Emergency and Educational Communication Vehicle (EECV)

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When disaster strikes..

- Multiple failure of utilities services (Electricity/Water/Telephone)
- Multiple disasters: storm, flood, fire and earthquake can take place in combination
- Fires are often caused by explosion of fuel storage and electrical faults/accidents
- Calls for help require **EFFICIENT COMMUNICATIONS**
- Communication systems may fail completely due to broken connections, collapsed radio towers and power outage
- Search and Rescue team usually comes with limited communication capability, not sufficient to serve the desperate public
- Communication systems are overloaded with calls.
War and pandemic

Source: Trin Tantsetthi

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ITU/ESCAP Disaster Communications Workshop, 12 – 15 December 2006, Bangkok, Thailand
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Terrorism, bombs, mudslides
Industrial disasters, Flood, Tsunami, and Monster?
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Flood in Angthong Photos: Thomas Brecelic (Oct 2006)
Flood in Pichitr
Why EECV?

- The Tsunami in the south of Thailand in December 2004 raised the **need for a large capacity ad-hoc communication system** for emergency response teams to report losses and coordinate rescue missions.

- NECTEC's **Rural Wireless Broadband Access (RWBA) solution** can be applied to EECV for providing a high-capacity ad hoc broadband access communication system in the event of emergency.

- **EECV can be used for educating** emergency response teams/volunteers or providing broadband access services for rural schools and communities.
What is EECV?

- A versatile vehicle with communication system
- A large capacity ad hoc communication system for voice and data
- Fast deployment and high mobility
- Self sufficient in terms of energy storage and generation
Objectives of EECV

- To design and develop a versatile emergency communication vehicle with a capability to provide telephone and broadband Internet access services for emergency response teams.
- To drill and practice the system preparedness for emergency situations (in collaboration with DDPM and ADPC).
- To deploy the system in rural schools/communities for educational purposes during the non-disaster period (in collaboration with Cisco Systems).
- To provide a best practice example for telecommunication service providers on the preparation for mobile emergency services provisioning for disaster areas.
Emergency and Educational Communication Vehicle

A Collaboration between...

National Electronics and Computer Technology Center (NECTEC)
National Science and Technology Development Agency (NSTDA)
Ministry of Science and Technology

Department of Disaster Prevention and Mitigation
Ministry of Interior

Cisco Systems (Thailand), Ltd.

Asian Disaster Preparedness Center (ADPC)
EECV - The First Prototype
## Technical Specifications

<table>
<thead>
<tr>
<th>Category</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Radio technology</td>
<td>NECTEC's Rural Wireless Broadband Access (RWBA)</td>
</tr>
<tr>
<td>Operating frequency</td>
<td>2.4 GHz IEEE 802.11b/g</td>
</tr>
<tr>
<td>Capacity (voice)</td>
<td>25 simultaneous voice-connections (wire/wireless)</td>
</tr>
<tr>
<td>Capacity (data)</td>
<td>30 broadband Internet access terminals (wire/wireless)</td>
</tr>
<tr>
<td>Operating range</td>
<td>300 meters around the vehicle (wireless access)</td>
</tr>
<tr>
<td></td>
<td>2 kilometers line of sight (using additional antenna)</td>
</tr>
<tr>
<td>Backhaul connection</td>
<td>choice of cable, terrestrial wireless links (Microwave, WiFi, WiMAX), satellite links (IP-Star Satellite)</td>
</tr>
<tr>
<td>Power generation</td>
<td>two sources: (1) when the car engine running (2) from a stand alone power generator with capacity to support all system equipments operating continuously for 3 days</td>
</tr>
<tr>
<td>Fuel type</td>
<td>Diesel (for car engine and the power generator)</td>
</tr>
</tbody>
</table>

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# Vehicle Specifications

<table>
<thead>
<tr>
<th>Specification</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vehicle frame:</td>
<td>six-wheeler truck (short body)</td>
</tr>
<tr>
<td>Compartments:</td>
<td>(1) driver's section and (2) operation section</td>
</tr>
<tr>
<td>Air conditioning:</td>
<td>cover both compartments and all equipments</td>
</tr>
<tr>
<td>Engine:</td>
<td>Diesel engine</td>
</tr>
<tr>
<td>Drive:</td>
<td>4-wheel drive, designed for accessing unpaved roads</td>
</tr>
<tr>
<td>Flood tolerance:</td>
<td>Capable of wading through 70-centimeter flood</td>
</tr>
<tr>
<td>Climbing capability:</td>
<td>40-degree slope (max.)</td>
</tr>
<tr>
<td>Total carrying weight:</td>
<td>4.8 tons</td>
</tr>
<tr>
<td>Antenna tower:</td>
<td>18-meter telescopic tower which can be stretched up and retracted down to</td>
</tr>
<tr>
<td></td>
<td>the vehicle when out of operation</td>
</tr>
<tr>
<td>Stabilization feet:</td>
<td>four retractable feet to add extra stability</td>
</tr>
<tr>
<td>Levelling gears:</td>
<td>to level the vehicle horizontally during operation</td>
</tr>
</tbody>
</table>
Connection to Backbone Network

1. via terrestrial wireless links such as microwave, WiFi, WiMAX

Gateway to Telephone Network and Internet

Users:
- Student
- Recovery Staff
- Aids and Donation Mgt
- Forensic Scientists
- Police
- Citizen

Communication/Information Command Center

- PSTN
- Internet
- Voice Gateway
- Router

Wireless IP Phone x 25 (SCCN/SIP)

PC x 25
Connection to Backbone Network

2. via satellite (such as IP-Star)

Gateway to Telephone Network and Internet

Users:
- Student
- Recovery Staff
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Communication/Information Command Center

Connection to Backbone Network

PSTN

Internet

Voice Gateway

Router

Wireless IP Phone x 25 (SCCN/SIP)

PC x 25

BST
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ITU/ESCAP Disaster Communications Workshop, 12 – 15 December 2006, Bangkok, Thailand
EECV serving at flood and mudslide areas in Northern Thailand 24 – 31 May 2006
EECV serving at flood and mudslide areas in Northern Thailand 24 – 31 May 2006
EECV serving at flood areas in Ang Tong
21 October 2006 - today
EECV for *ad hoc* communication services in special events.
EECV Educational Program with Cisco Systems, DDPM and ADPC
September 2006 – March 2007,
Concluding remarks

- EECV proved to be very successful – with one prototype and full deployment, we have:
  - Developed training and operational manuals
  - Provided training to three classes
  - Low cost is less than one-fifth of other models

- Field trial results are encouraging.
- We still need more experience in exploiting the Internet information access to its best potential (missing persons, I am Alive, Donation+Need Exchange)
- Thailand requires one EECV per province (or more)!
- EECV can help in education and bridging the digital divide.
Thank you for your attention.

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