JST-JICA Science and Technology Research Partnership for Sustainable Development

# Information Network for Natural Disaster Mitigation and Recovery

DISANET

For a number of years, researchers have investigated the use of information technology to mitigate damage and suffer due to natural disasters by early detection, rapid and optimal resource distribution, and information utilization. However, the infrastructure to enable these operations has not yet been established. This pilot collaboration between India and Japan aims to deploy infrastructure for continuous data collection, expecting earthquakes and weather as test cases, and to develop the technical basis for rescue and recovery.

This project is conducted on the framework of Science and Technology Research Partnership for Sustainable Development (SATREPS) which is the joint enterprise of Japan Science and Technology Agency(JST) and Japan International Cooperation Agency(JICA) .

Keio University | THE UNIVERSITY OF TOKYO | Indian Institute of Technology Hyderabad | Japan Science and Technology Agency | Japan International Cooperation Agency

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# Project Overview


## Research Subjects

- Earthquake Disaster Mitigation
- Weather Monitoring Platform
- Sustainable Communication Infrastructure
- ICT platform and resource development for emergency and disaster mitigation

## Principal Investigator

Prof. Jun Murai / Faculty of Environment and Information Studies, Keio University

Prof. U.V. Varadaraju / Indian Institute of Technology, Hyderabad

## Research Period

July 16, 2010 – July 15, 2015 (5 Years)

# Organizations

| | | |
|---|---|---|
| Project Management | Keio University | Indian Institute of Technology, Hyderabad (IITH) |
| 1. Seismic Disaster Group | | |
| 1-1. Strong Motion Seismometers | The University of Tokyo | National Geophysical Research Institute, Hyderabad (NGRI) |
| 1-2. GPS Receivers | The University of Tokyo | Indian Institute of Technology, Kanpur (IITK) |
| 1-3. Building Vibration Sensors | The University of Tokyo | International Institute of Information Technology, Hyderabad (IIITH) |
| 2. Meteorological Observation Group | The University of Tokyo | India Meteorological Department (IMD), Hyderabad |
| | Keio University | India Meteorological Department (IMD), Pune |
| 3. Communications Infrastructure Group | Keio University | Indian Institute of Technology, Madras (IITM) |
| 4. Information-Communication Platform Group | Keio University | Indian Institute of Technology, Hyderabad (IITH) |

### Japan

- Keio University
- The University of Tokyo

### India

- Indian Institute of Technology, Hyderabad (IITH)
- Indian Institute of Technology, Kanpur (IITK)
- Indian Institute of Technology, Madras (IITM)
- International Institute of Information Technology, Hyderabad (IIITH)
- National Geophysical Research Institute, Hyderabad (NGRI)
- India Meteorological Department (IMD), Hyderabad
- India Meteorological Department (IMD), Pune

# Research Groups

## Group 1. Earthquake Disaster Risk Mitigation

Conducts assessment of hazard and risk of earthquakes to mitigate potential earthquake disaster in India through the research activity in the following three groups.

### 1-a. Strong Motion

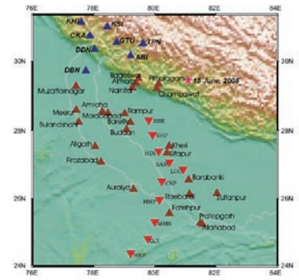
Assesses the earthquake hazard in the Indo-Gangetic Plains in the Himalayan region. Strong motion seismometers will be deployed to obtain data on the assessment of the seismicity in the region and to record earthquakes from the Himalayas. These moderate size earthquakes recorded with this network can be used to make predictions of strong motions for large earthquakes. It will also become feasible to take up detailed numerical modeling of seismic ground response for complex 3D velocity structures.

### 1-b. GPS

Performs active fault mapping and slip rate estimation in the NW-Central Himalayan region. GPS data, together with high resolution satellite photos and geological data will be used to identify active fault scarps and related features. Slip rates are calculated to estimate recurrence interval along the faults in the study area.

### 1-c. Building Vibration Sensors

Performs building vulnerability and earthquake damage evaluation for the city of Chandigarh. Building vibration will be monitored to identify building typologies, providing basic data for the damage estimation and risk assessment in the city.



Existing observation points (red, blue) and deployment plan (brown) of accelerograph stations

## Group 2. Weather Monitoring Platform

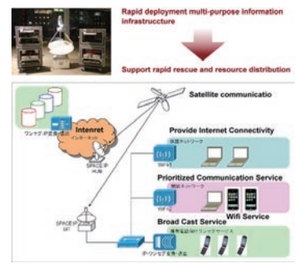
Develops a prototype sensor network to acquire data for weather hazard monitoring in India with limited cost. This research group develops the following items:

- sensors and converters for monitoring various, meteorological date with robustness, high accuracy and affordable cost
- Development of communication system to transfer collected data from Automatic Weather Station (AWS) to network control centre, and
- Development of AWS network to contribute to environment survey, mitigation and recovery of natural disasters.

Live E! Weather Sensor

## Group 3. Sustainable Communication Infrastructure

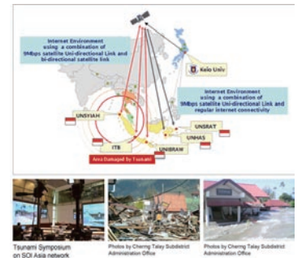
Develops a networking package to quickly deploy communication infrastructure under the situation of natural disaster in India. The package provides connectivity to the Internet from disaster sites to enable telephony, multimedia data transfer, and information collection and sharing for rescue and recovery operation. The research work includes wireless communications, broadcast, ad-hoc networking, QoS optimization and multicast considering the research activity in other groups.




Communication Package for Disaster Situation

## Group 4. ICT platform and resource development for emergency and disaster mitigation

Develops an application infrastructure that supports the education for emergency and disaster preparedness, mitigation, and recovery as well as communication and information sharing in emergency situations. This research group also develops an advanced disaster management system containing information such as victim information, hazard damage information, and information on rescue and relief operations.




SOI Asia -Tsunami Disaster Recovery Project