



# DUMBO and THNG Camp Experience

Professor Kanchana Kanchanasut  
Director

Internet Education and Research Laboratory (IntERLab)  
Asian Institute of Technology (AIT)

September 2011

# Outline

1. IntERLab Overview
2. Project DUMBONET
3. Thailand Networking Group (THNG) Camps



# 1. IntERLab Overview

# Internet Education and Research Laboratory (intERLab)

- Established on December 15<sup>th</sup> , 2003
- Endorsed by the Ministry of Information and Communication Technology (MICT), Thailand
- IntERLab aims to be center of AP region
  - Center of Human Resource Development
  - Center of Internet Research
  - Center of Internet Information



# Collaborative Partners

- THNICF (THNIC Foundation)  
<http://www.thnic.or.th>
- APNIC (Asia Pacific Network Information Center )  
<http://www.apnic.net>
- NSRC (Network Startup Resource Center)  
<http://www.nsrc.org>
- APAN (Asia-Pacific Advanced Network)  
<http://www.apan.net>
- WIDE/AI3/SOI-Asia  
<http://www.wide.ad.jp>  
<http://www.ai3.net> (Asia Internet Interconnection Initiatives)  
<http://www.soi.wide.ad.jp/soi-asia> (School of Internet Asia Project)

# Research Collaborations

- STIC-ASIE (France)
- Hipercom/INRIA (France)
- UPMC-LIP6 (France)
- Telecom SudParis (France)
- WIDE Project (Japan)
- NECTEC-NSTDA (Thailand)
- I2R (Singapore)
- FIBO-KMUTT (Thailand)
- Kasetsart University
- and more...

## 2. Research Project: Digital Ubiquitous Mobile Broadband OLSR (DUMBO)

# Digital Ubiquitous Mobile Broadband OLSR

A Multimedia Emergency Communication Network which aims for the situations where there is very little, severely disabled, or no communication infrastructure available.

The project aims to demonstrate the use of mobile ad hoc networks in an environment where fixed network infrastructure is not available, such as in the case of natural disaster.

Operations of heterogeneous networks in emergency conditions will be explored.

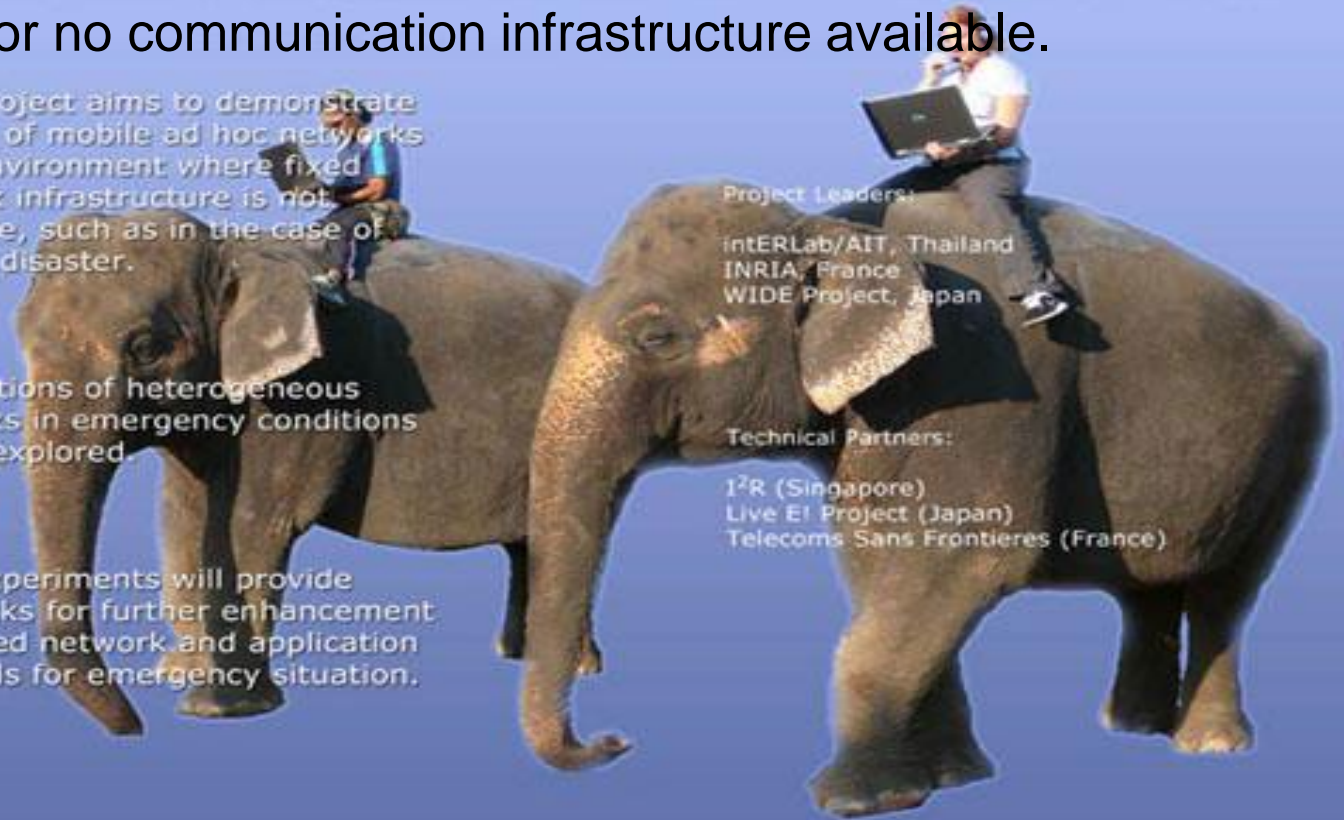
The experiments will provide feedbacks for further enhancement of related network and application protocols for emergency situation.

Project Leaders:

intERLab/AIT, Thailand  
INRIA, France  
WIDE Project, Japan

Technical Partners:

I<sup>2</sup>R (Singapore)  
Live EI Project (Japan)  
Telecoms Sans Frontieres (France)

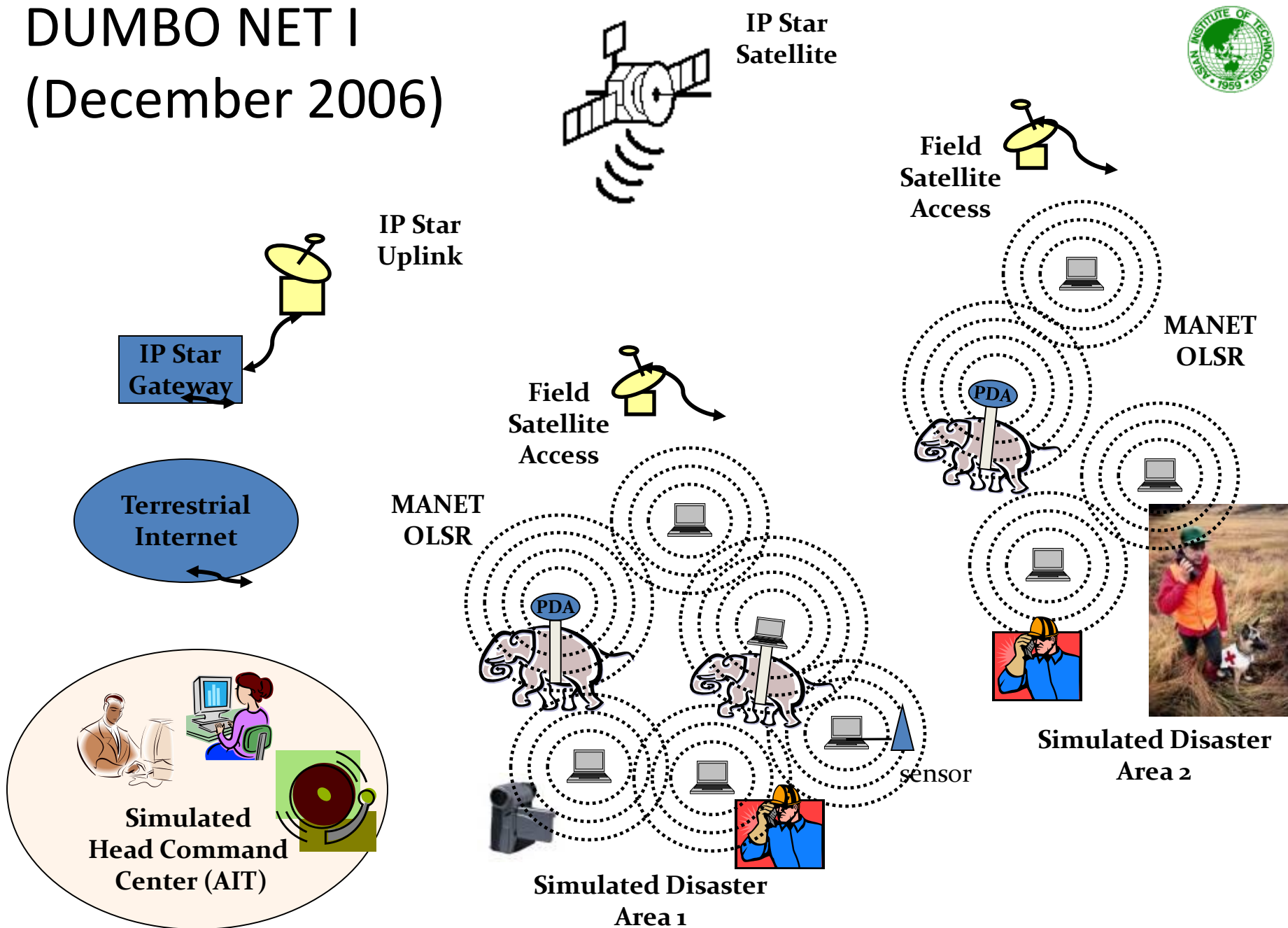


# DUMBO Objectives

- To provide a collection of post-disaster emergency communication tools
  - which can be quickly and reasonably deployed for rescuer activities.
- To enable multimedia communications
  - Photos, videos, texts, audios

# History of DUMBO

# DUMBO NET I (December 2006)



# Multimedia Communications for Disaster Emergency Responses

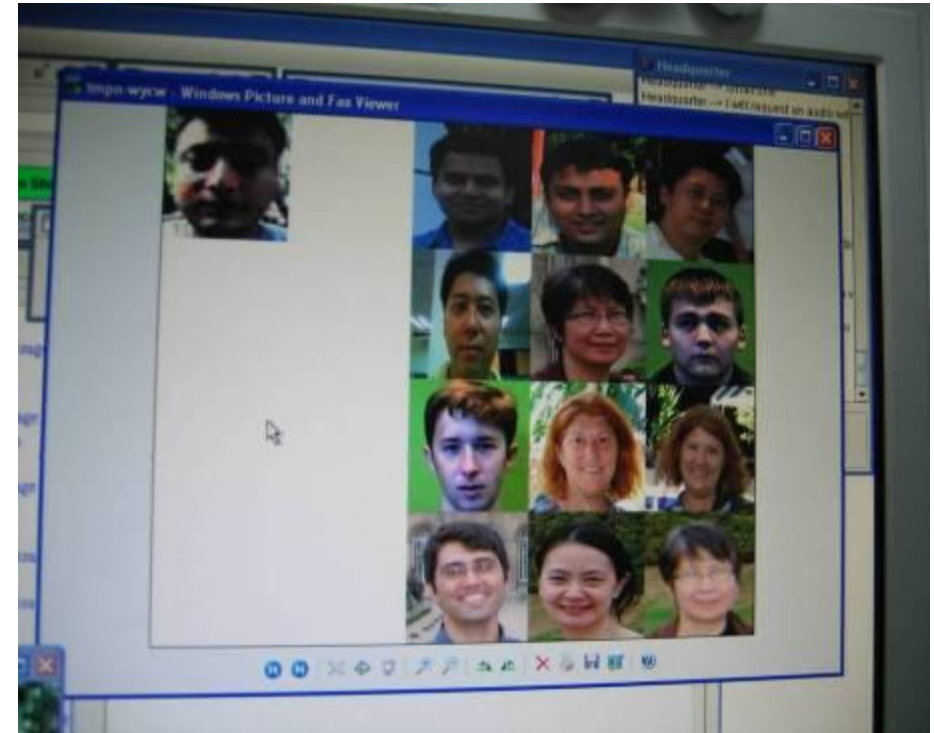
- Interactive Video, Voice, and Instant Messaging
  - very important for situational awareness
- Peer-to-Peer Paradigm ( **no centralized server \*\*** )



# A real experiment in 2006



# Facial Recognition System App



Face Recognition : to search and identify people

# In 2008, After Cyclone Nargis struck Myanmar



and there, DUMBONET was deployed to help the Myanmar people.

# DUMBO NET II (2008)

The project aims to demonstrate the use of mobile ad hoc networks in an emergency situation where fixed network infrastructure has been destroyed by natural disaster.

**DUMBO2** is the second phase of the project where we assume that partial recovery of the fixed infrastructure has been successful. The focus of this phase is on how to automatically connect the mobile ad hoc networks to the fixed infrastructure in order to attach the networks set up for emergency scenario with the normal Internet.

Mobile nodes and routers are placed on small boats moving in the sea moving vehicles like motor bikes, tuk tuk and cars on the shore forming Vehicle-to-Vehicle (V2V) MANET. Fixed network access points placed within the proximity of the V2V network are the point of attachment to the normal Internet.

Multimedia communications among field workers using V2V network is the main target of this demonstration. The experiment will provide feedbacks for further enhancement for related network and application protocols for emergency situation.

## **Project Leaders:**

- *intERLab/AIT, Thailand*
- *Hipercom/INRIA and LOR/Telecom SudParis, France*
- *WIDE Project, Japan*

## **Tech Partners and Sponsors:**

- *NECTEC, Thailand*
- *UniNet, Thailand*
- *French Regional Cooperation, France*

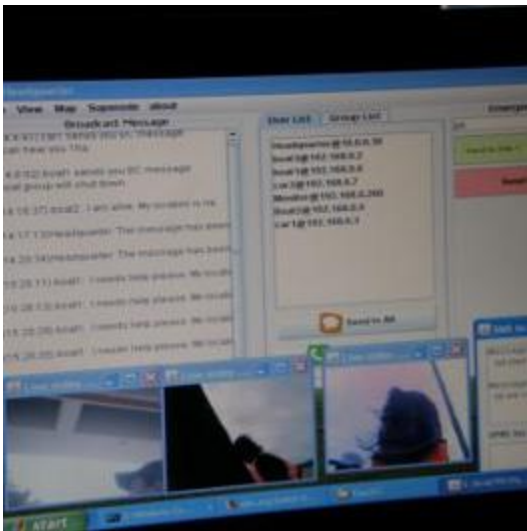
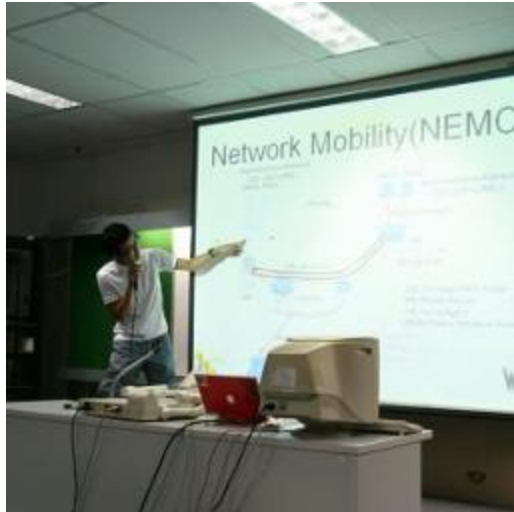


# In 2008, After Cyclone Nargis struck Myanmar



IntERLab's staff members trained Myanmar engineers and NGOs for the deployment of DUMBONET in Myanmar

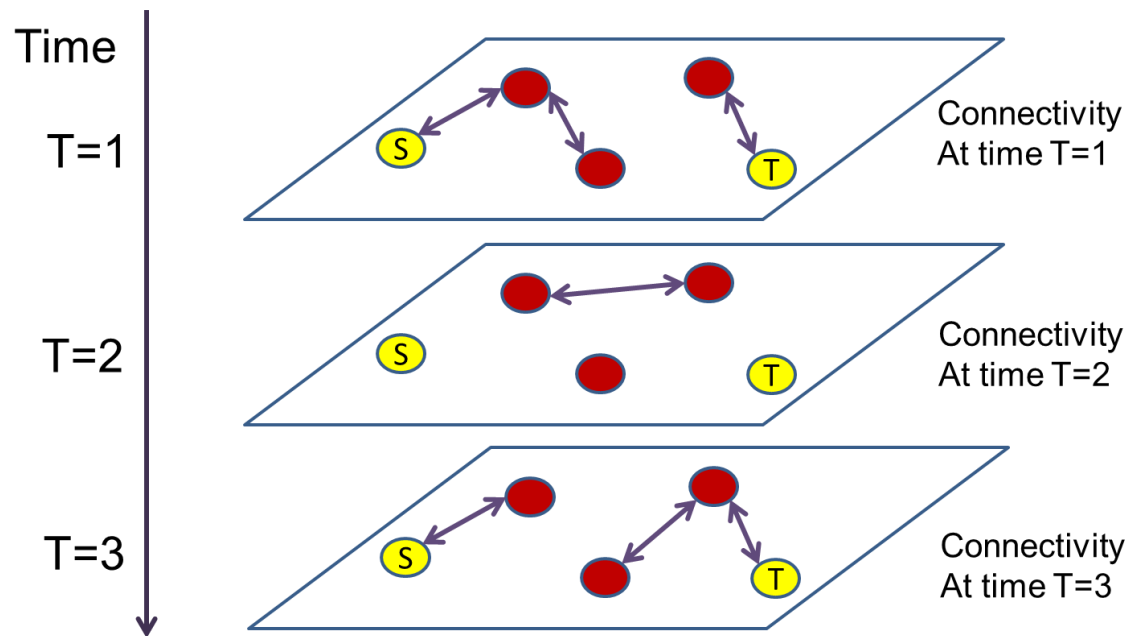
# DUMBO NET II (2008)





# DUMBO NET III (2010)

- Mainly deals with the disruptions (intermittent connectivity) in emergency networks
  - Disruption Tolerant Networking (DTN)
  - Social Networking on MANET (SocMANET)



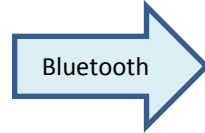
# DTN file transfer in a disruptive MANET



1. Take a picture or a video with your ordinary mobile phone

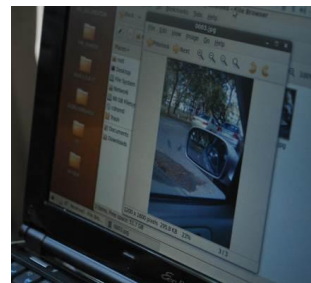


2. Send via Bluetooth to one of EEE PCs

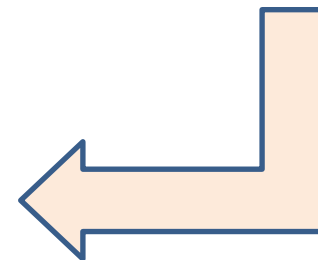
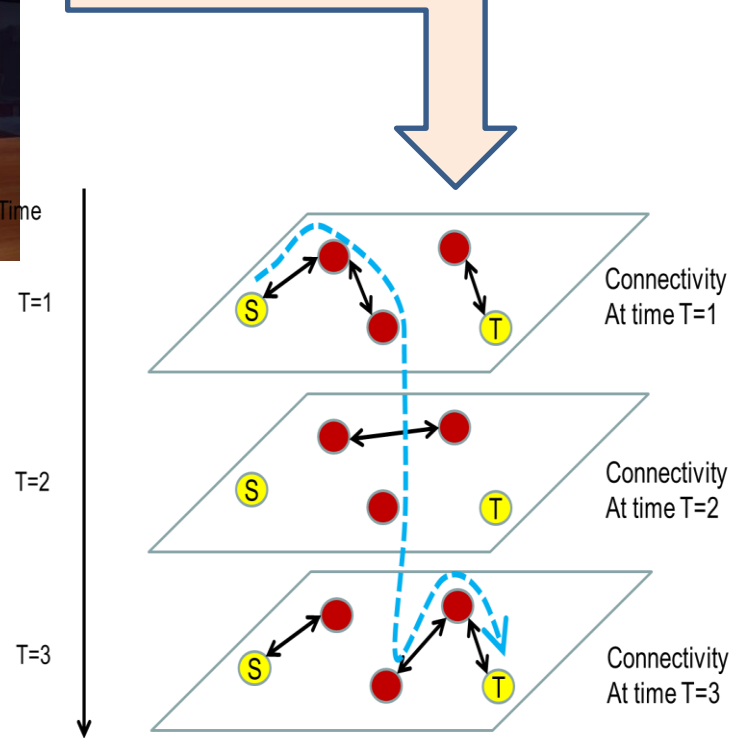


3. The netbook receives the file, makes it a DTN bundle, and forwards the DTN bundle in a disruptive MANET

4. The DTN file bundle arrives at its destination EEE PC (e.g. a command headquarter, or other members of the rescue team)



WiFi MANET + DTS-OLSR



# 3. Technology Transfer: THING Camps

# What is THNG ?

- Thailand Networking Group (THNG) is an ongoing project of the Thai Network Information Center Foundation (THNICF)
  - *To build a group of volunteers who can help deploy Internet technologies to various sectors, especially in the digitally-lagged-behind rural areas.*
  - *One of the key missions: to respond to post-disaster scenarios by utilizing cutting-edge ICT*

# THING Camps

- THNG Camps consist of the workshop and actual field deployment of the most recent DUMBONET and other relevant technologies (e.g. robotics).
- THNG Camps teach and train the youths on how to utilize modern ICT in post disaster scenarios

# THNG Camps

- First THNG Camp
  - *Dates: 5 – 7 March 2010*
  - *Venue: Khao-Yai (Grand Mountains) National Park, Nakhonratchasima, Thailand.*
  - ***40 participants***
- Second THNG Camp
  - *Dates: 6 – 8 May 2011*
  - *Venue: Shinawatra University, Pathum Thani, Thailand.*
  - ***80 participants***

# The First THNG Camp/DUMBONET III (March 2010)



Khao-Yai (~Grand Mountains) National Park, Thailand

- Trail in a dense tropical rainforest (~ 3 KM)
- Highly 'challenged' environment:
  - Trees and terrain disrupt our WiFi, CB, and GSM signals
  - Even GPS signal oftentimes cannot get through dense tree leaves

# First THNG Camp (March 2010)



# How to enable *multimedia* emergency communication in the highly challenged environments?



# The Second THNG Camp

“IT for Disaster Responses”

6-8 May 2011 @ Shinawatra University



# Second THNG Camp : 6-8 May 2011



We teach Thai youths how to setup and deploy DUMBONET and its services. With proper equipment and coaching, they can do it typically in less than 30 minutes.

# Second THNG Camp : 6-8 May 2011



We interconnected many modern commodity Android and iOS devices to DUMBONET services. These devices are things that the youths are very familiar with.

# Second THNG Camp : 6-8 May 2011



The youths learn how to use our (self-contained) social-network, Email-to-DTN, and Bluetooth-to-DTN services on DUMBONET.

# Second THNG Camp : 6-8 May 2011

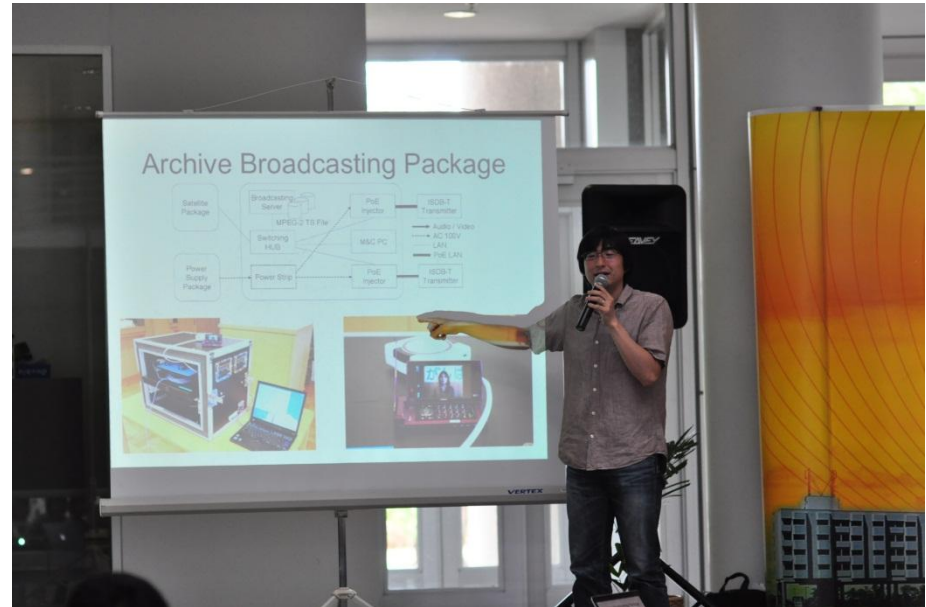


The youths field-tested DUMBONET in a simulated mission.

# DUMBONET connected with Inmarsat BGAN Satellite Gateway



# Second THNG Camp : 6-8 May 2011



Dr.Kotaro from WIDE Project presented technology on disaster recovery in Japan

# Second THNG Camp : 6-8 May 2011



DUMBONET  
and  
FIBO Robots  
(Courtesy of FIBO/KMUTT)

The next step of our DUMBONET research is to build and expand emergency networks with the help of robotic routers.  
(The project is partially funded by NECTEC/NSTDA in late 2011-2012)

Thank you very much  
for your interest

For further information please contact:

Professor Kanchana Kanchanasut

[kk@cs.ait.ac.th](mailto:kk@cs.ait.ac.th)