 to 5 Years Typical
- 3, Needs Oriented & Large-Sized Project
with Industry & Government
- 4, External Funding

Advanced Mobility System Research

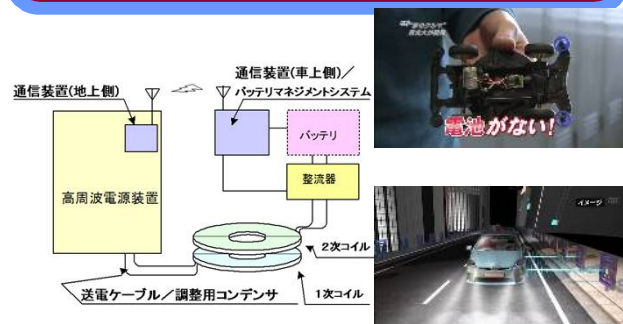
Demonstration in Aobayama



Miyagi Reconstruction Park



Contactless Power Transmission



Robotics

Autonomous Driving



EV: Passenger, Transit Bus, Bike





Contribution to Local Community

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

Site:

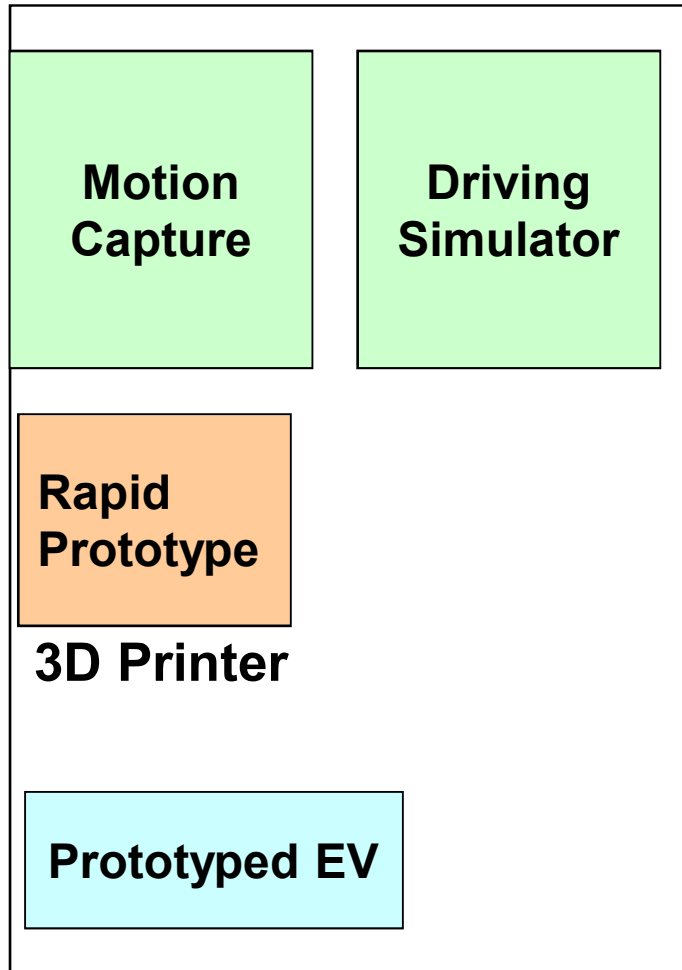
- Miyagi Fukko, reconstruction Park (Tagajo)
- Aobayama Campus (Sendai)
- Tohoku Coastal Area i.e. Ishinomaki, et.al.



Miyagi Fukko, Reconstruction Park

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

Total Floor Space: 39,000m², Free of Charge for 10 Years

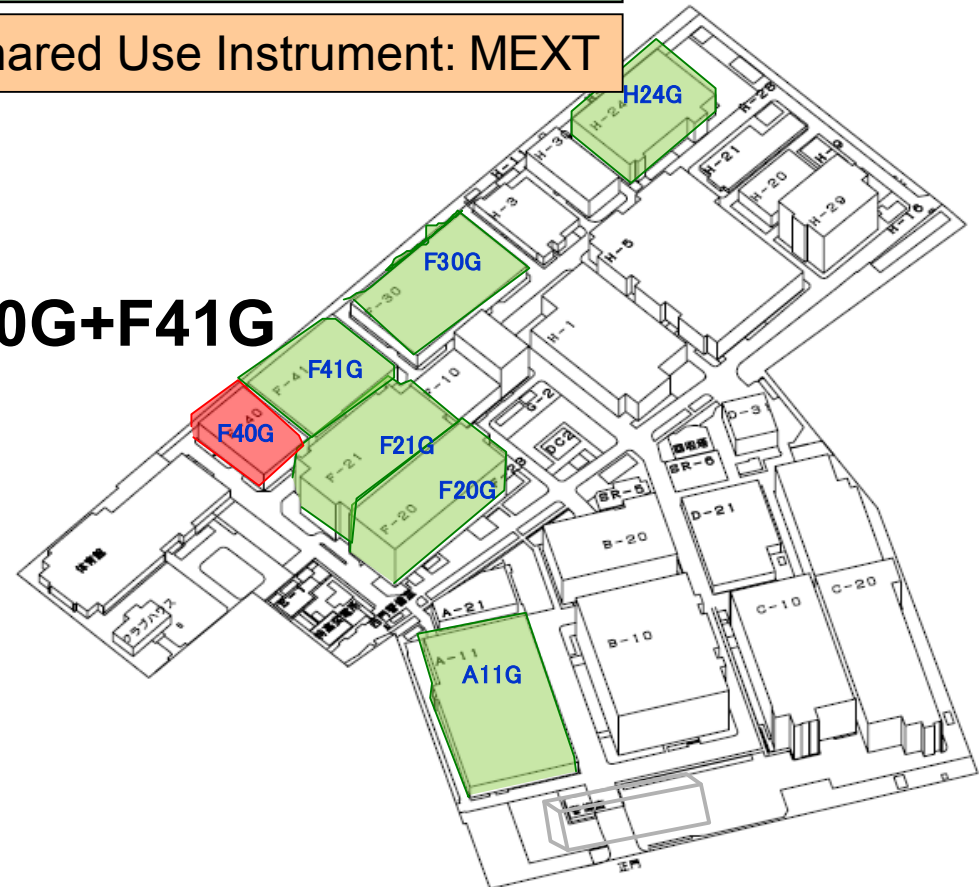


1st Floor, F40

Shared Use Instrument : METI

Shared Use Instrument: MEXT

F40G+F41G



Miyagi Fukko, Reconstruction Park





Autonomous Urban Traffic by Micro EV

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



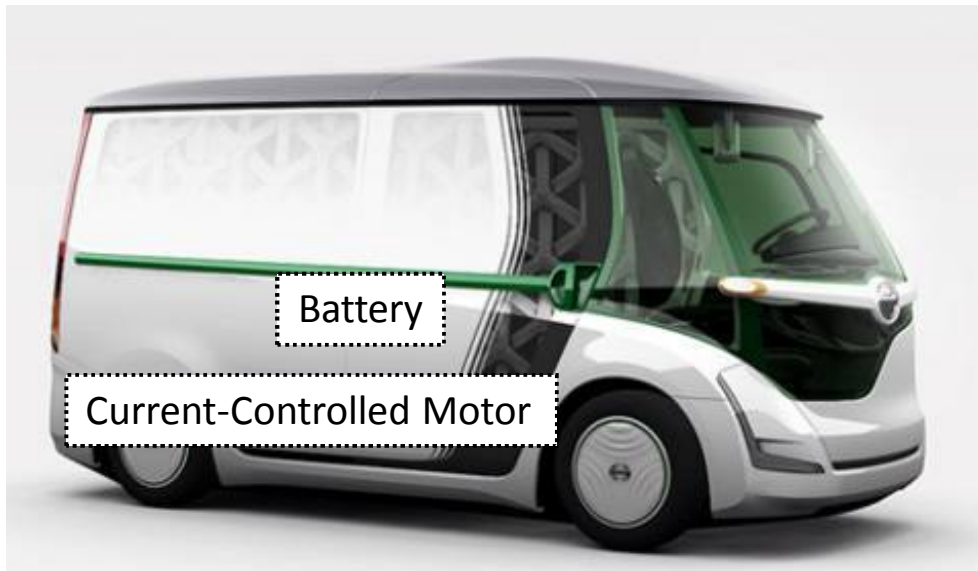
Photo 1



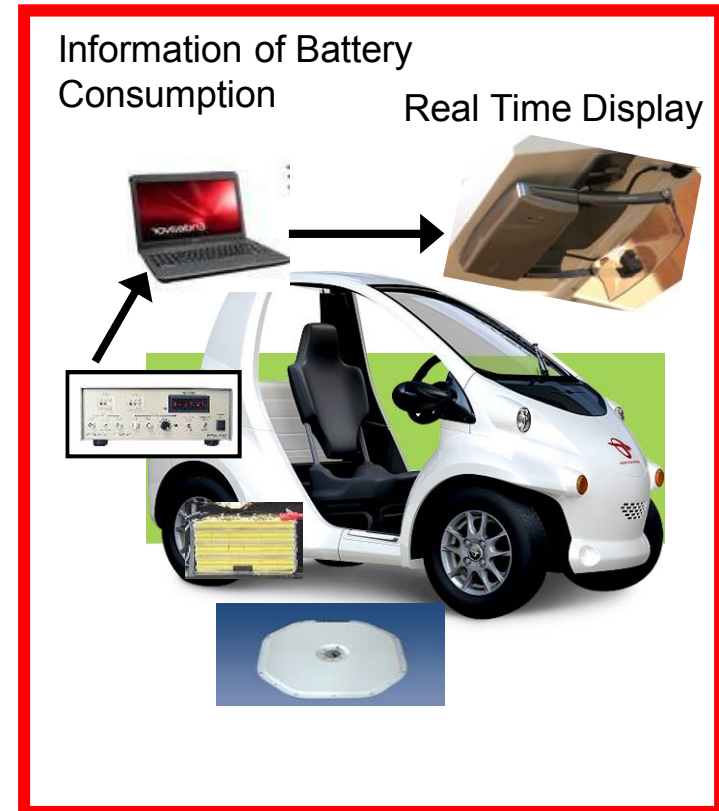
Photo 2

EV for Energy Management

Energy Combined with Mobility



E-Bus

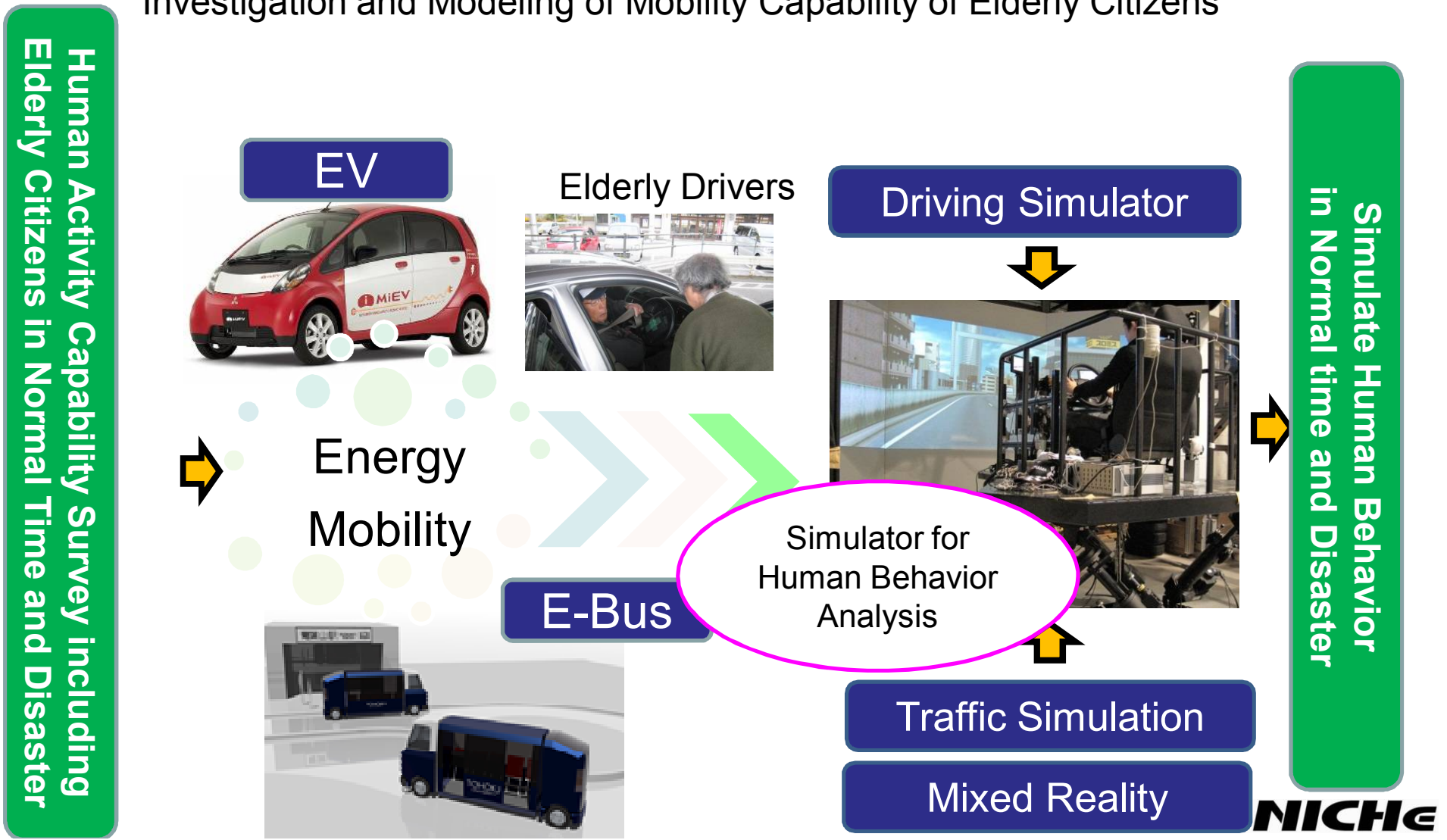


**Small Size EV for
Demonstration**



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





For Disaster Prevention and Mitigation

- Should Evacuate on Foot, Some by Car without Thinking, Others Have to by Car
-> Provide Adequate 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 Adequate Distribution of Electricity



Visits for Restoration Model within and outside of the country

- Receiving inspection groups from countries in reconstruction by JICA
 - 2013: Somali Democratic Republic (Africa)
 - 2014: Republic of Mali (Africa)



Somali Democratic Republic (Africa)



Republic of Mali (Africa)



Advanced Mobility Research Integration

R&D with Local Industries

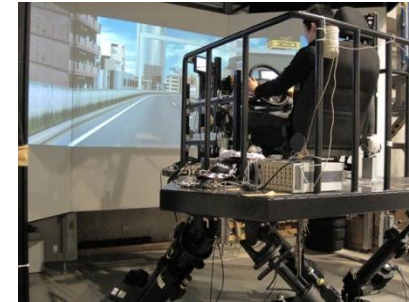


Miyagi Fukko, Reconstruction Park

Traffic Simulation and Management

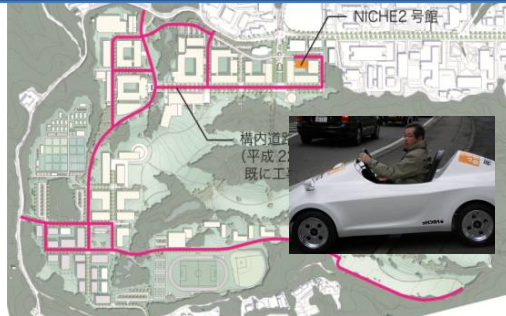


Human Behavior Analysis

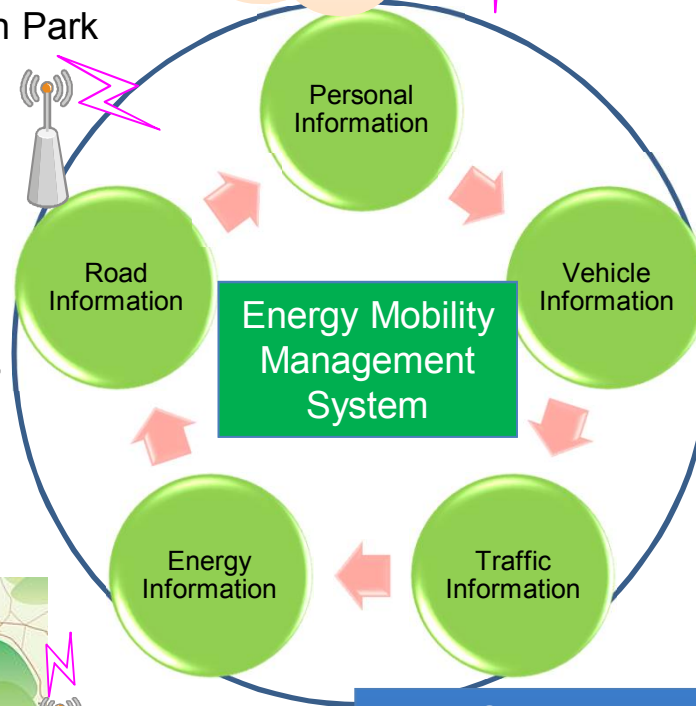


Driving Simulator

Demonstration of Traffic System



Aobayama Campus



Next-Generation Mobility



EV, E-Bus



Ishinomaki City

Total Energy Management in Urban Area

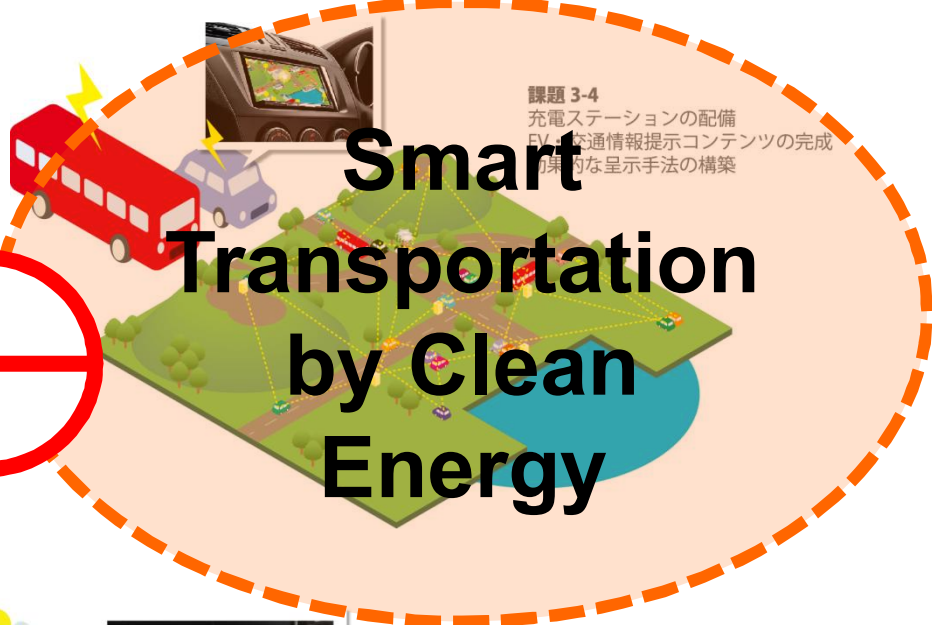
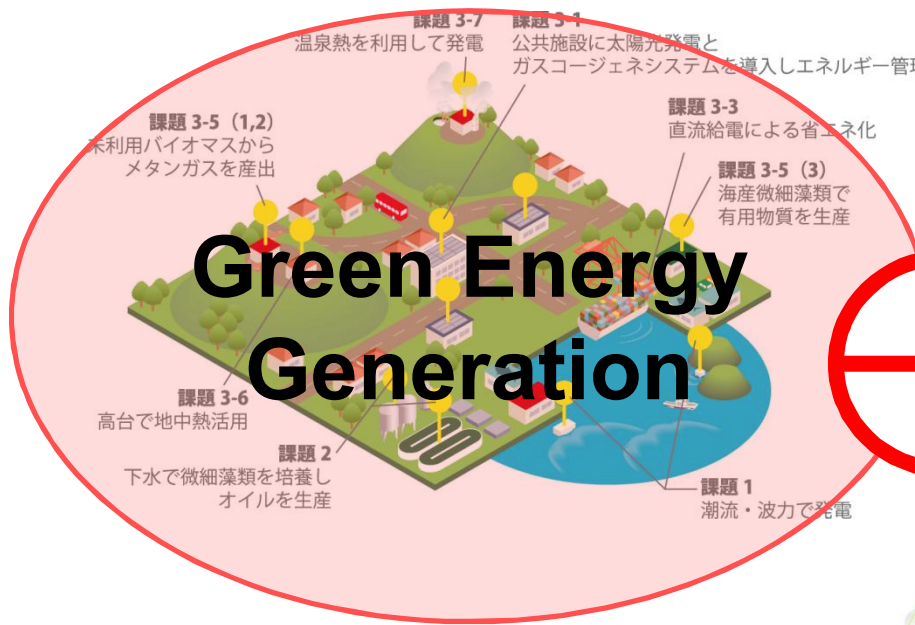
Mode Change in Disaster (Energy Supply from EV)



Wireless Charging Station



Research & Development of Energy-Mobility Management System



Show how much energy is generated and consumed



課題 3-2 固定型サイネージを公共施設へ設置し地域のエネルギー情報を提供

課題 3-4 平時 / 非常時に応じた情報を運転者に提供 非常時にはエネルギーの集約を可能に

Provide smarter mobility considering energy condition





Energy-Mobility Management System Research

Image & Information Provision System

- Virtualized Urban Space & Visualization of Information -



3D Measurement Vehicle



Virtualized Space

Virtualized Space Implementation



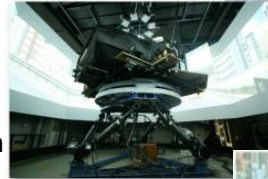
View Image in Normal Time or in Disaster

Display of Estimated Damage

Providing Contents

Human Behavior Analysis System

- Navigation and Evacuation System Development and Validation -



Acquisition of Driver Behavior by Driving Simulator



Human Factor Evaluation

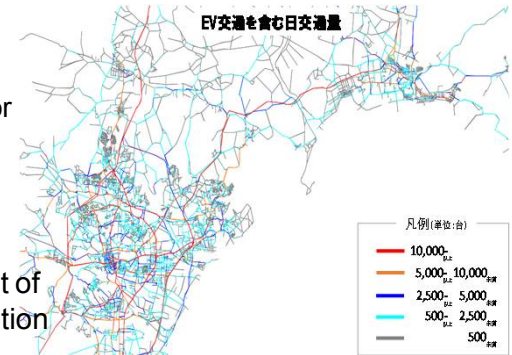


Arrangement of Charging Station

Interface Verification

Energy & Mobility Integrated Simulation

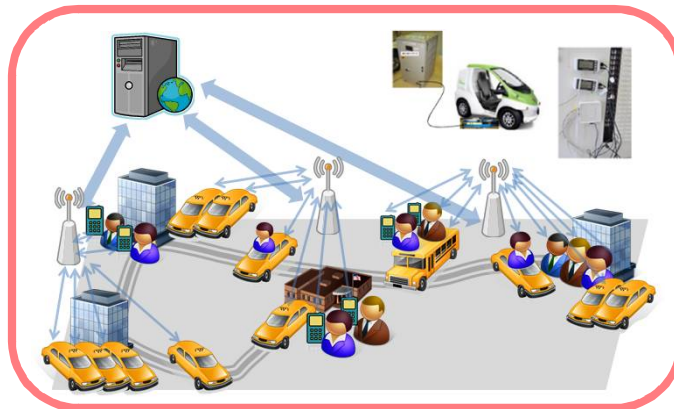
- Behavioral Analysis by Traffic Simulation of EV -



Traffic Simulation considering Energy Consumption of EV

Traffic Prediction

Field Data



Practical Diffusion and Operation in Tohoku Coastal Area (Ex. Ishinomaki)



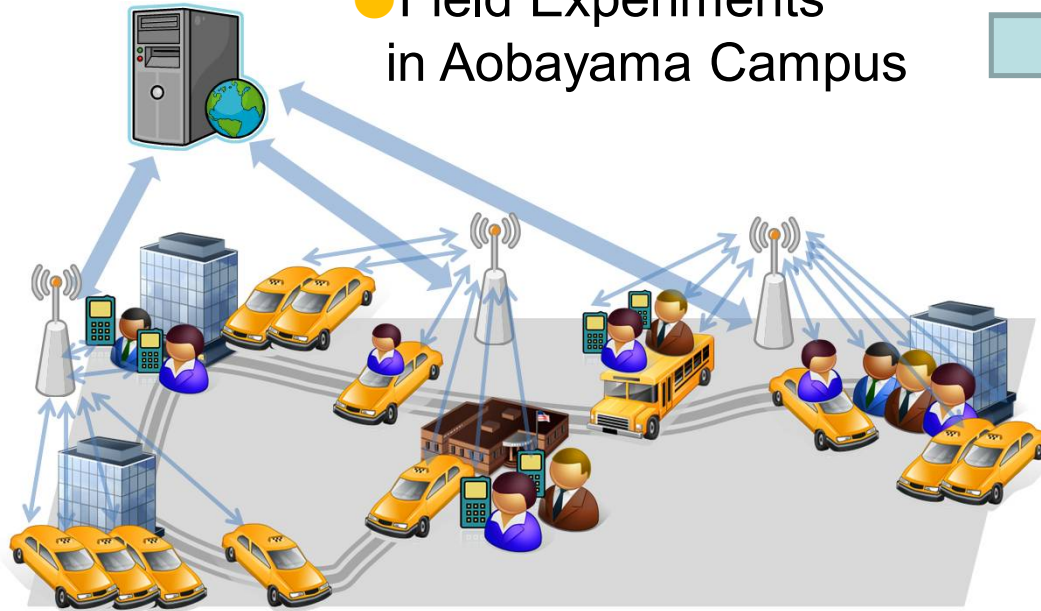


Research & Development of Energy-Mobility Management System

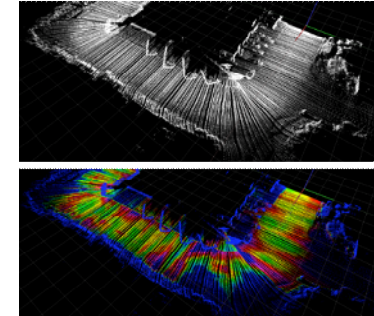
● Field Experiments in Aobayama Campus



Develop to Coastal Area (Ishinomaki, etc.)



● Autonomous Driving of Efficient Micro EV



3D environmental sensing

● Development of Mode-Changeable EV

Supply Energy from EV in Emergency



Wireless Charging Station

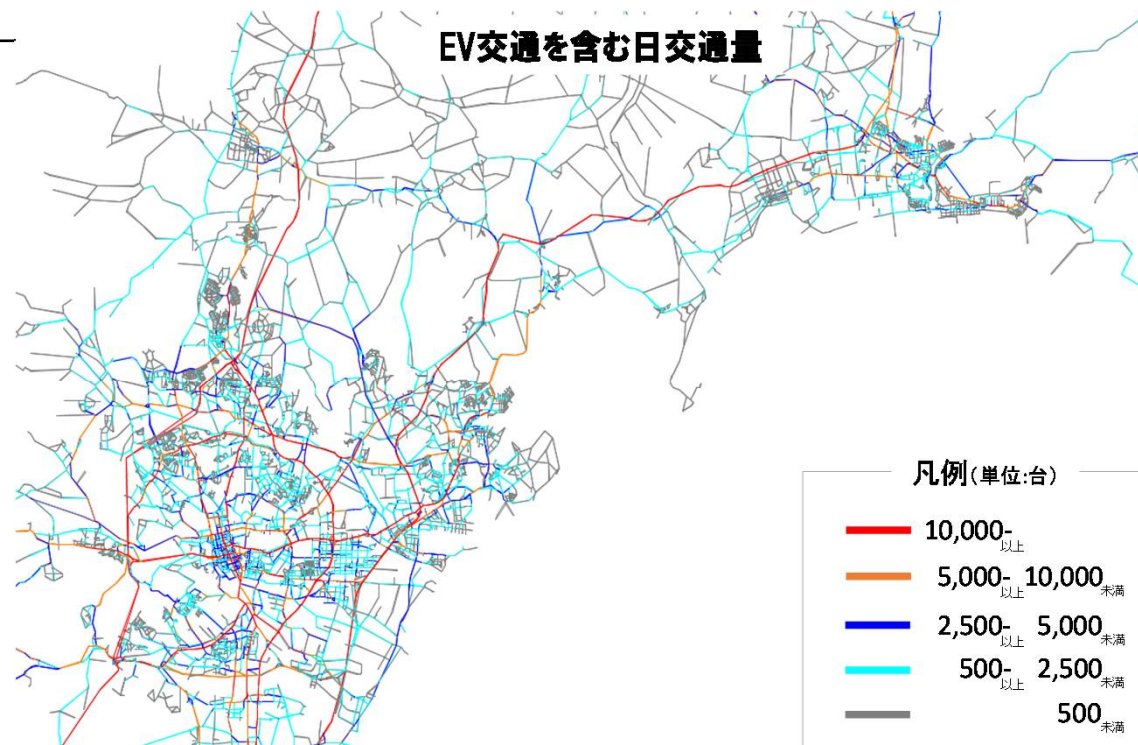




Energy-Mobility Management System

- Integrated Simulation of Mobility and Energy -

- Macroscopic Traffic Simulation evaluating Energy Consumption
 - Using Keihanna and Goto EV field data
 - Integrating with traffic data in coastal area of Sendai and Ishinomaki
 - Possible to evaluate energy consumption of EV and traffic effect by charging action
- Integration of Traffic Simulation and Tsunami Simulation (Ishinomaki)



Traffic Simulation in Sendai and Ishinomaki considering EV effects

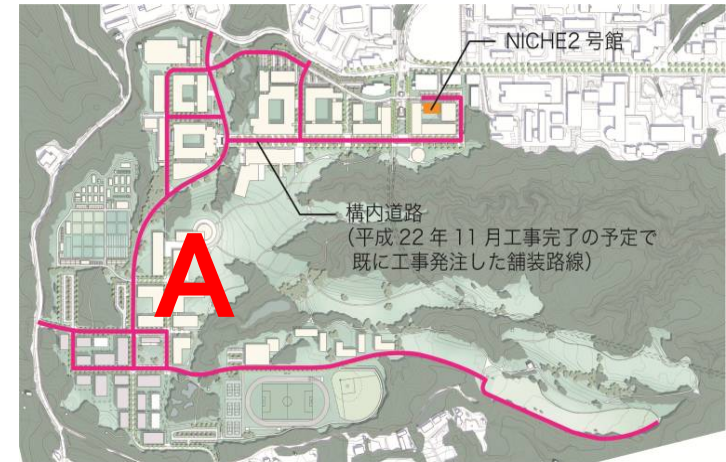
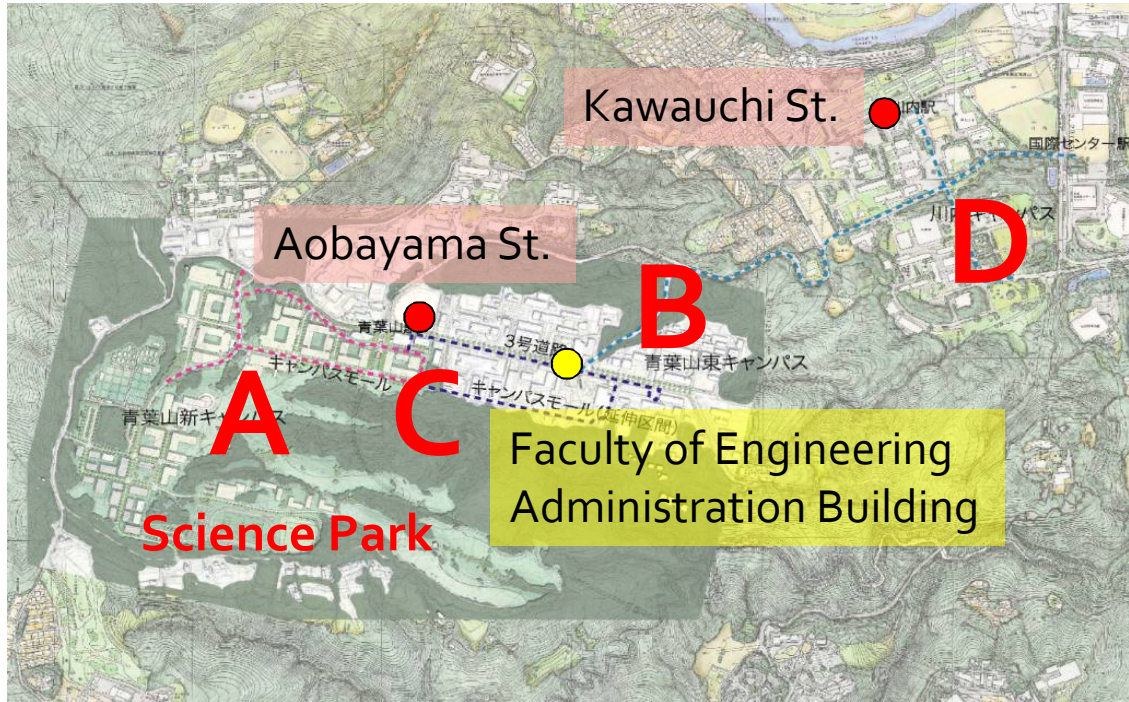




Aobayama New Campus & Subway Tozai Line

Up to 10 thousands Commuter, Only One Subway Station

No Feeder Transportation in New & Existing Aobayama Campus



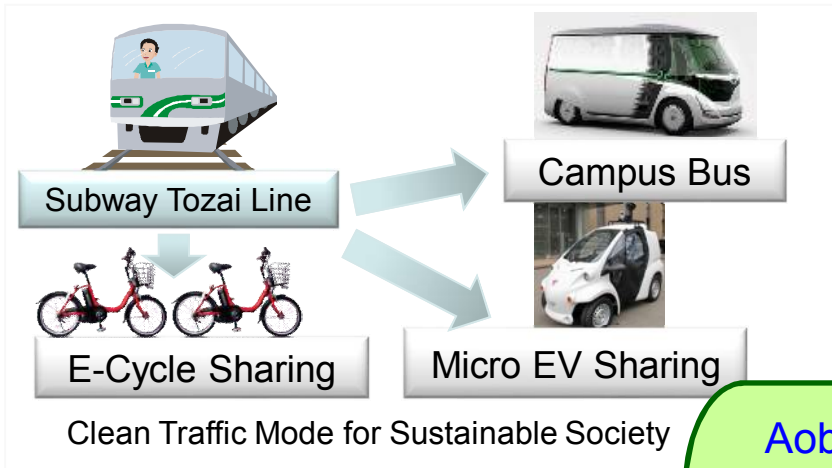
Demonstration Phase	Demonstration Area
2013FY ~ Vehicle Development	Campus Mall Zone, Aobayama New Campus ^A
~2015 FY Pilot Study 1	^A Aobayama, New Campus & East Zone ^B Determine the best way to the Mobility in Aobayama
Pilot Study 2	^C ^D Aobayama & Kawauchi Stations and Other Campuses



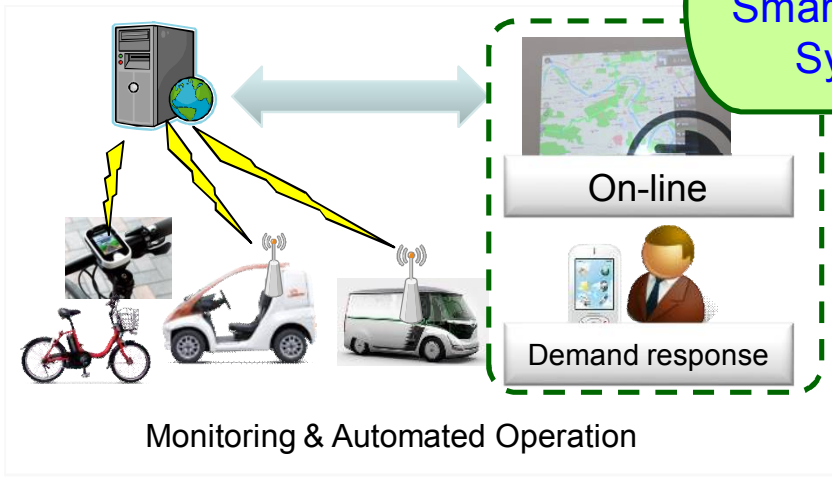
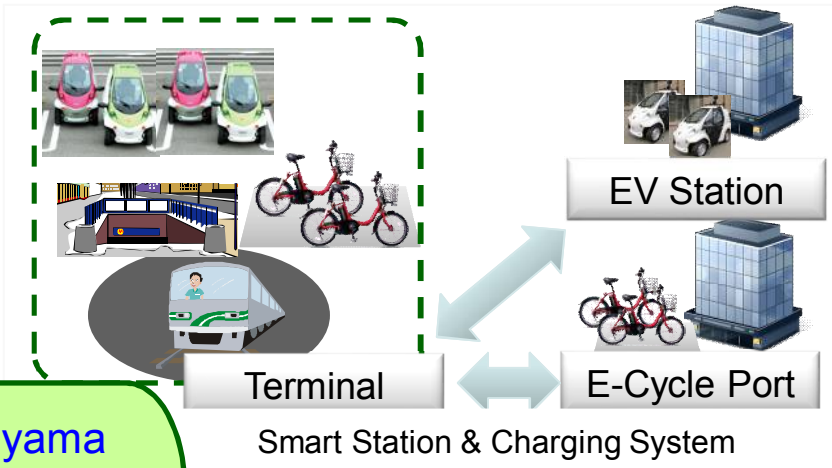
Aobayama Campus Smart Mobility Vision (Planning)

[Concept]

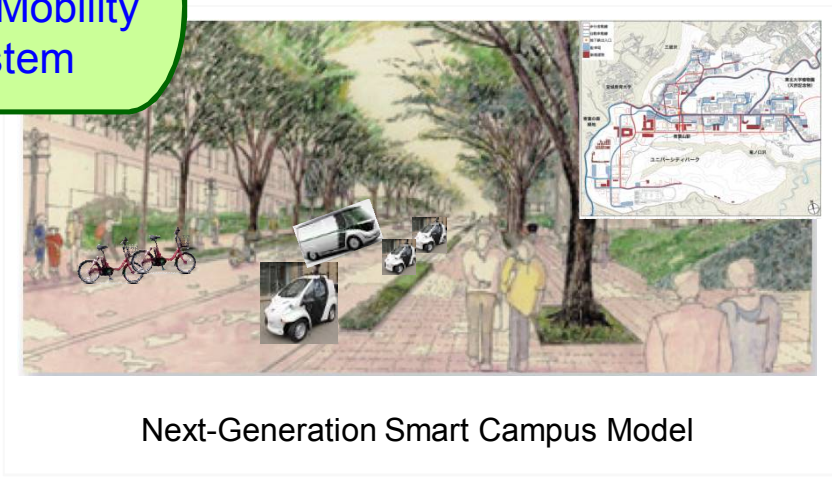
Smooth Transfer to Multi-Mode



Development of Smart Station/Port



Smart & Integrated Management



Showcase of Advanced Technologies

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





On-demand Car Sharing & Providing EV Trip Information

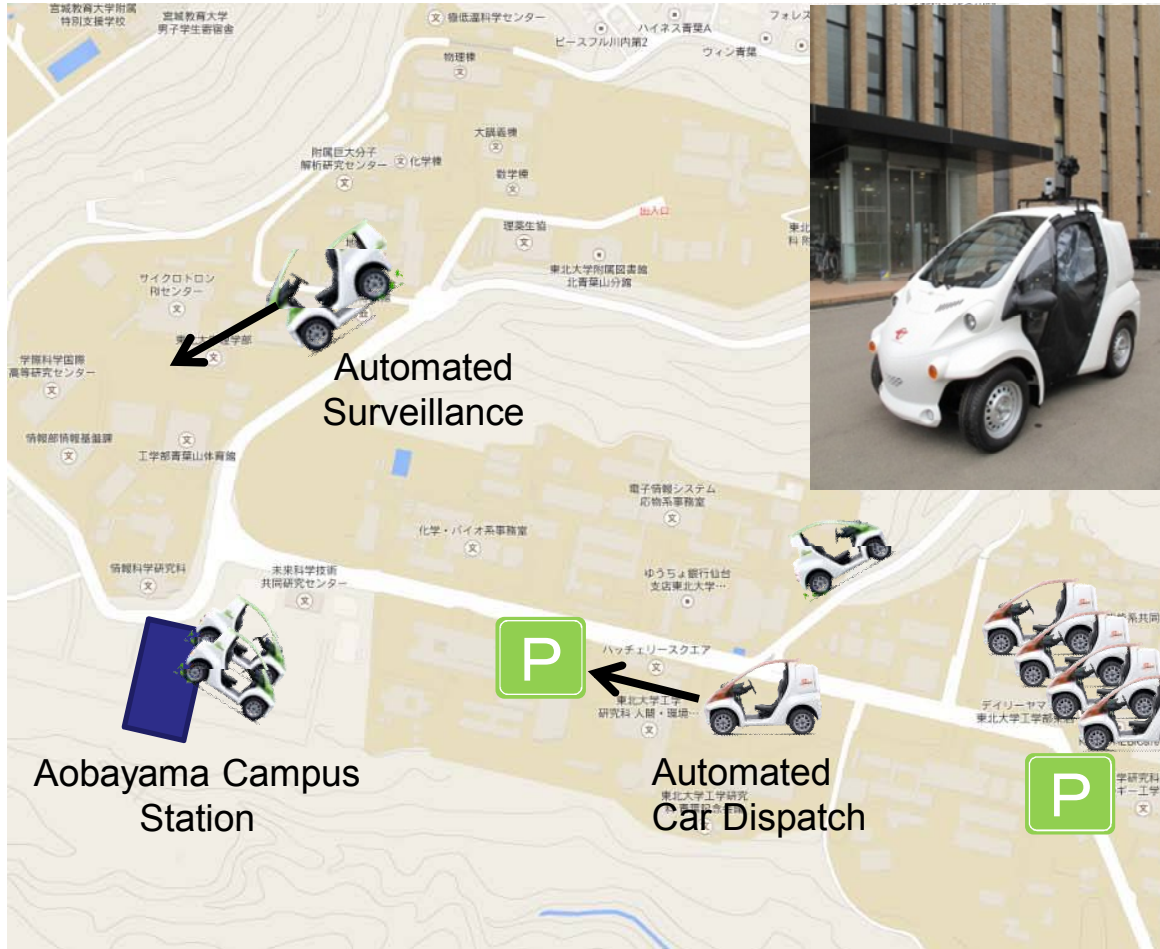
Display route information and campus information in e-Bus

On-demand usage information

Service information, Vehicle information & Driver assistance



Automated Car-Sharing Dispatch and Surveillance using Robot Technology



- Development of environment recognition and control technology for autonomous driving on public road
- Development of traffic data collection technology and cooperation with data analysis

<Application example>

- Efficient operation by automation of a part of car-sharing (night-time, closed space)
- Automated surveillance at night or in emergency in campus



Smart Mobility System in Tohoku University Aobayama Campus

Sendai City + Tohoku University + NICHe Next-Generation Advanced Mobility System

