



Hazard & Disaster Research Center – HDRC  
Electronics Engineering Polytechnic Institute  
of Surabaya - EEPIS  
East Java - Indonesia



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Surabaya – East Java – Indonesia

# Partnership of Collaboration



Hazard & Disaster  
Research Center



**Keio University**

Graduate School of Media and Governance  
Multimedia Laboratory  
Prof. Yasushi Kiyoki

- Students
- Research Group Members

# Collaborative Research & Education

EEPIS (HDRC)



KEIO Univ. (Multimedia Lab)



Keio University

## Research

- Joint Research Projects
- Joint Experimental Research on the Integration of Disaster & Environmental Issues
- Remote Research Meetings
- Organization of Annual Joint Seminar/Workshop
- Joint Paper Publication

● Ongoing

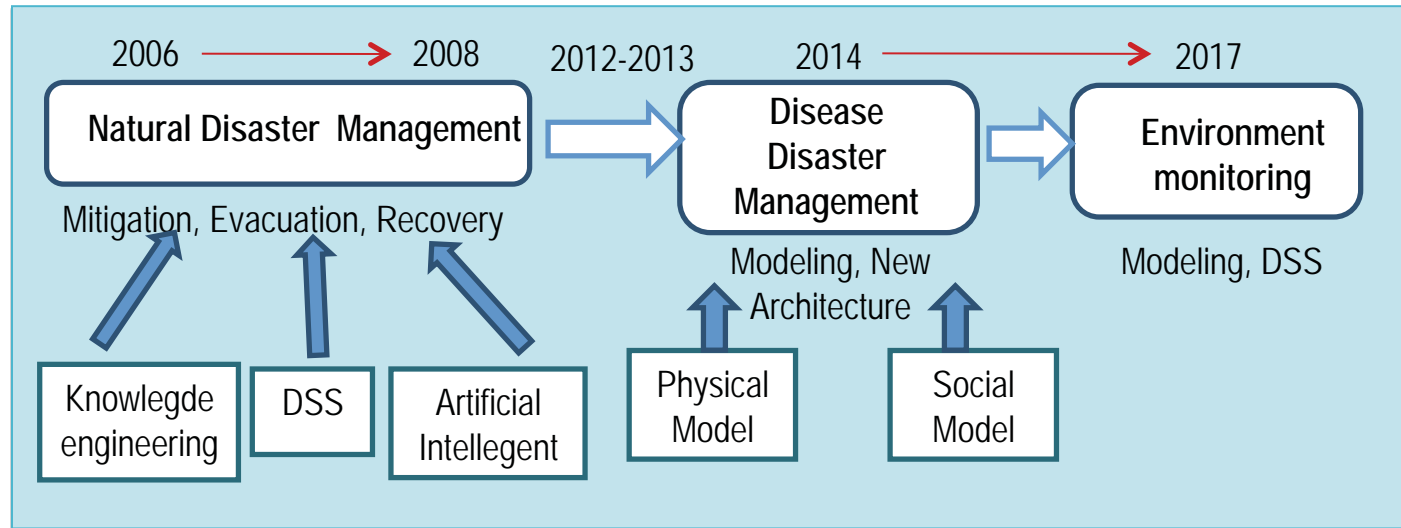
● In plan

## Education

- Internship Program
- Mutual Guest Lecturer Exchange
- Interchange Students
- Double Degree

# Roadmap of the Collaboration

## EEPIS – Keio University



- **1<sup>st</sup> step of activity (2006-2008):** collaborative research with specific topic knowledge engineering in disaster in case Hot Mudflow Disaster in Sidoarjo.
- **2<sup>nd</sup> step of activity (2012-2013):** collaborative research, doctoral degree program, Annual Collaborative Conference: KCIC, International Symposium of GESL Program.
- **Note:** 2014 – 2017 collaborative research with specific topic **Disease Disaster Management:** in inter-discipline field related with environment & disaster management.

# Collaborative Challenges



## Mitigation & Preparedness

- Extraction of parameter and variable of disasters based on natural phenomena
- **Dynamic moving modelling**
- Sattelite Image Processing
- **Wireless Sensor Network (devices)**
- Software for sensor network management (modeling)
- Emergency communication systems
- History based disaster modeling (especially for health and environment)
- Qualitative data analysis for knowledge disaster
- **Prediction systems of disaster spread**



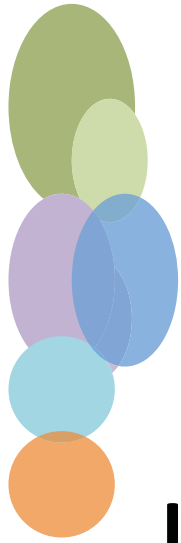
## Response & Evacuation

- Construction of the base map for evacuation
- Development of database evacuation systems
- Decision Support System for evacuation systems
- Software for giving the information assistance to the victim (modeling of impact of disaster)
- Solutions for stability of infrastructure
- Dissemination of the information systems of disaster response (Web and mobile phone)
- Implementation of artificial intelligence on evacuation systems
- Dynamic traffic model in case evacuation



## Recovery

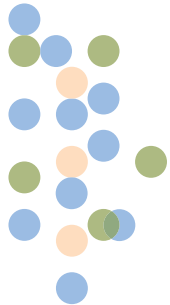
- Develpoment of warehouse
- Statistical model for disaster
- The business continuity (IT base)
- Replanting (IT Base)
- Relocation (IT Base)
- The disaster insurance (IT base)
- Software for helping plan the activities post-disaster



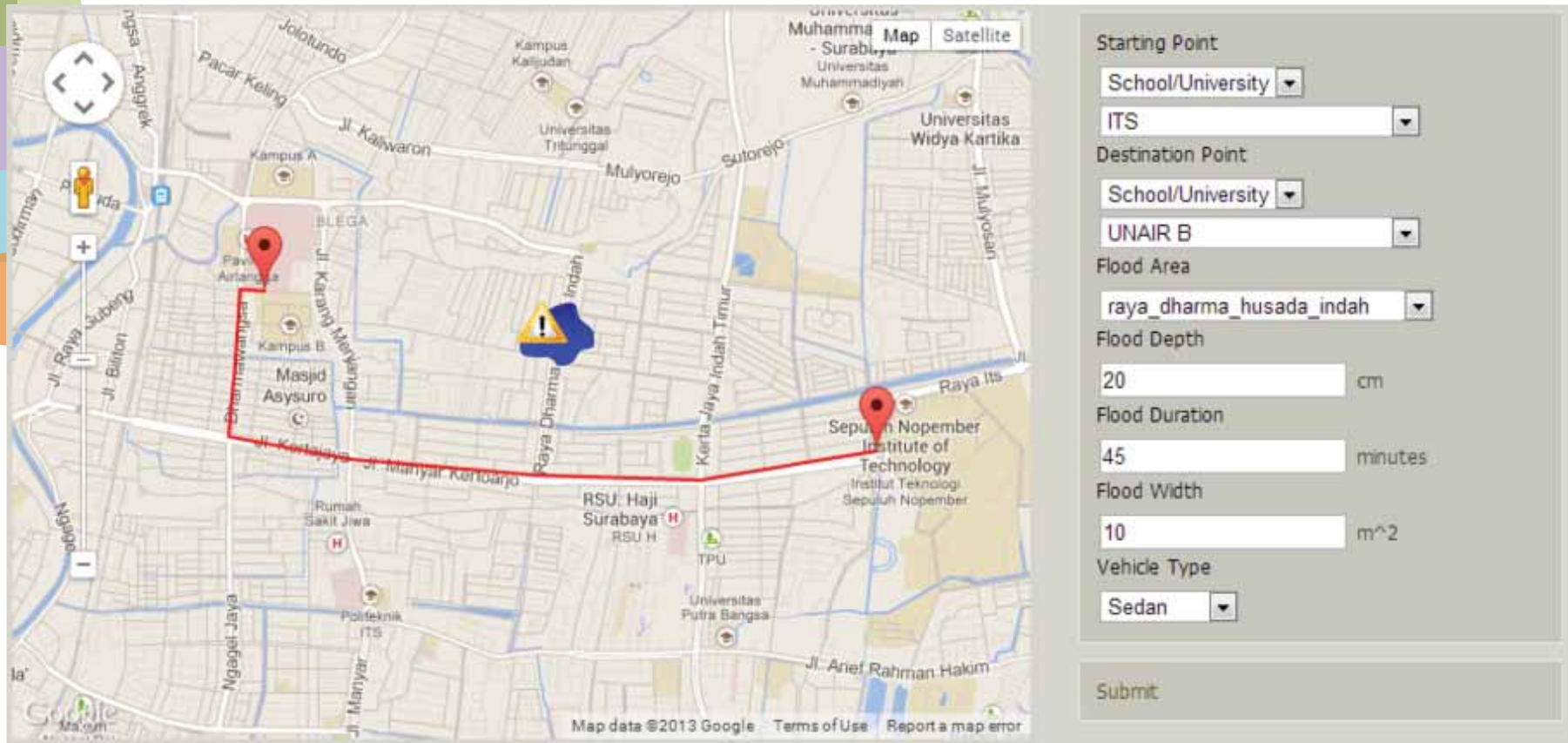
## One of research topic in HDRC of EEPIS [This Year]

### **Integrated Urban Flood Management System:**

- 1. Urban Flood Prediction**
- 2. Urban Flood Modeling and Alternative Route of Transportation with GIS  
Case in Surabaya City**



# Result



The image shows a Google Maps interface with a route highlighted in red. The route starts at ITS (Institut Teknologi Sepuluh Nopember) and ends at UNAIR B (Universitas Airlangga). The route passes through several streets, including Jl. Raya Dharma Wangsa and Jl. Raya Dharma Husada Indah. A flood area is marked on the map, and a warning icon is visible. The interface includes a search bar, a map control, and a sidebar with various settings.

Starting Point  
School/University  
ITS

Destination Point  
School/University  
UNAIR B

Flood Area  
raya\_dharma\_husada\_indah

Flood Depth  
20 cm

Flood Duration  
45 minutes

Flood Width  
10 m<sup>2</sup>

Vehicle Type  
Sedan

Submit

### Info & Recommendation

Alternative Route :

Raya Kertajaya Indah - Manyar Kertoarjo - Kertajaya - Raya Dharma Wangsa - Airlangga

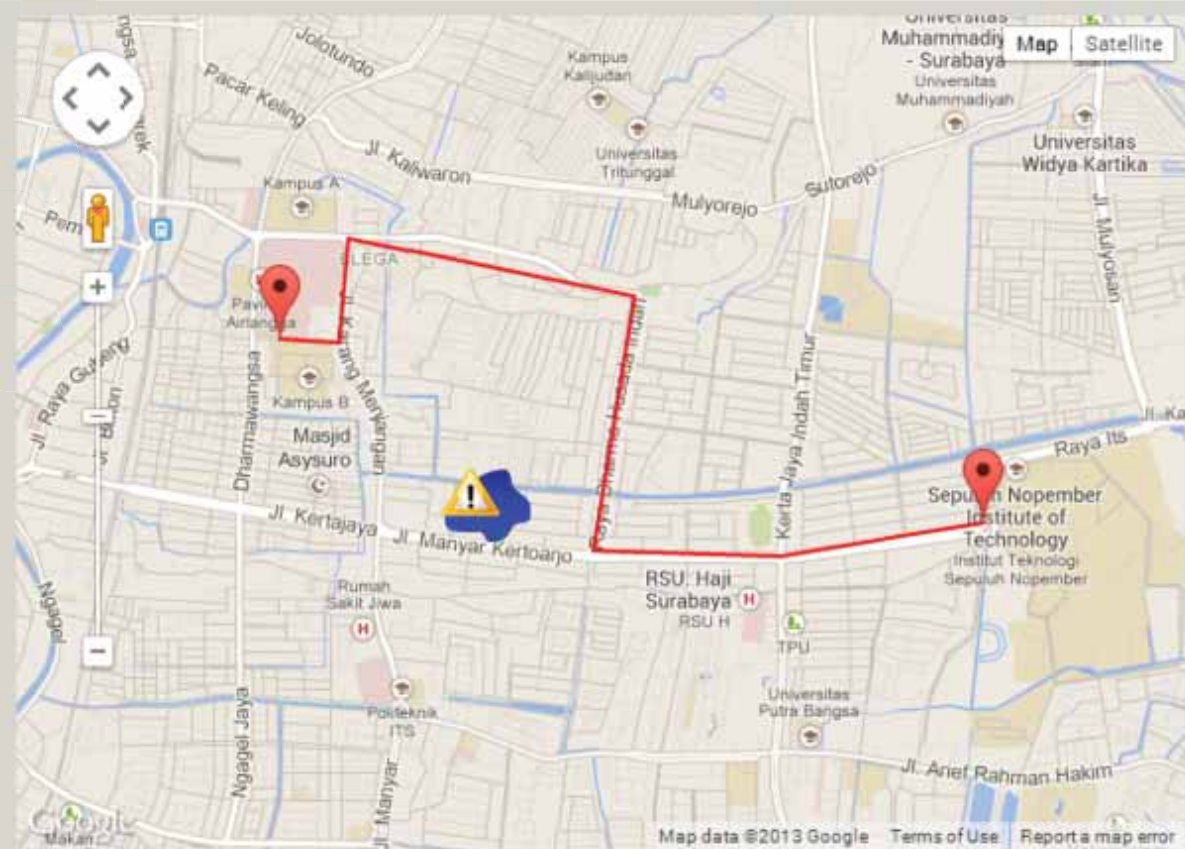
Route Weight : 1200

Flood Location : Jl. raya\_dharma\_husada\_indah

Allowed Vehicle at Jl. raya\_dharma\_husada\_indah : Truck

Route Searching Time : 0.86461697088013 seconds

# Result



Map data ©2013 Google Terms of Use Report a map error

Starting Point  
School/University  
ITS

Destination Point  
School/University  
UNAIR B

Flood Area  
manyar\_kertoarjo\_1

Flood Depth  
20 cm

Flood Duration  
45 minutes

Flood Width  
10 m<sup>2</sup>

Vehicle Type  
Sedan

Submit

## Info & Recommendation

Alternative Route :

Raya Kertajaya Indah - Manyar Kertoarjo - Raya Dharma Husada Indah - Prof Dr Mustopo - Karang Menjangan - Airangga

Route Weight : 1200

Flood Location : Jl. manyar\_kertoarjo\_1

Allowed Vehicle at Jl. manyar\_kertoarjo\_1 : Truck

Route Searching Time : 0.75693988800049 seconds





# Conclusion

- Integrated Urban Flood Management System can **show the alternate route of the transportation.**
- For the next works, there is a good chance to **share this system to the global disaster and environmental communities / societies.**

