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Real-time Disaster Response using Positioning Information and Quasi-Zenith Satellite System

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NTT DATA CORPORATION

Contents

Introduction of the Project

Red Rescue Project

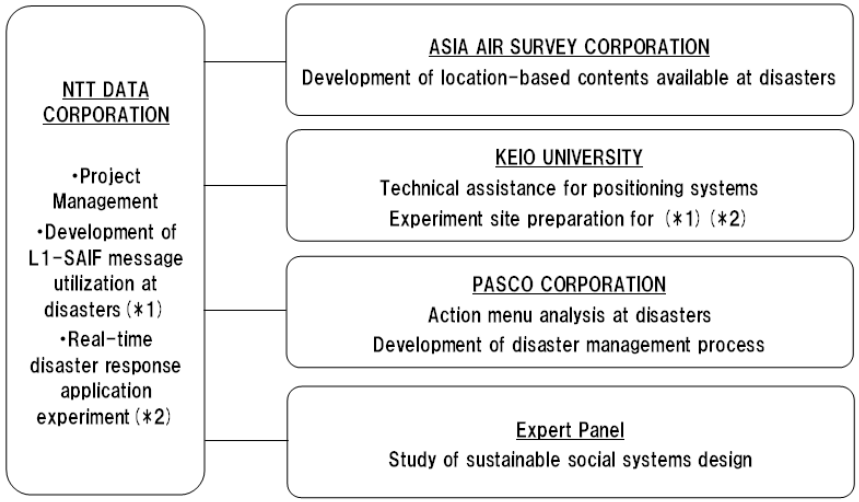
Red Rescue Project is a 3-year research project funded by MEXT (Ministry of Education, Culture, Sports, Science and Technology) since 2009.

"REal-time Disaster REsponse using Small-Capacity data from the UniversE."

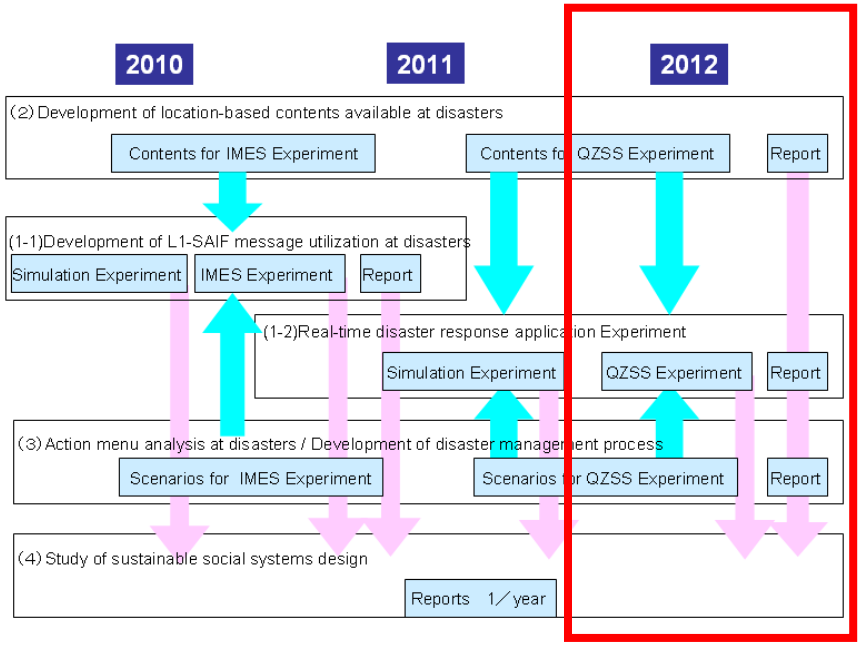
"REal-time Disaster RESponse using QZSS"

We aim to **utilize small-capacity data from satellites for FAM** using Satellite Based Augmentation System (SBAS) function.

FAM: Flexible Action Management



Project Member Structure



Project Timeline

Conceptual Chart (1)

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QZS

Key innovation

→Utilize satellite technology and location information

→Improve decision-making at disaster time

Conceptual Chart (2)

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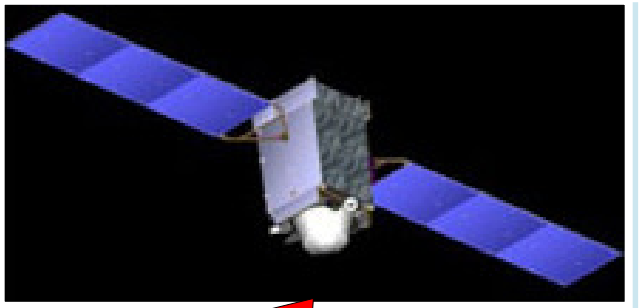
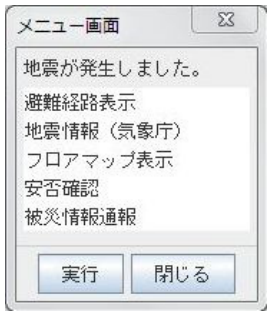
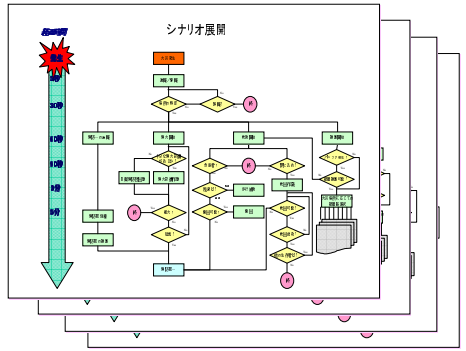




Show action menu for afflicted people to choose proper action suited to its situation.

Show direction on sat-nav to slow down on highways.



Trigger series of process or rich-contents

Red Rescue System Configuration

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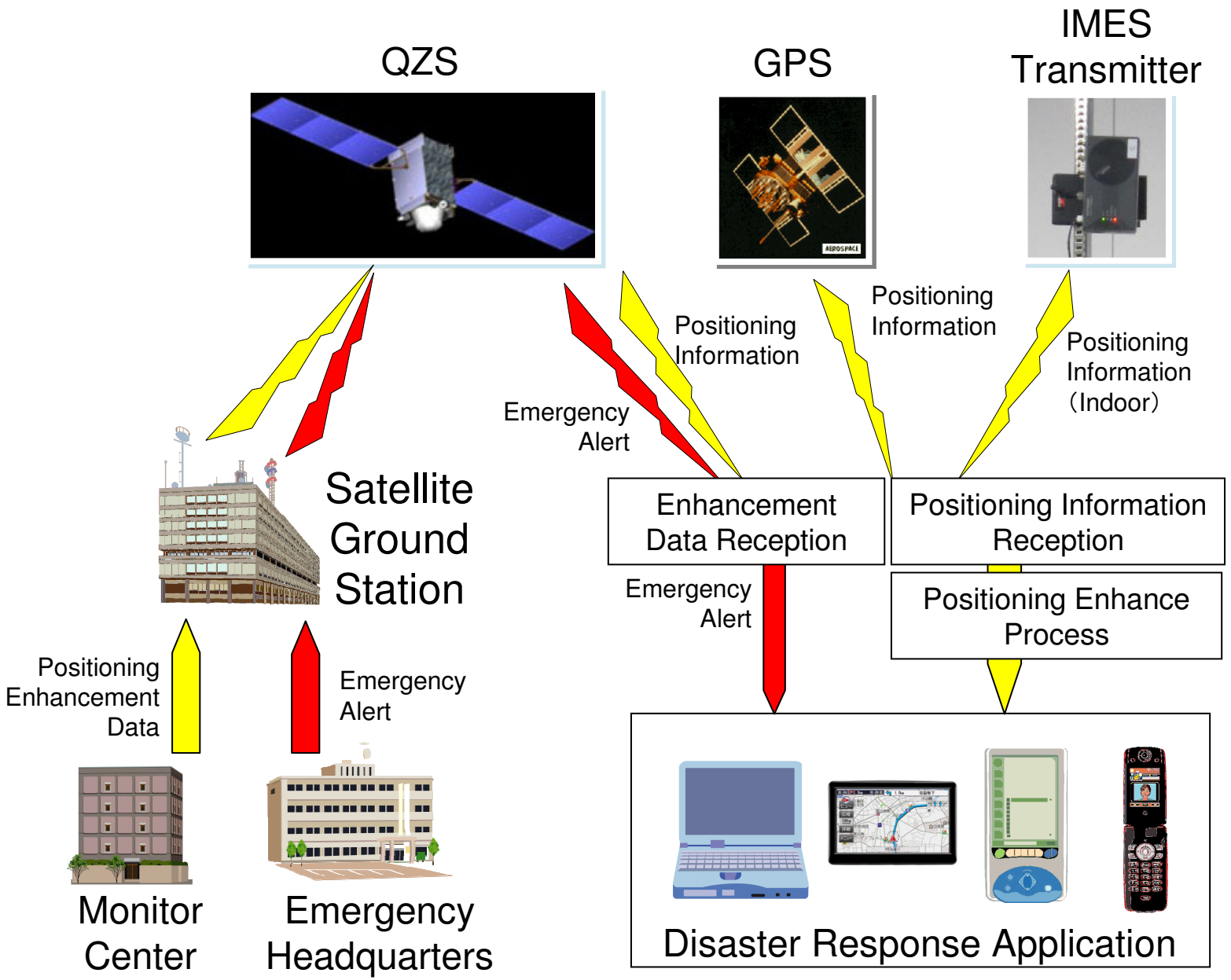
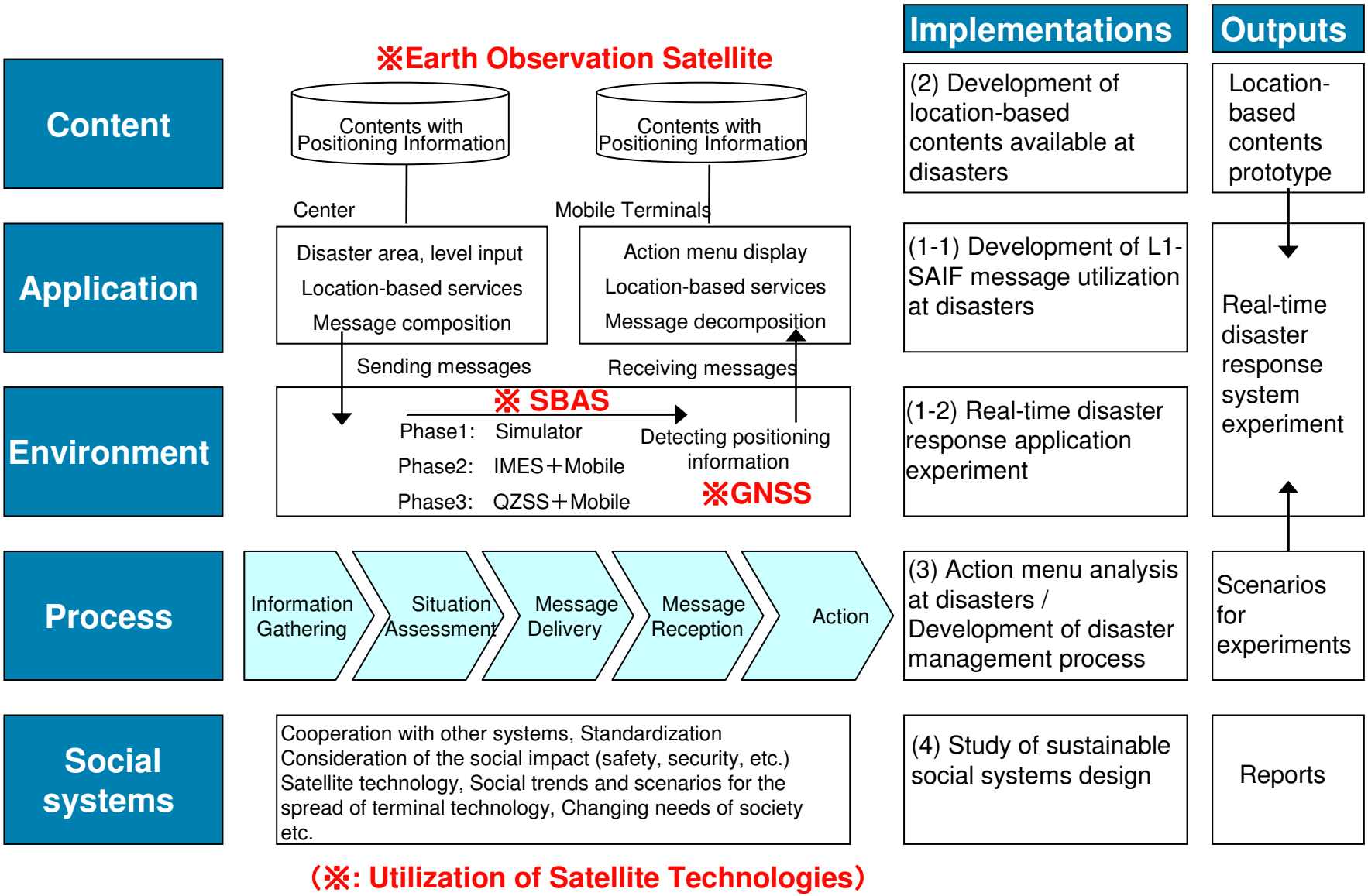


Red Rescue Project Architecture



（※: Utilization of Satellite Technologies）

Experiment in March 2011

Experiment Layout

Evacuation route for major earthquake : Stairs G/H (Up only)

Yokohama PORTA Layout (Underground mall)

PRN1 IMES Transmitter

LAN1 WIFI Access Point

Evacuation route

S End Start / End point

Evacuation route for major flood : Stairs D (Up only)

Map source : http://www.yokohamaporta.jp/shopguide/index.html annotation by NTT DATA

Experiment Structure (@Yokohama PORTA)

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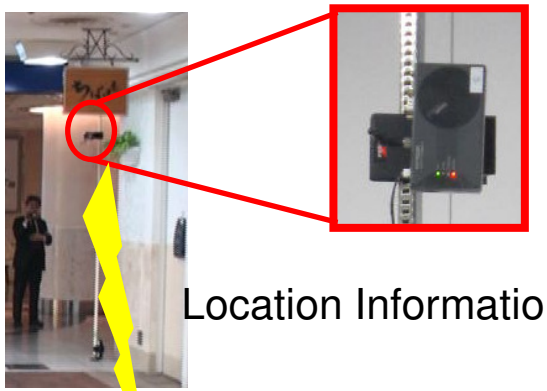
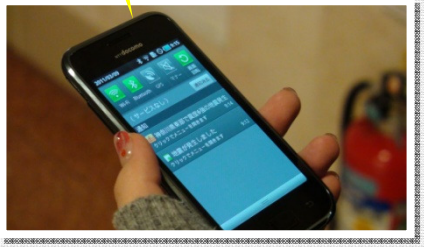


IMES Transmitter
(Battery-powered)

Location Information

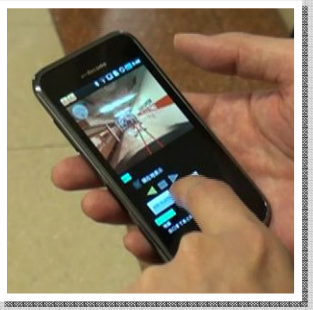
Action Menu is displayed by the Selective Reception AP using Emergency L1-SAIF Data and Location Information.



Selective Reception Application on Android Smartphone
(via Receiver + Windows Mobile PDA)

Receive & Show information

Show action Menu



Launch 3D Contents Application for evacuation

Emergency L1-SAIF Data

Wireless LAN access point (Battery-powered)

Emergency L1-SAIF data transmit simulator

Experiment Scenario

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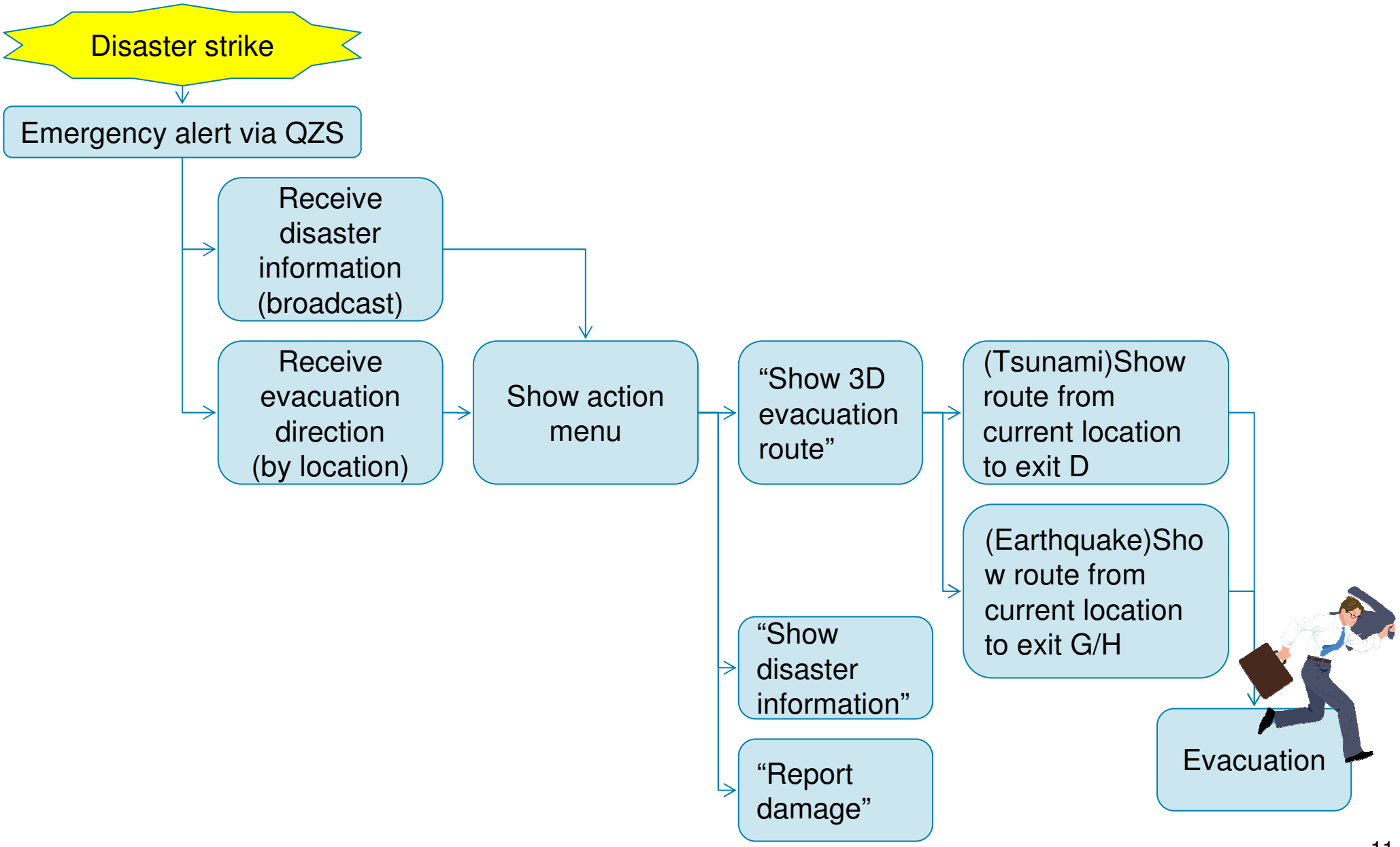

Experimental flow

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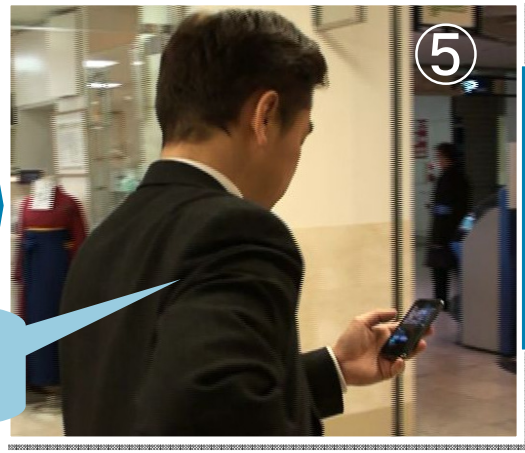
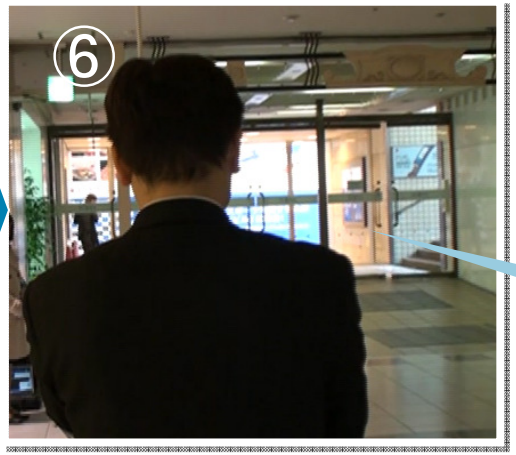
Receive disaster information (broadcast)

Receive evacuation direction (by location)

Select action from action menu (Show evac. Route)

Evac. route from current location to exit is displayed





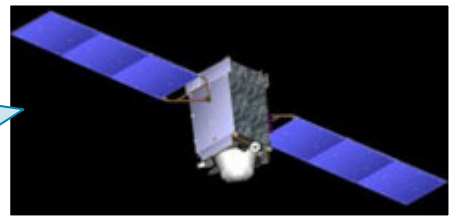
Move to exit

Exit

Planned experiment in Nov.2011

Outline

We finally use actual QZS for transmitting Emergency Alert



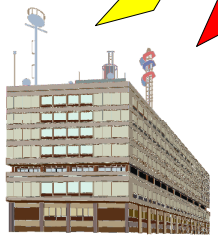
QZS

GPS

IMES Transmitter

Positioning Information

Positioning Information (Indoor)

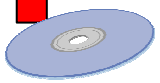


Satellite Ground Station

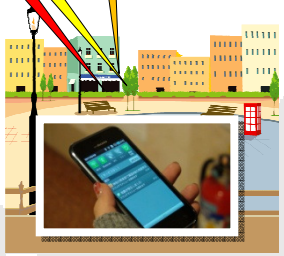
Positioning Enhancement Data

Emergency Alert (Simulated)

SPAC



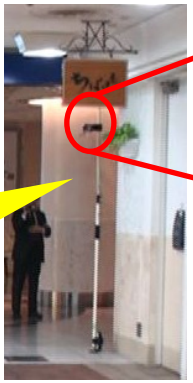
RedRescue



1) Receive simulated emergency alert at several places
2) It launches disaster action software for evacuation experiment

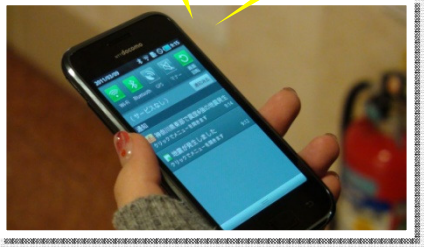
Experiment Structure

QZS



IMES Transmitter
(Battery-powered)

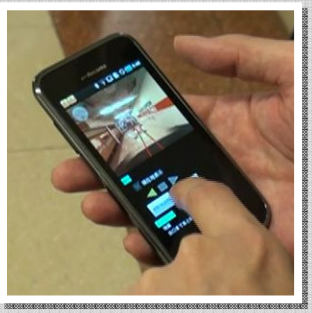
Location Information



Selective Reception Application
on Android Smartphone
(via Receiver + Windows Mobile PDA)

Receive & Show
information

Show action
Menu

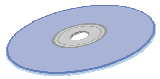


Launch Application
for evacuation

Emergency L1-SAIF Data

QZS

SPAC



RedRescue

Conclusions

Conclusions

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- We launched Red Rescue Project and researched user needs of FAM and system requirements by system design management methods.

- We could demonstrate the feasibility of utilizing small-capacity data for FAM on real-time disaster response.
  - Information are useless if you only have them.
  - Use them for controlling something.
  - We can utilize a small data as a trigger for flexible actions.

- The next step is to combine user requirements with the solutions on QZSS environment.

Thank you for your attention.

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