Disaster Information/Communication System Using Vehicles as Communication Hub

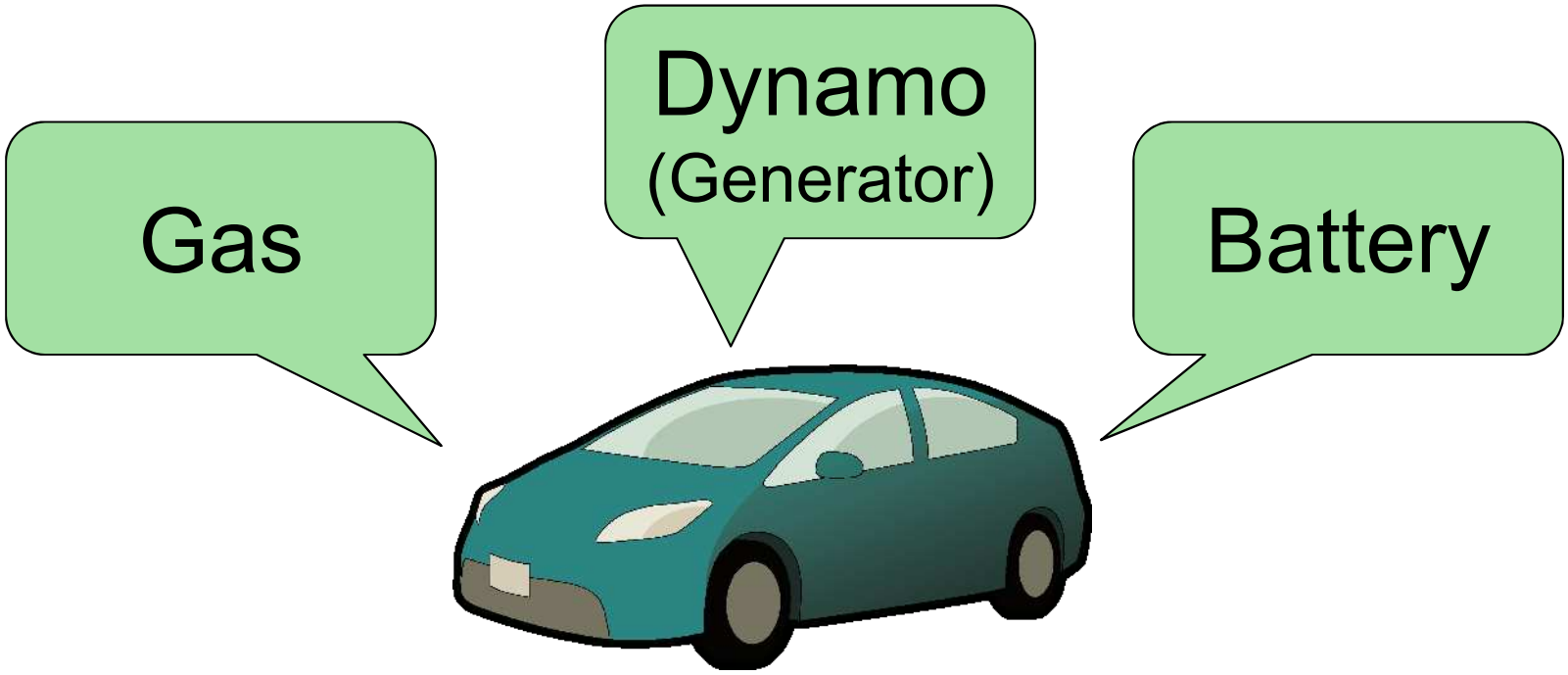
Telecommunication Technology Committee (TTC)
JAPAN

Introduction

- Vehicles may provide more than transportation:
  - Physical shelter
  - Electric power source
  - Radio Communication

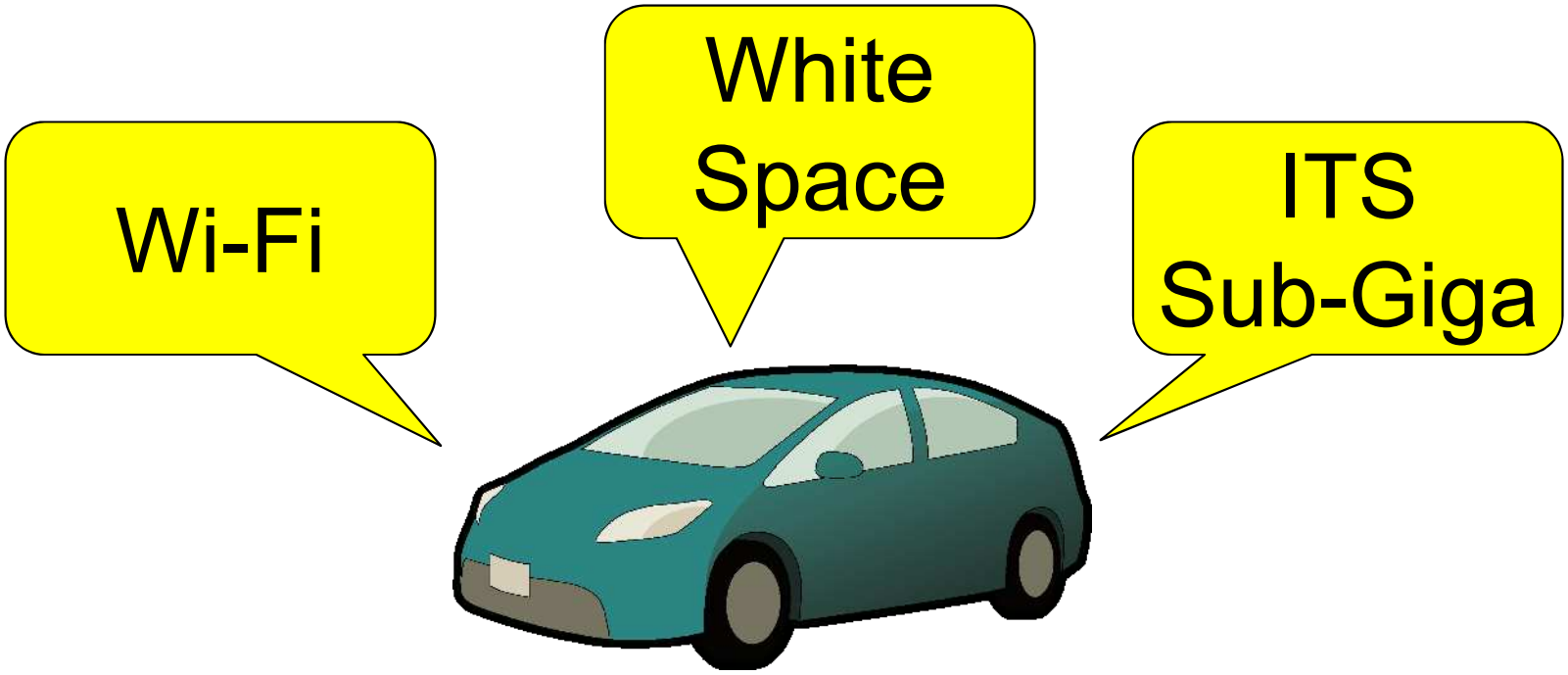
Introduction

- Communication was literally vital
  - Driven by electric power
  - Vehicles may produce electric power



Introduction

- Emerging efforts to bring radio into vehicles

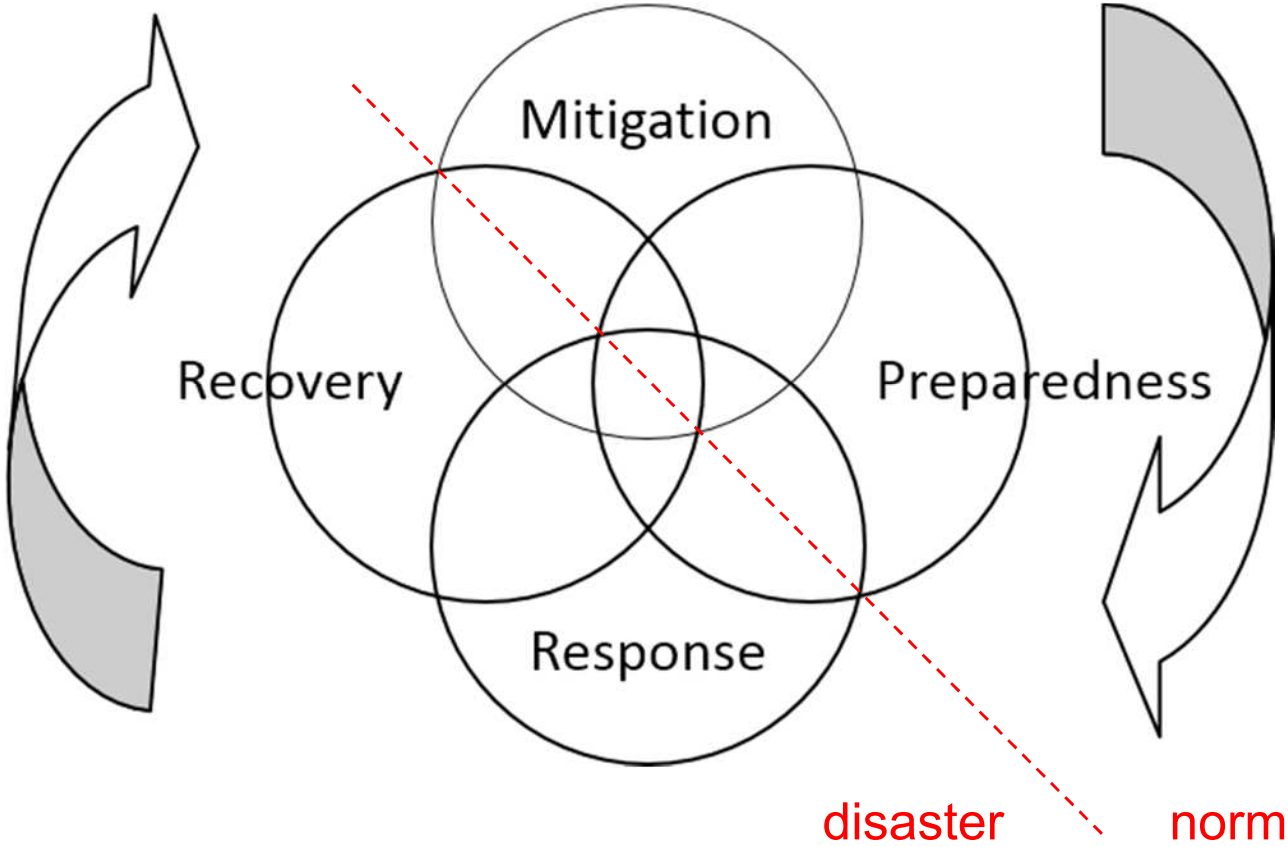


(DRAFT)
Standard Framework

Contains use case examples

Scope of the standard

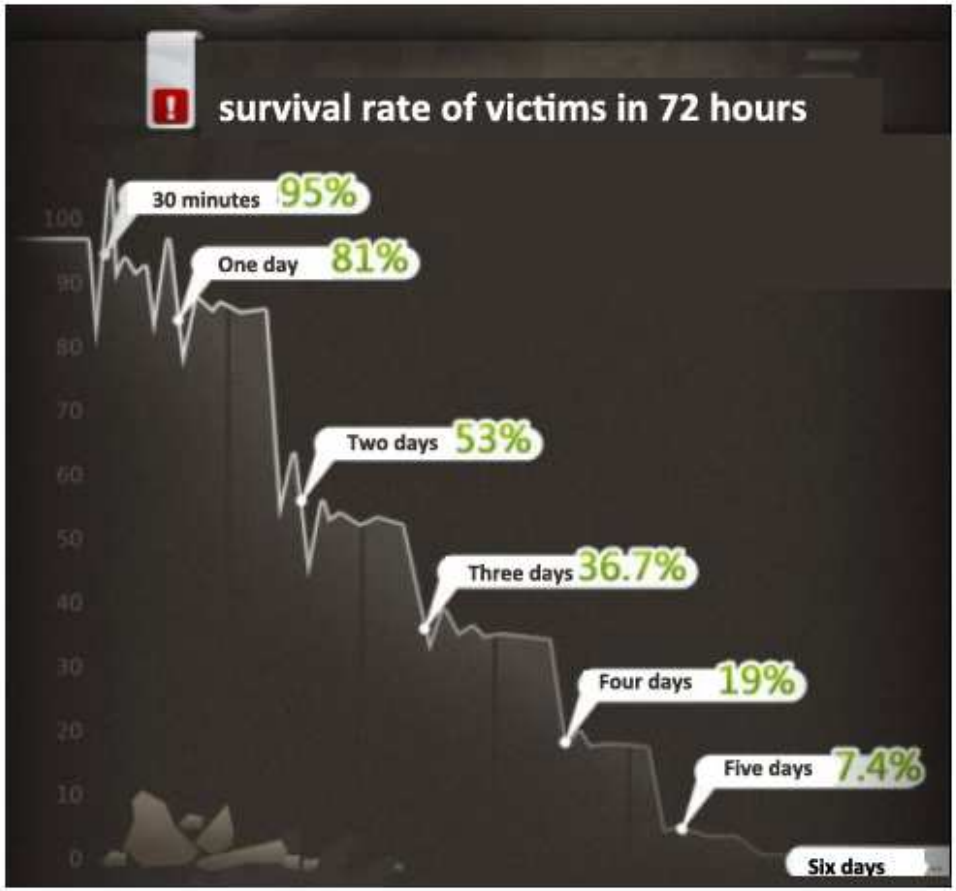
- The cycle of integrated disaster management



Reference:
E. Asimakopoulou and N.Bessis, “Advanced ICTs for Disaster Management and Threat Detection (Collaborative and Distributed Frameworks)”, published by Information Science Publishing (2010)

Framework

- %survival in the China Sichuan Earthquake

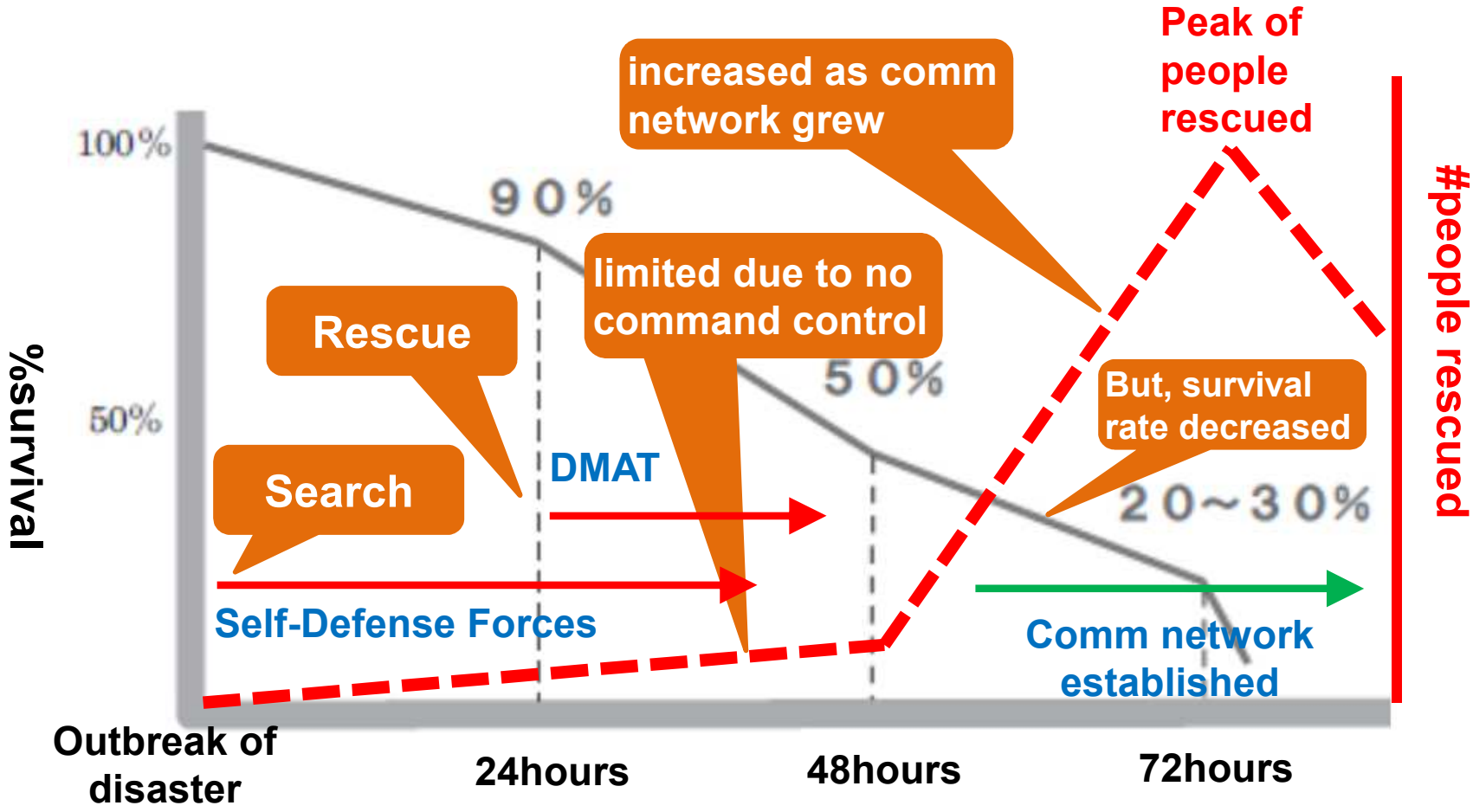


Reference: Live report: 7.0-magnitude quake hits SW China's Sichuan, China Daily (2013)
http://www.chinadaily.com.cn/china/2013-04/20/content_16425393.htm

Framework

- %survival and #people rescued by DMAT*

  * Disaster Medical Assistant Team



Framework

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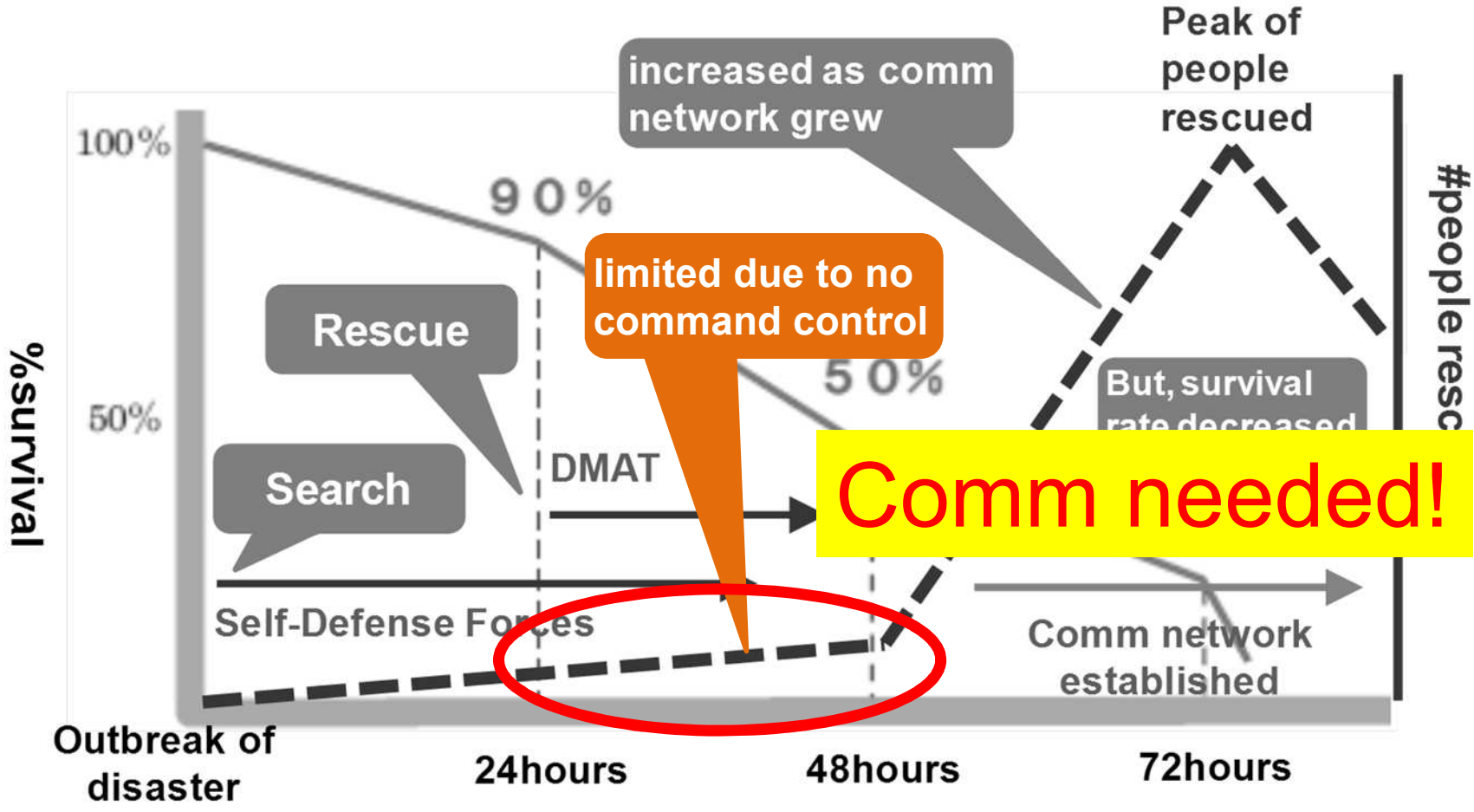
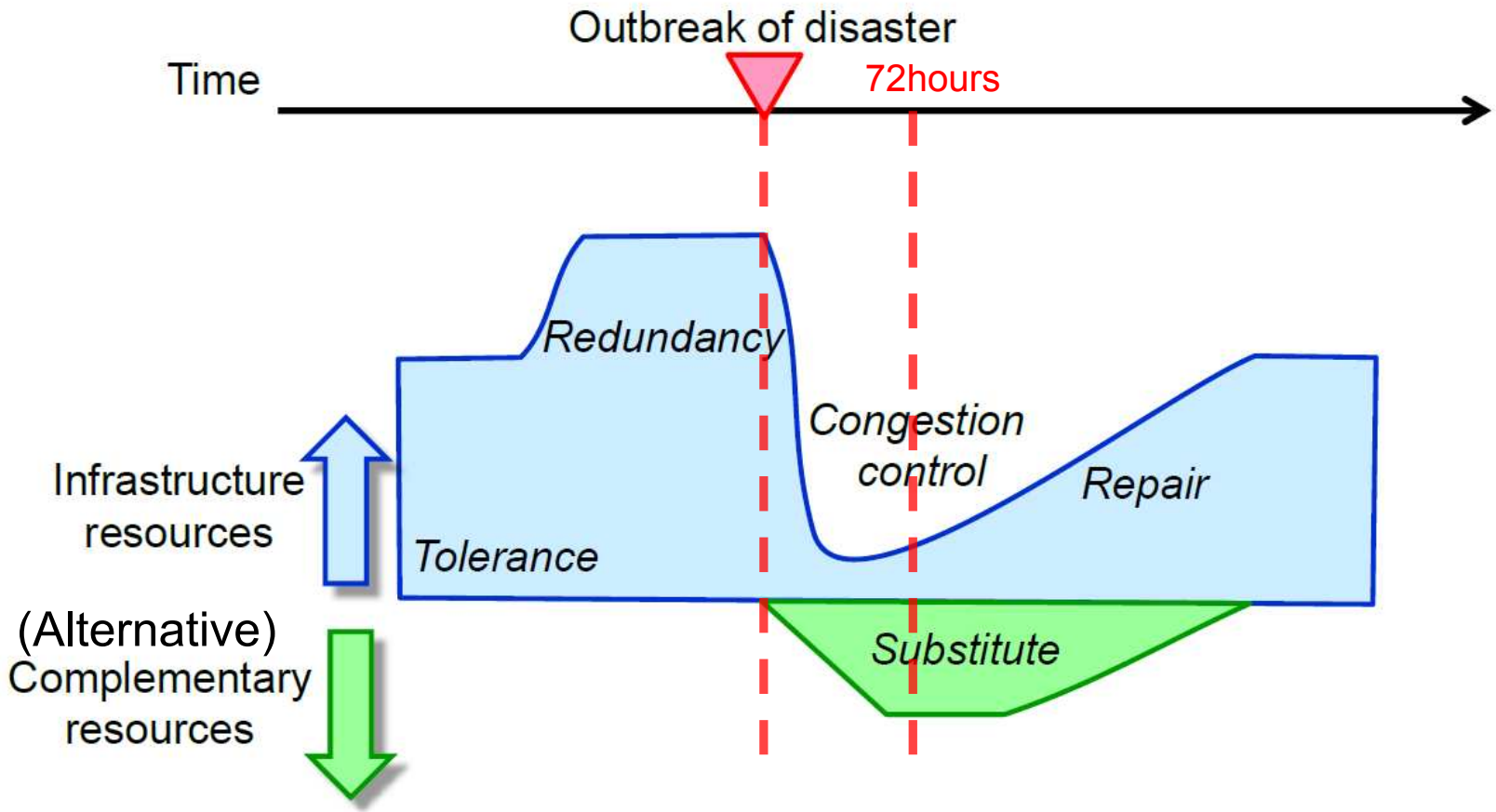


Framework

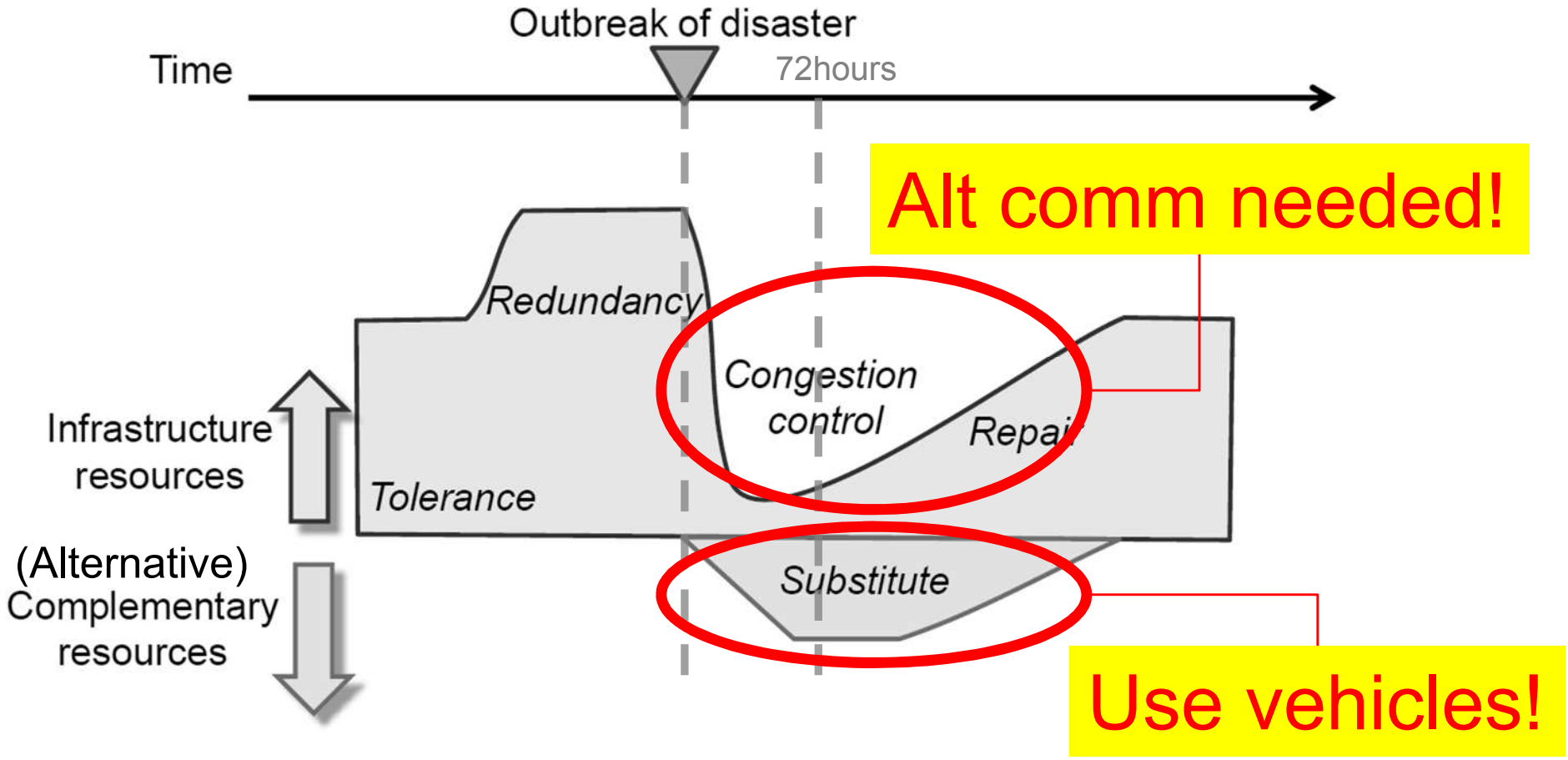
- Comm. resources after the outbreak of disaster



Reference: Overview of Disaster Relief Systems, Network Resilience and Recovery, ITU-T (2014)
http://www.itu.int/en/ITU-T/focusgroups/drnrr/Documents/fg-drnrr-tech-rep-2014-1-Overview.pdf

Framework

- Comm. resources after the outbreak of disaster



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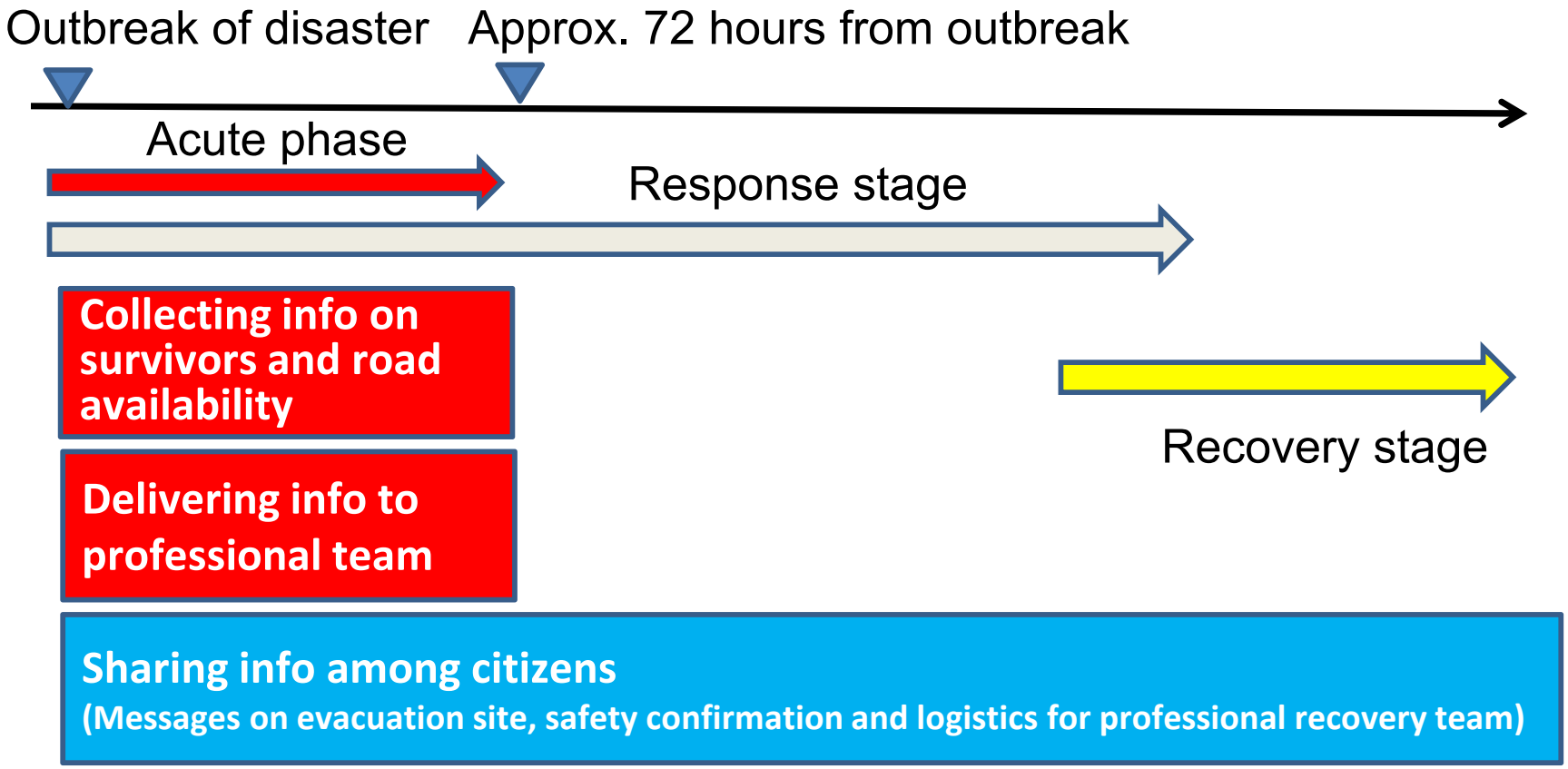
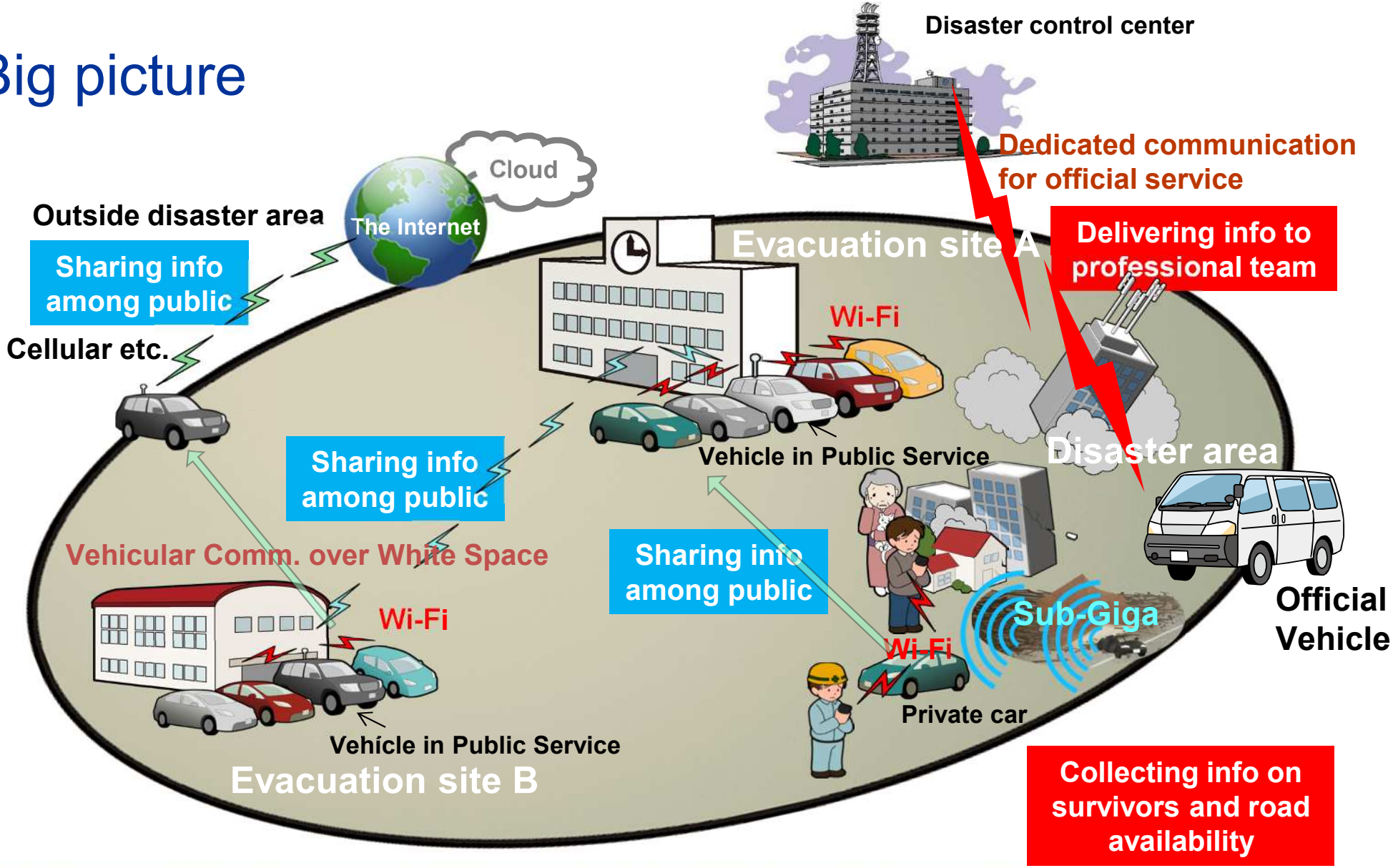
Framework

- 3 major functions for disaster info/comm system



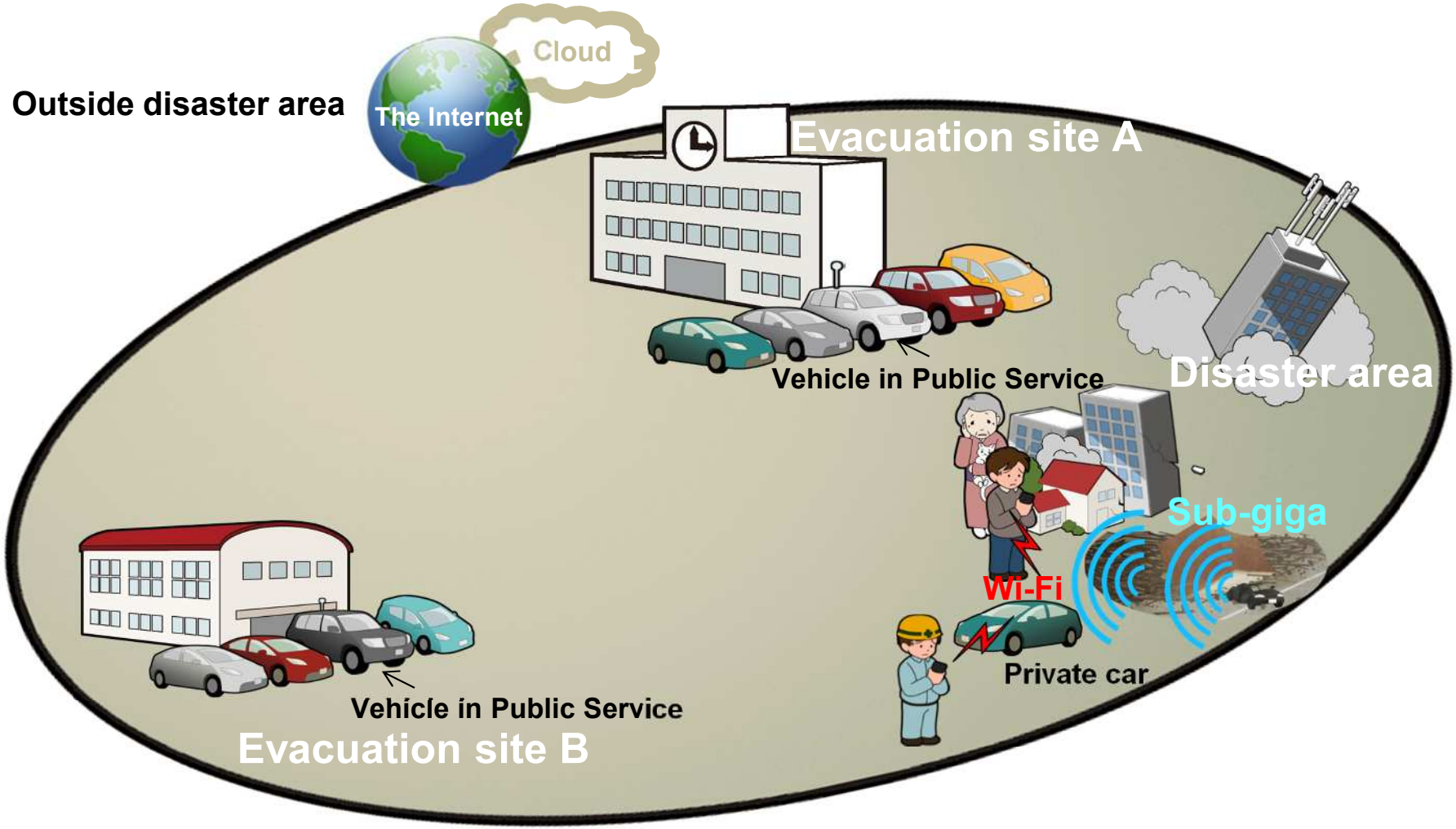
Framework

- Big picture



Use case examples

- Sharing information among citizens



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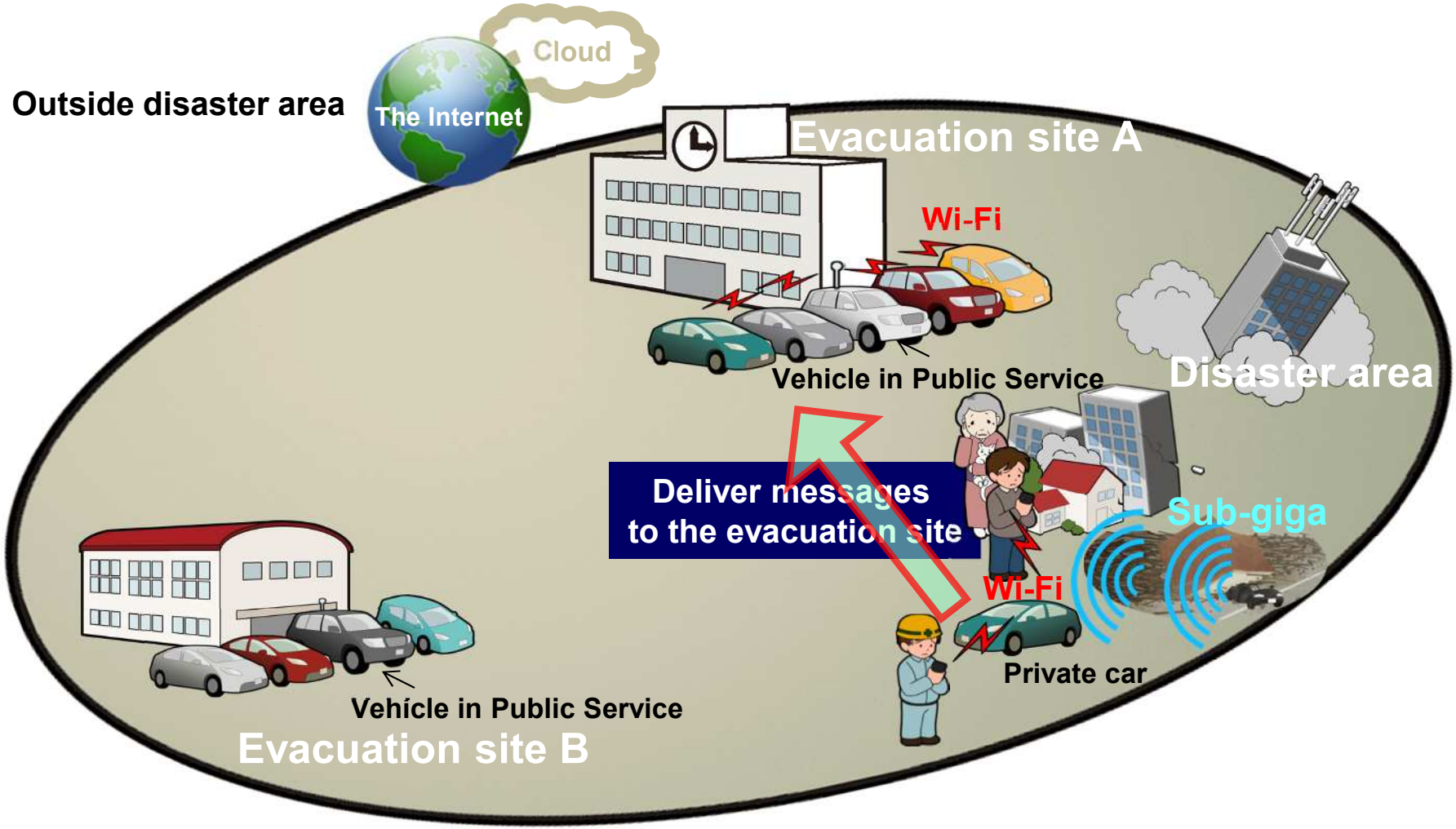

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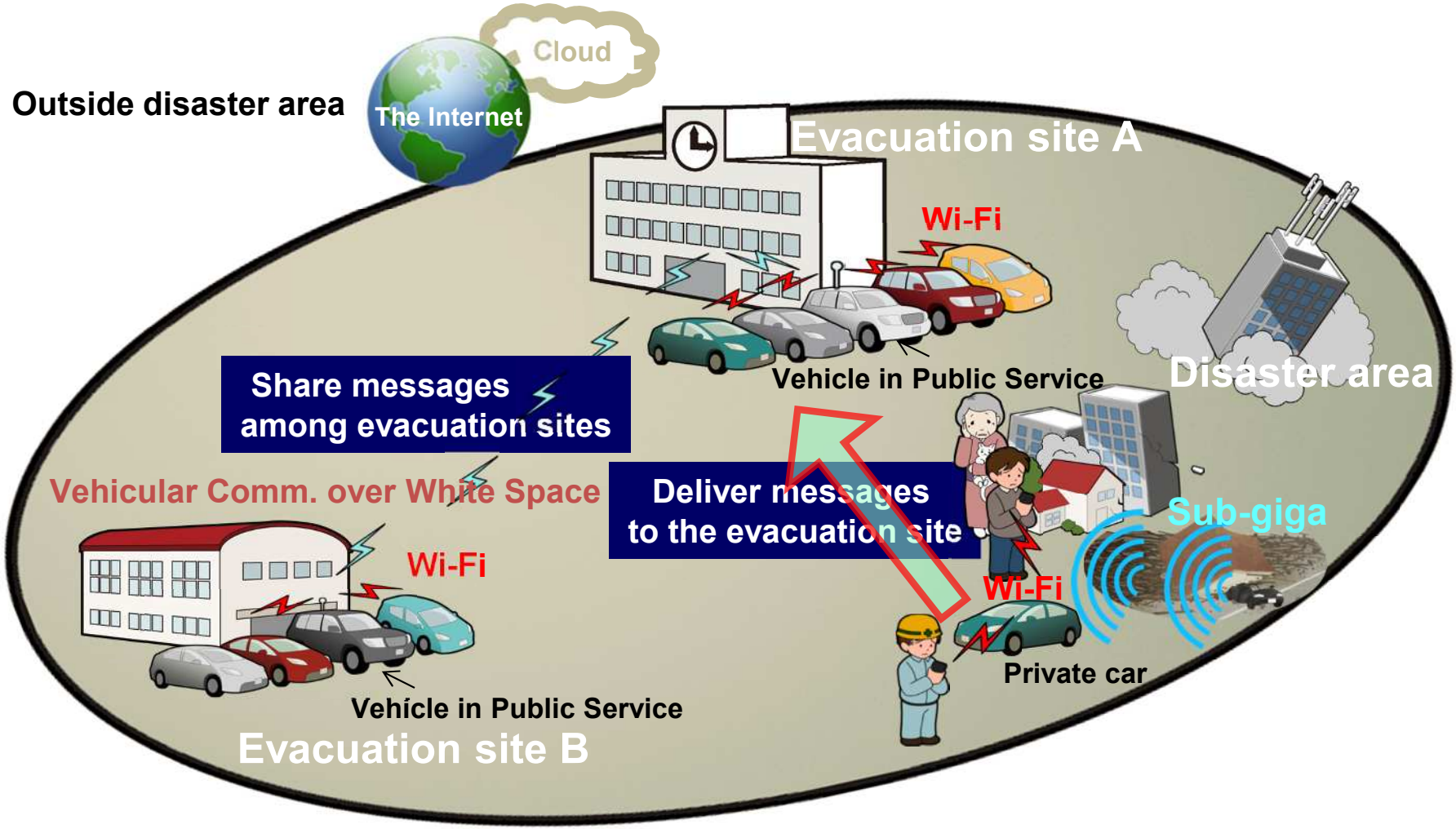

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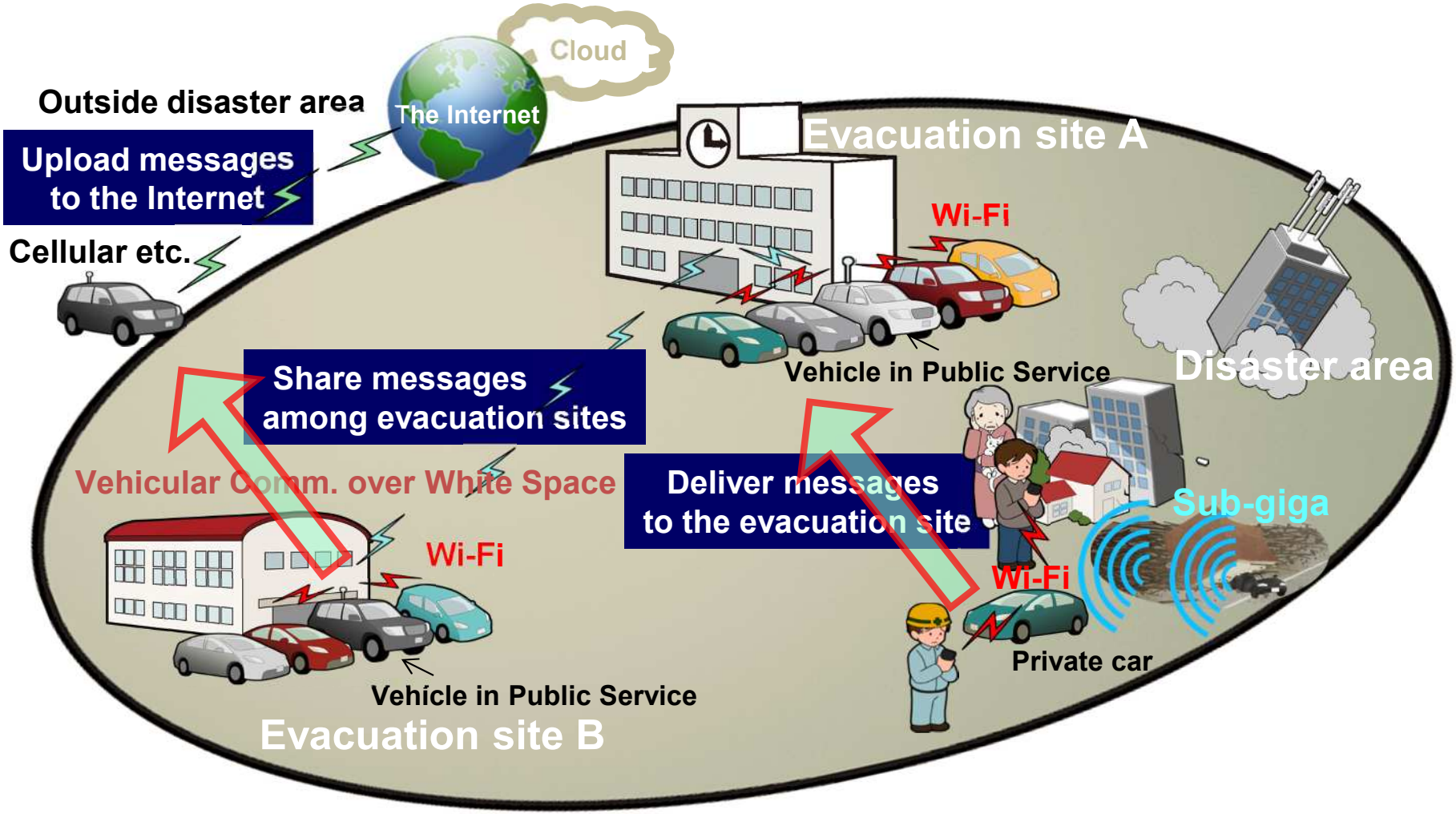
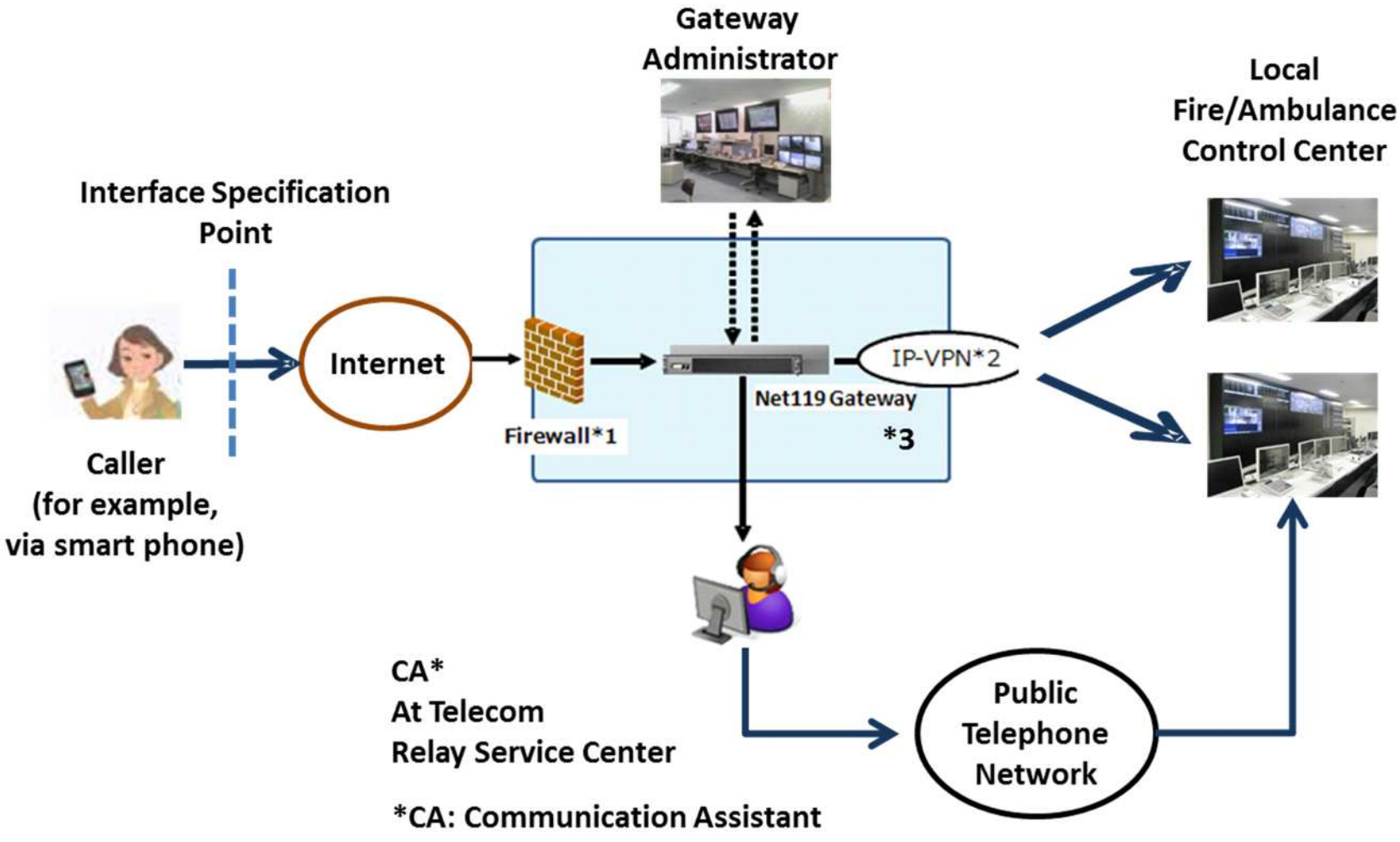


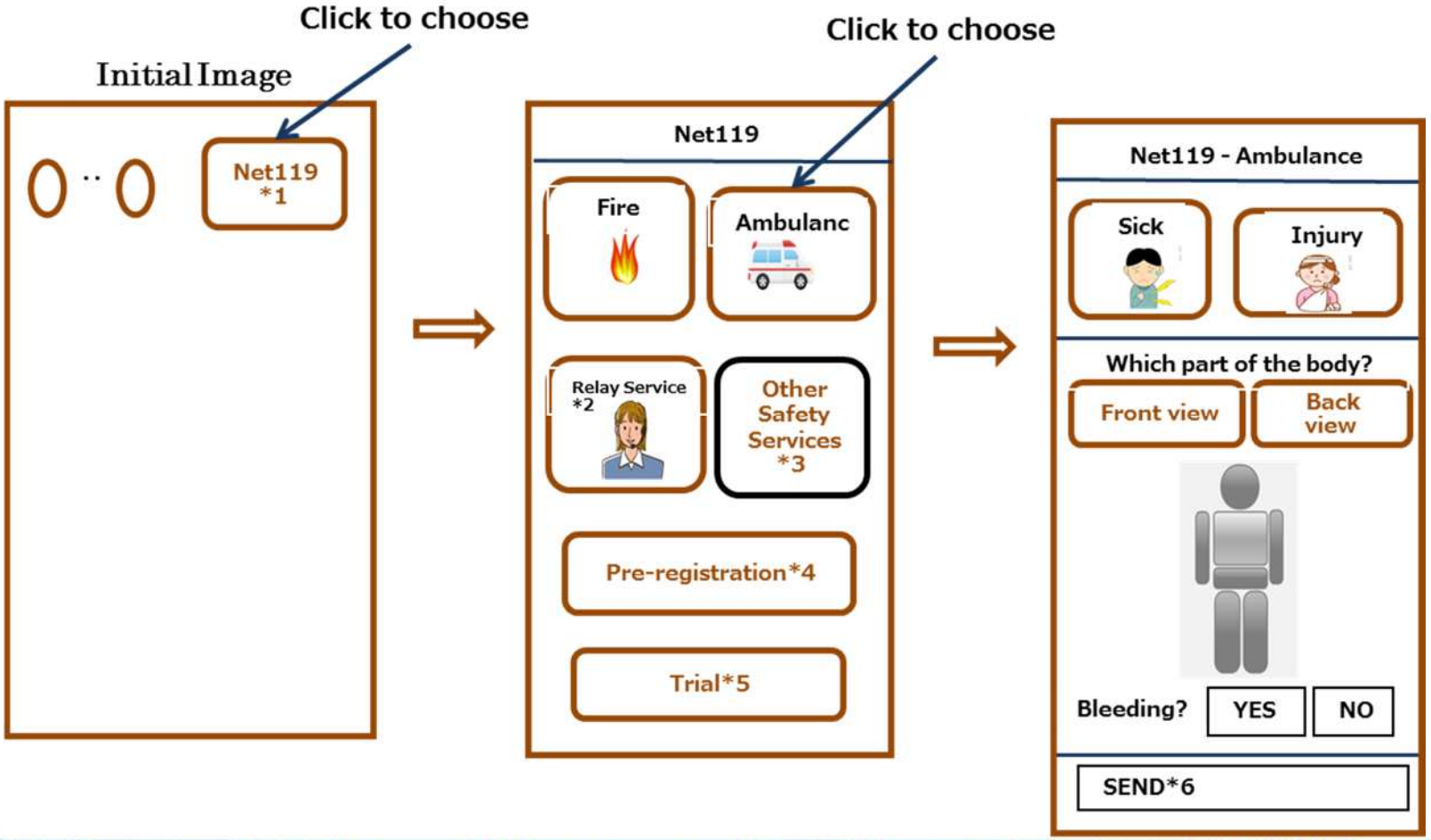
Use case examples

- Emergency call system



Use case examples

- Emergency call system
  - Smart phone interfaces for ambulance request



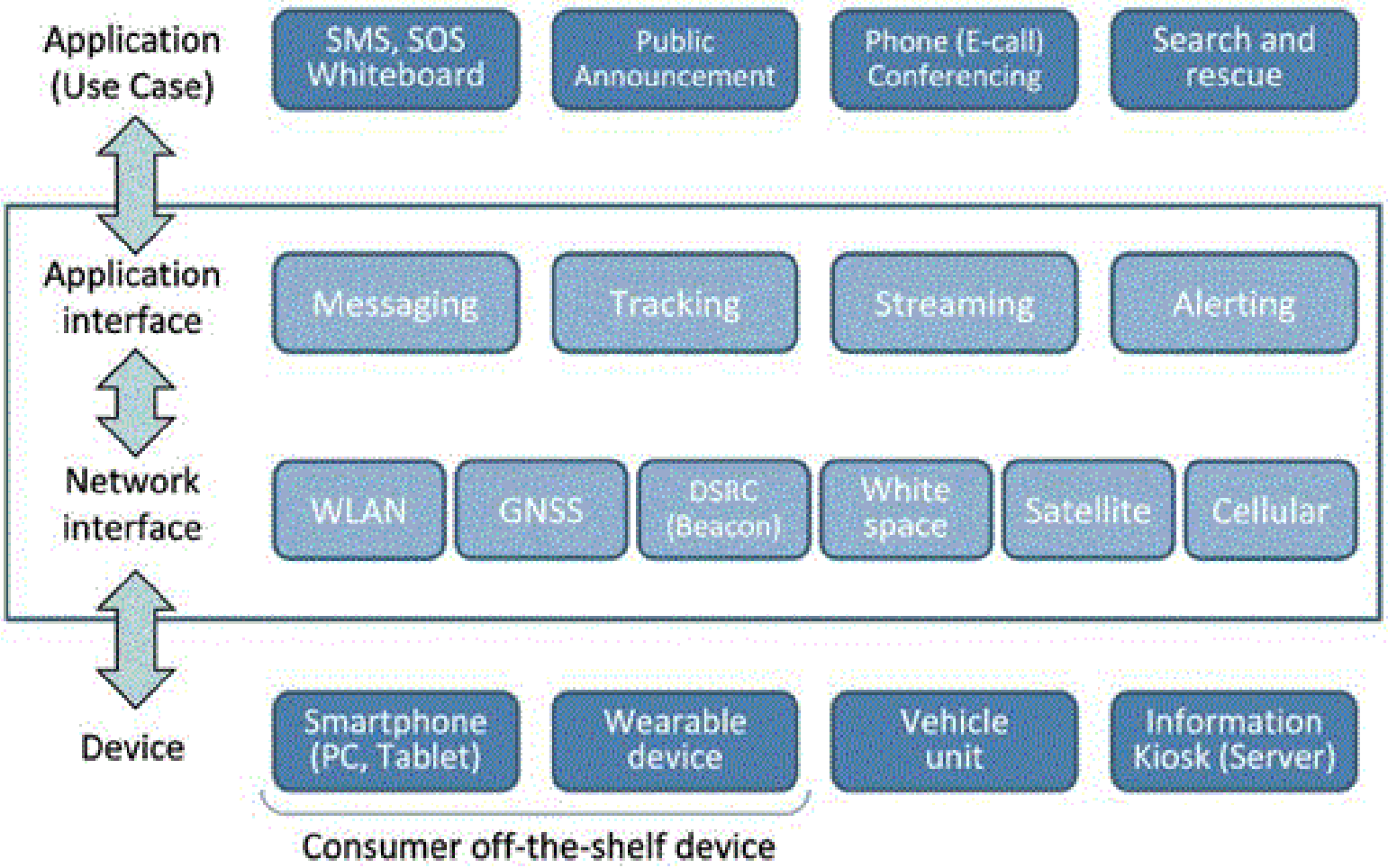
Collected Use Cases

ANNEX II Use cases of Information and Communications System using Vehicle during Disaster

NO	INPUT Nation	Use case Name	Description	Assumptions	Interactions	Results	Issues
1	IRAN	Cell on Wheels (COW)	COW is a mobile cell site that consists of a cellular antenna tower and electronic radio transceiver equipment on a truck or trailer. COWs can provide fully-functional service, via vehicles such as trailers, vans and trucks, to areas affected by natural disaster. COW network backhaul communication is enabled via terrestrial microwave, satellite and wired infrastructure.	Vehicles have cellular antenna tower and electronic radio transceiver devices User devices: Cell phones	1. People connect their cell phones to a BTS on a vehicle over 2G/3G/LTE 2. BTS on a vehicle connect to cellular network over terrestrial microwave or satellite link 3. People connect to cellular network and can use voice telephony or send/receive data	Providing cellular network coverage in disaster areas	
2	AFGHANISTAN	Vehicle Message Delivery	People post/get message from/to Vehicle	Vehicles should be equipped with HF, WLAN and Satellite terminals for transmitting data of the natural disaster warning system to the relevant agencies for public awareness and safety.	1. Vehicles have equipment to transmit data to the relevant agencies for prevention of loss and damage in area exposed to natural disaster. 2. People connect their devices to the vehicle over WLAN. 3. People post/get message among people as well as natural disaster relevant bodies.	Vehicles deliver message among people as well as natural disaster relevant agencies.	Automatic connection between the vehicles end user and relevant agencies.
3	THAILAND	Idea of WiFi on vehicle cell	Survivors are able to communicate after the disaster.	1. Vehicles, drone and networking shall be prepared. 2. Disaster information Application software on ios/android/microsoft OS installed on user device.	Survivors are able to access WiFi from WiFi vehicle cell.	Survivors are able to access WiFi to get important information to survive.	pre-installed software application required.
4	THAILAND	Mobile Communication System for Disaster Area	Rescue team/People Post and Get information via Vehicles	C2 for HQ and rescue team - Joint Communications System for Disaster Area - Digital Trunk Radio for rescue team -Personal/Vehicles Tracking -Video Streaming -Web Conference -COP Access -Internet Access			

Requirements

- System architecture



Conclusion

Use vehicles as communication hub!

1. We built the first draft standard framework.
   - Communication is very important at acute phase.
   - Template for use case collection.
2. We proposed use cases based on our experiences.
   - Search & rescue
   - Information sharing
   - Emergency call

Schedule

1. Harness use cases from all Asia-Pacific experiences.
2. Develop "Use case report" in EG-BSG at ASTAP-26, 2016.

3. Suggest building "System standard" in EG-DRMRS to ASTAP-28, 2017

Thank you!