Last-Mile Hazard Information Dissemination

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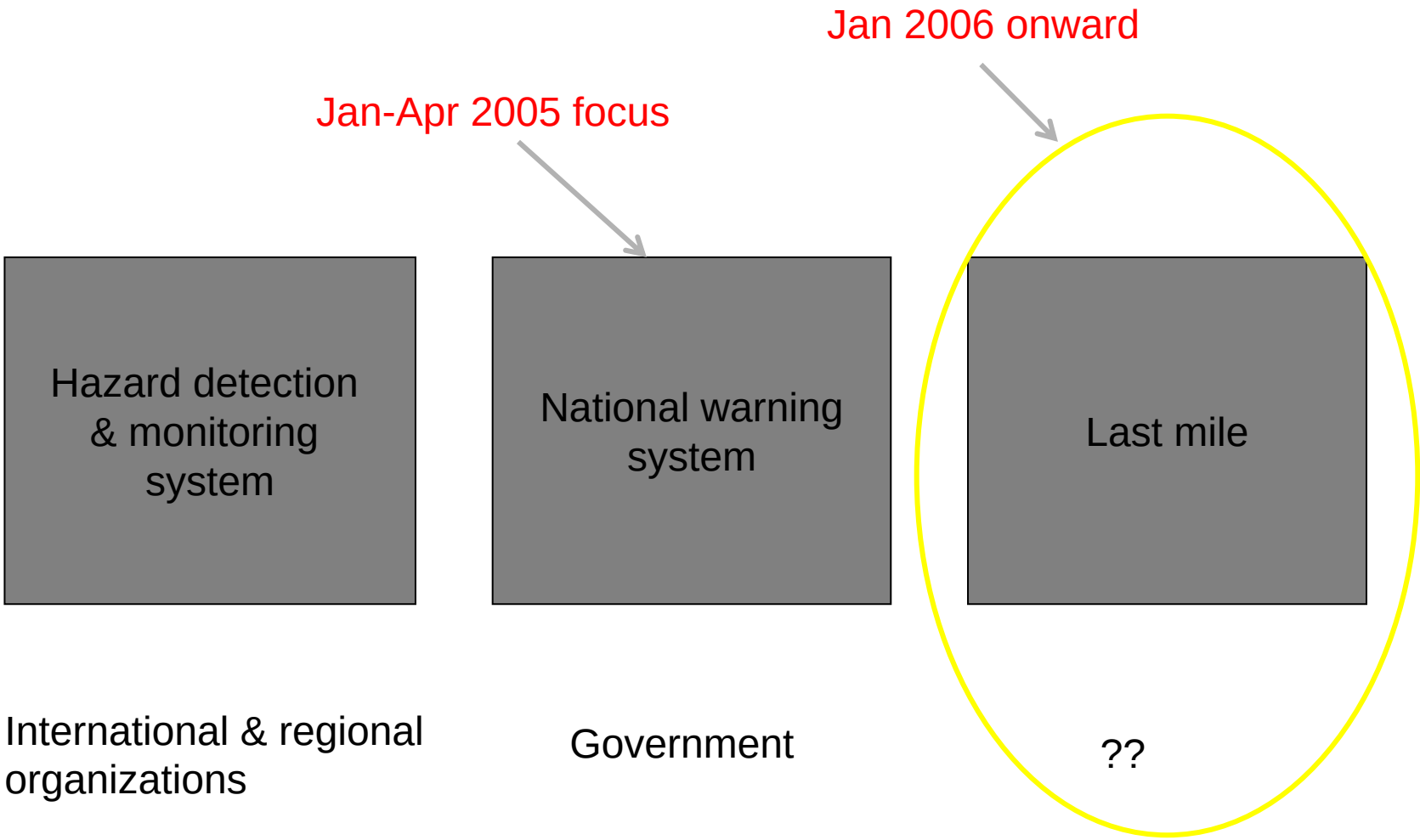
Presentation Overview

- 2004 Tsunami: The Need and the Response
- The Role of HazInfo in the 'Last-Mile'
- Contributions of Space-based Technology to HazInfo
- HazInfo Results
- Future Steps and Challenges

2004 tsunami in Sri Lanka: Failures of ICT use and of institutions

- Assumed ubiquity and power of ICTs not evident on December 26, 2004
  - 1883: Krakatoa disaster carried by telegraph agencies 2 days later
  - 2004: Destruction of Aceh carried by satellite and Internet-equipped news organizations 2 hours later
- News of inundation of coastal towns in Southeast Sri Lanka reaches the capital, but is not broadcast; failure to reduce loss of lives on other coasts

Warning chain for tsunamis



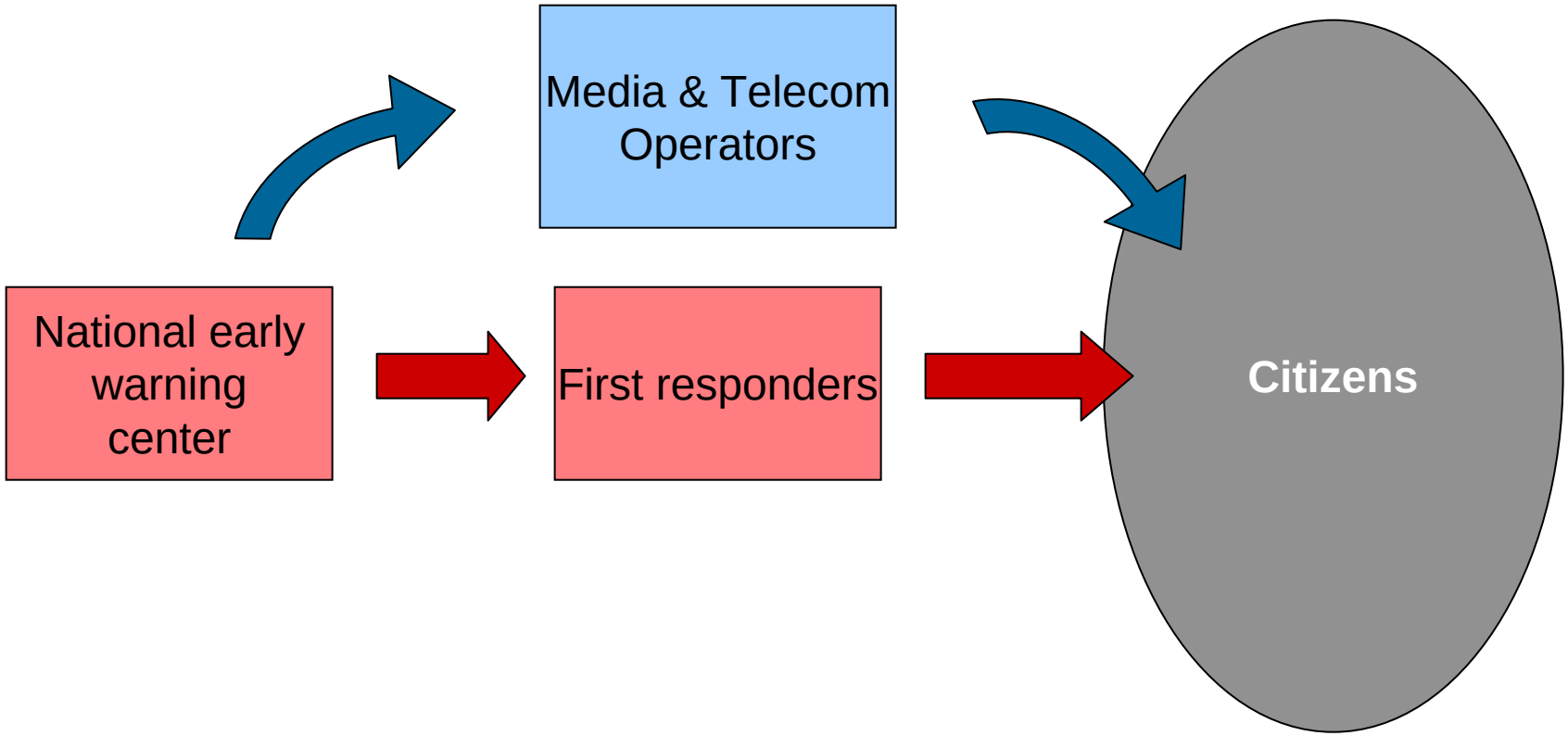
LIRNEasia's initial response

- Participatory research the develop a concept paper for NEWS:SL, National Early Warning System: Sri Lanka (January-March 2005)
  - Report presented to TAFREN, the government tsunami-response authority
  - Findings presented to Presidential Commission
- Lacking traction on the government front, decided to focus on the most difficult part of the warning chain in partnership with Sri Lanka's leading community-based organization, Sarvodaya (226 of its 15,000 villages affected by the tsunami)

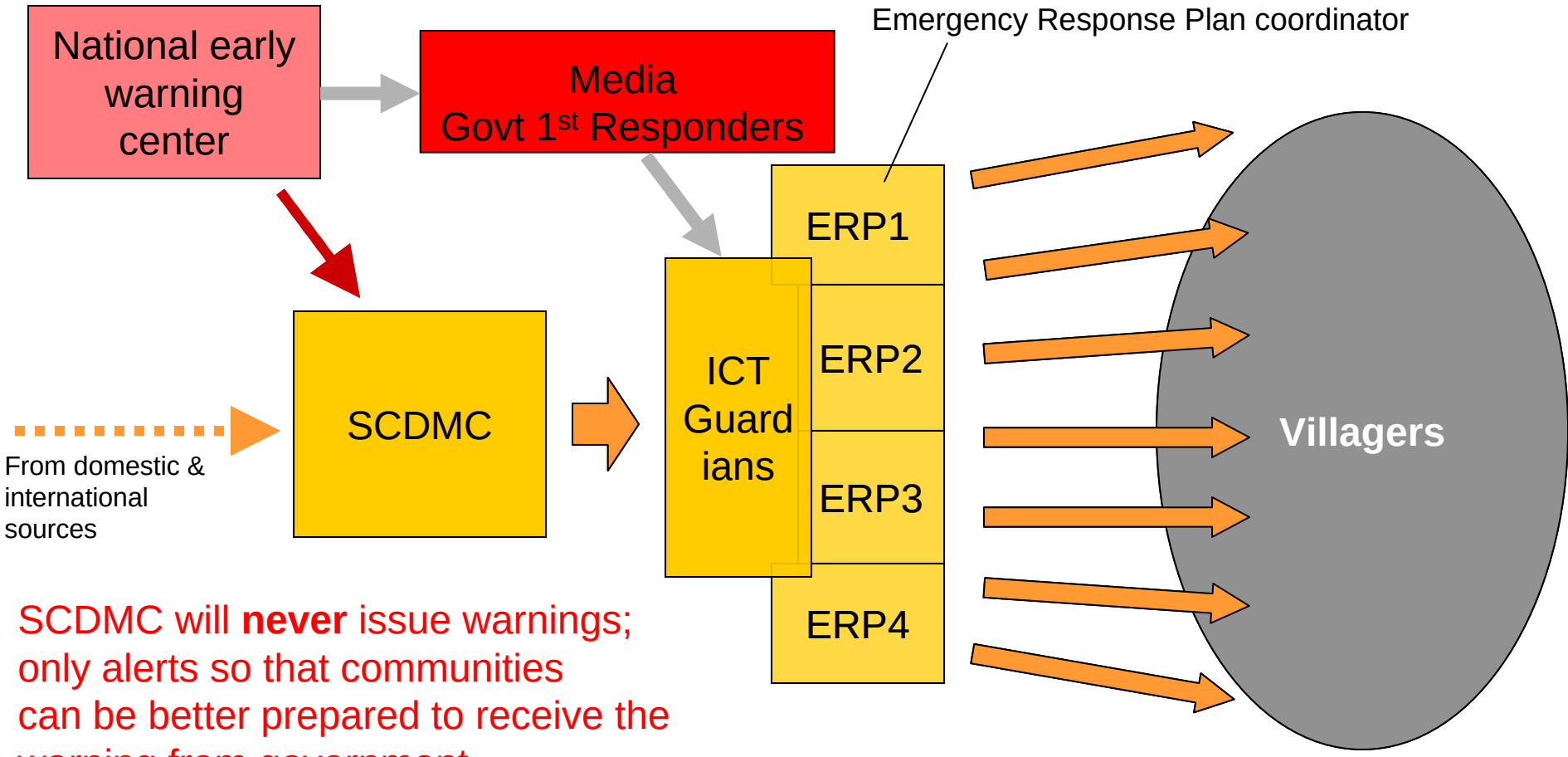
Scale of the problem

- Imagine sequentially dialing and giving the message to
  - Television channels (7 in Sri Lanka)
  - Radio channels (10+)
  - Telecom operators (8)
- If each call takes 3 minutes, need 75 minutes for the whole set (leaving aside government first responders)
  - 2004 Indian Ocean tsunami reached Komari/Arugam Bay coastline within 90 mts of earthquake
  - Detection-monitoring people require 15 mts minimum to issue a warning, so all we have in 75 mts
  - Faster we get the message out, more time for people to respond

Early warning chain (standard form)



Early warning chain (community based; applicable to Last-Mile HazInfo project)



SCDMC will **never** issue warnings; only alerts so that communities can be better prepared to receive the warning from government

Efficient procedures can improve decision making and avoid bad outcomes

- Getting the best possible information to national experts
- More time for experts to consider the options and advise authorities
- False warnings can cause
  - Deaths (more than 10 in Sri Lanka in the 2005 evacuation)
  - Robberies
  - People refusing to evacuate

HazInfo – Pilot Phase

- Involved 32 selected tsunami impacted villages from eastern, western, northern and southern coastal areas of Sri Lanka;
- Tested different combinations of ICTs and community mobilization in the participating villages.

ICTs used in reaching communities

CDMA Fixed Phone

GSM Mobile Phone

Remote Alarm Device

Addressable Radios for Emergency Alerts

Very Small Aperture Terminals

HazInfo Communities, Organizational Level and ICT Selection

	With ERP Training				No ERP Training			
Sarvodaya Stage 1, 2, 3	VSAT Urawatha (Galle)	MoP Nidavur (Batticalo)	FxP Thirukadalar (Trincomalee)	AREA Moratuwella (Colombo)	MoP Meddhawatha (Matara)	MoP Thambiluvil (Kalmunai)	FxP Oluville (Kalmunai)	AREA Maggona (Kalutara)
	AREA + RAD Modarapallassa (Hambantota)	AREA + FxP Wathegama North (Matara)	AREA + MoP Palmunnai (Batticalo)	Control Village Abeyasinghepura (Ampara)	AREA + RAD Thondamanar (Jaffna)	AREA + FxP Karathivu (Kalmunai)	AREA + MoP Munnai (Jaffna)	Control Village Modara (Colombo)
Sarvodaya Stage 4	VSAT Modaragama (Hambantota)	MoP Diyalagoda (Kalutara)	FxP Periyakallar (Batticalo)	AREA Panama North (Ampara)	MoP Satur-kondagnya (Batticallo)	MoP Samodhagama (Hambantota)	FxP Indivinna (Galle)	AREA Brahamana-wattha (Galle)
	AREA + RAD Kalmunai II (Kalmunai)	AREA + FxP Samudragama (Trincomalee	AREA + MoP Valhengoda (Galle)	Control Village Mirissa South (Matara)	AREA + RAD Venamulla (Galle)	AREA + FxP Kottegoda (Matara)	AREA + MoP Thallala South (Matara)	Control Village Thalpitiya (Kalutara)

WorldSpace AREA satellite radios

Emergency Alert Delivery through WorldSpace

- Covers more than 100 countries with one secure uplink
- Can be addressed by country, group, tier or even the current location of the receiver
- Delivered with a latency of less than 10 seconds
- Automatically triggers a siren/alarm whether or not the receiver in use
- Displays text and automatically switches to audio information in local language(s)
- Caters to diverse requirements/infrastructure ranging from a sophisticated weather office to a fisherman out at sea
- Goes beyond conventional modes of communication and supplements/complements other technologies
- Survives most hazardous conditions & power failures
- Re-used for the daily requirements of the community (entertainment, agriculture, health, training..)

Terminal Options

- AREA - Addressable Radio for Emergency Alerts

  - **AREA-C** Audio Alerts for Community Deployment
    (Remote Locations, Beaches, Community Centers, and Places of Worship)
  - **AREA-M** Alerts for the Mobile User
    (Trucks, Ships, and Trains)
  - **AREA-A** Audio and Data Alerts for the Computer-connected sites
    (Airports, Harbors, NGOs, and First Responders)

WorldSpace Summary

- The Government Agency responsible for Alert Delivery needs local partners
- These partners can be NGO's, Private sector or other national organizations (Each country has to choose a model that best suits it)
- Non-alert time usage of the system **vital** not only for the economics, but for the local acceptance & up keep of the system
- If implemented in a large scale, across multiple projects and over a long duration, these solutions are cost-effective
- Need to bring in regional cooperation and inter-operability
- Important to adopt CAP and establish a Transmission Hub for all hazards, all media and all locations
- One point generation of the alert and multi point multiple media dissemination is reliable, scalable, sustainable and cost effective.

Pilot project results

- Efficiency of receiving the outputs of hazard detection and monitoring system
- Procedures for authorization of message, if any
- Efficiency of transmitting message
  - Role of Common Alerting Protocol
  - Single-input multiple-output mechanism: SMS module developed for Sahana disaster management software suite

Which technology works best?

- Eight modes (individual and combined)
- Reliability and effectiveness (composite measures)
- Complementary redundancy

Community specific

- Training to supplement technologies and suit roles within HazInfo (i.e. HIH monitors, ICT-G, ERP-C)
- Levels of organizational strength
- Importance of emergency response plans
  - Plan without simulation is no plan
  - Simulation without plan cannot be done

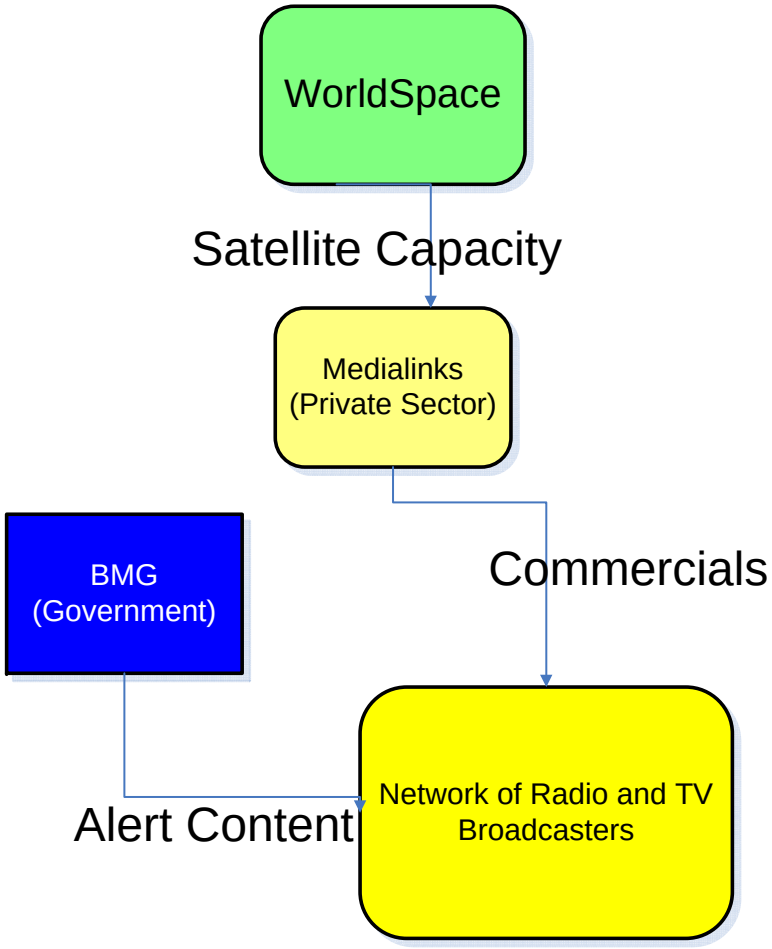
Sustainable HazInfo Implementation

- How to develop a stable, sustainable system for disaster risk reduction, first in coastal areas that are vulnerable to large-scale, rapid-onset hazards such as cyclones and tsunamis, that can then be extended inland
  - Developing SCDMC capacity and 24/7 HIH operations
  - Absent government funding, need to develop public-private models
  - Hotels and Sarvodaya villages are organized communities that can provide the base and funding for
    - Contingency planning and drills
    - Preparing communities to receive government warnings
    - Certification of hotels and villages as “disaster ready”

WorldSpace Implementation Challenges

- New Technology
- Alert Delivery is the responsibility of a government agency and usually that agency has no role or budget for social development
- Need for coordination among Ministries
- A comparatively large one-time investment if it has to scale up to its full potential
- Need owners for the activities at non-alert times (which is hopefully most of the time!)
- Continued training of personnel at the hub as well as in the communities
- Sustainability and upkeep of the system

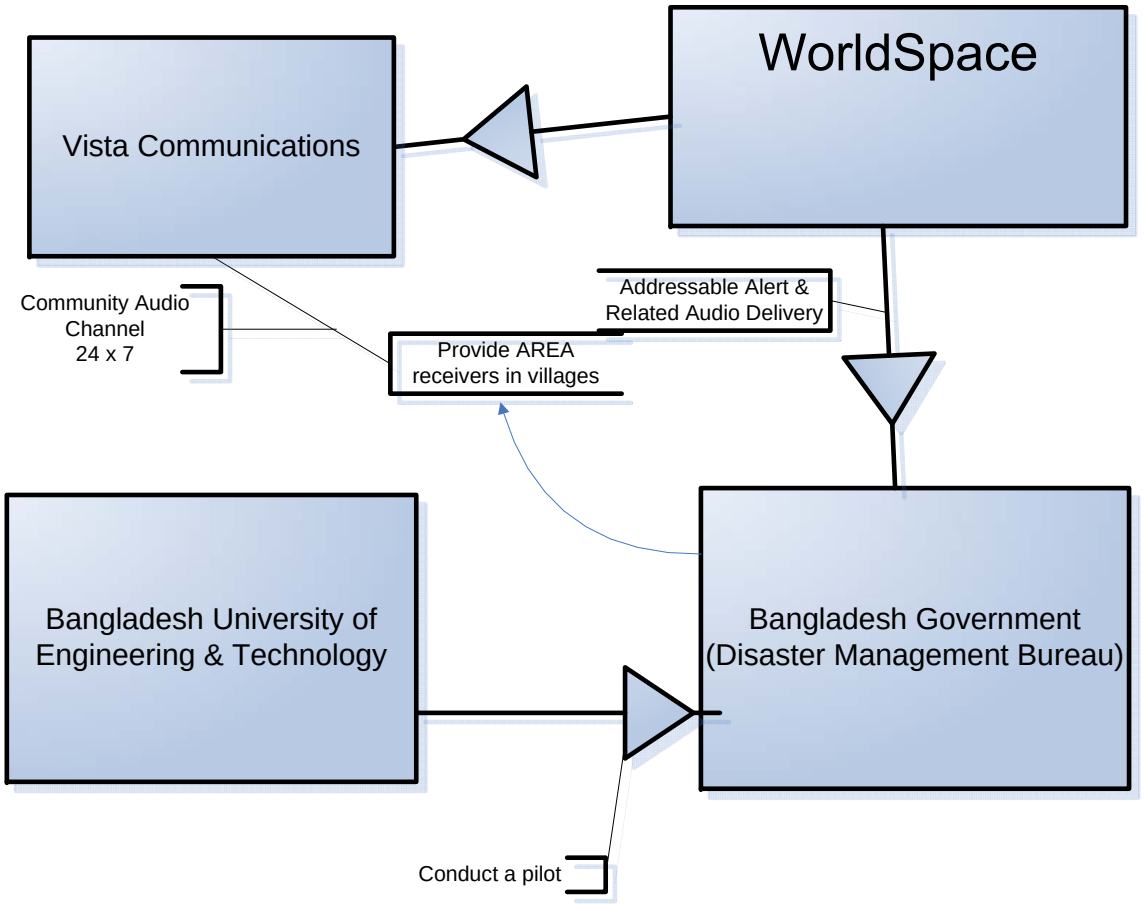
PPP Model in Indonesia



Stakeholders: Indonesia

Re-use Strategy Chosen	Datacast for Group of Media Companies
Channel Capacity	WorldSpace
Alert Content	BMG (Government)
Datacast Content	Advertisers
Custodians for Receivers	Media companies
Training & Upkeep	Private Sector Integrator
HIH Operation	BMG

PPP Model in Bangladesh



Stakeholders: Bangladesh

Re-use Strategy Chosen	Audio channel 24 x 7 for use in fishing boats (PFZ, Weather etc.)
Channel Capacity	WorldSpace
Alert Content	DMB (Government)
Audio Content	Vista Communications (Private Sector)
Custodians for Receivers	Individuals
Training & Upkeep	Vista Communications
HIH Operation	DMB- Trained by Vista and BUET

Conclusions

- HazInfo provides an effective last-mile solution within a national warning system
- Space technologies, i.e. WorldSpace satellite radios, can play a significant role given proper funding and implementation strategies incorporating appropriate training and participation of communities
- Absent government funding, PPP is the answer to effective last-mile communication with key stakeholders and desired ICTs