Impact Assessment Efforts to reduce pedestrian traffic accidents

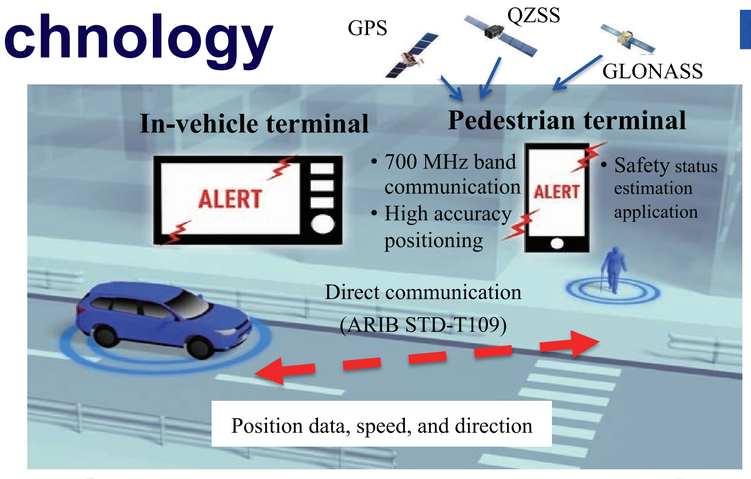
Objective

Vehicle to Pedestrian(V2P) Communication Technology

Panasonic

Realization of a safety support system
for pedestrians to reduce traffic fatalities

- Alert pedestrian or driver timely under potential dangerous situations
- Positional message exchange between terminals via direct communication



【 System Image of V2P Communication 】

Research and Development

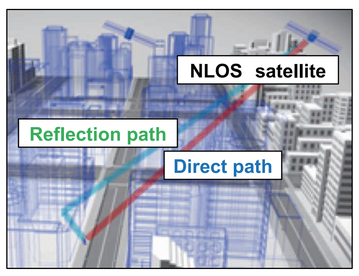
Realization of effective prototype terminal for pedestrian support

Panasonic

Pedestrian Positioning

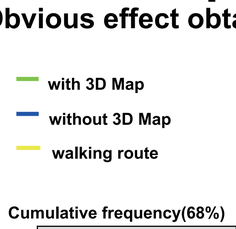
Improvement in high-rise building areas

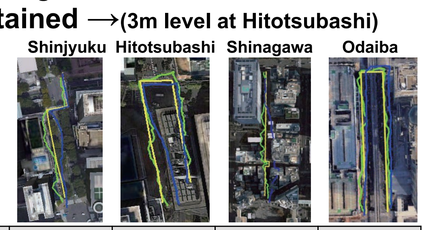
[Method]
Based on 3D map with height information of buildings, reflection path with respect to building walls being used for positioning.*1



*1: Technology and license supplied from the University of Tokyo
Source : Urban Pedestrian Navigation Using Smartphone-Based Dead Reckoning and 3D Map-Aided GNSS

[Evaluation results] target: horizontal error ≤3m
Obvious effect obtained ⟶(3m level at Hitotsubashi)





Cumulative frequency(68%)

	Shinjyuku	Hitotsubashi	Shinagawa	Odaiba
without 3D Map (GPS, GLONASS, QZSS, Galileo)	10.1	4.1	9.4	5.7
with 3D Map (3D: GPS, GLONASS, QZSS)	5.7	3.7	6.5	5.6

[m]

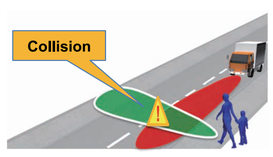
Safety Status Estimation

Alert timely under potentially dangerous situations

[Scenes Supported]

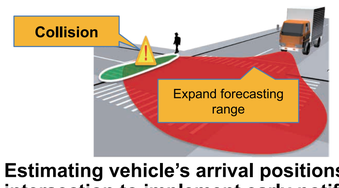
Collision prediction ➡ notification ON

Collision prediction



Collision predicted when arrival positions may overlay

Additional prediction at intersection



Estimating vehicle's arrival positions at intersection to implement early notification

[Scenes Not Supported]

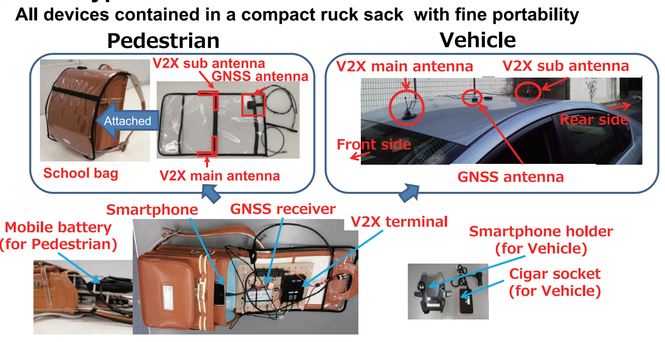
State prediction ➡ notification OFF

Scenes	Method
Inside vehicle	• Moving Speed ≥ 20 km/h • Satellite signal strength estimation • Moving state estimation
Inside building	• Satellite signal strength estimation • Radio elevation angle estimation
At overpass	• Map and position information • Altitude estimation by embedded air pressure sensor
Walking in sidewalk	• Sidewalk link map • Walking direction estimation

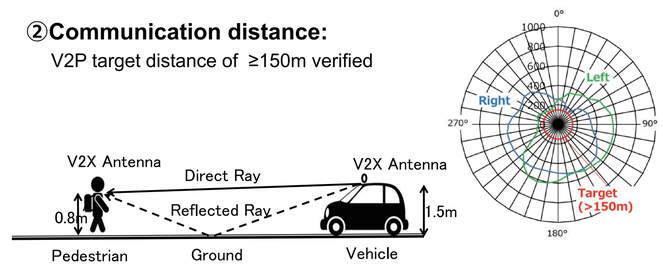
Terminal Prototyping

Performance (portability, antenna) fulfilled for 2018 large-scale demonstration

①Prototype Terminals:
All devices contained in a compact ruck sack with fine portability



②Communication distance:
V2P target distance of ≥150m verified



Large-scale Demonstration Experiment

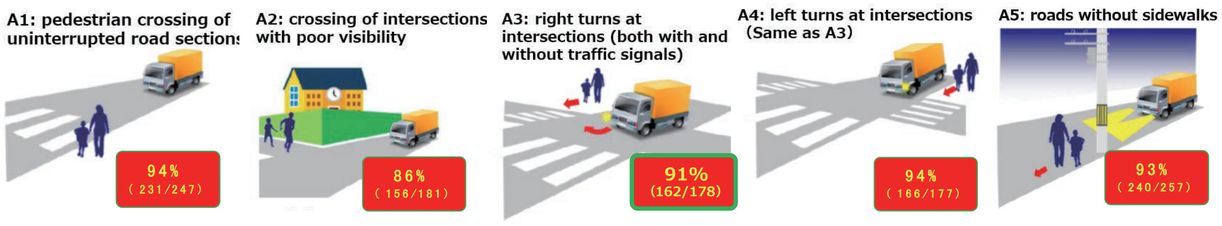
Verification of mutual attention function & Verification of effectiveness under the actual traffic environments

NIPPON KOEI

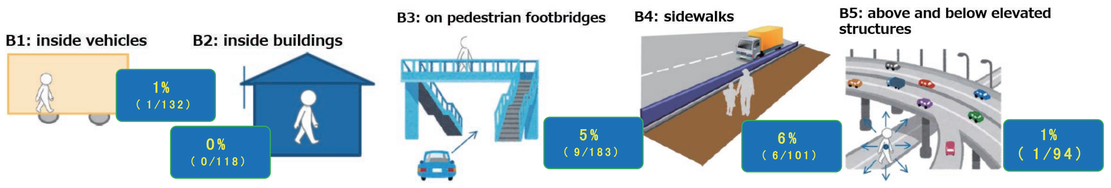
Verification of mutual attention function

■ **Repeat verification of proper operation for scenes pedestrian assistance is necessary/unnecessary**

(A) Rate that worked correctly in a situation where support is needed



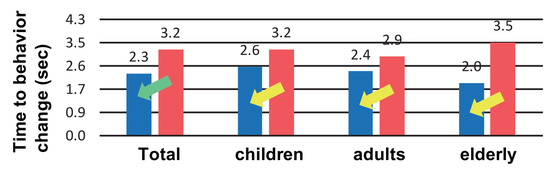
(B) Rate that worked incorrectly in a situation where support is unneeded



Verification of effectiveness under the actual traffic environments

■ **Experiment with senior citizens, adults and children as monitors in the Tokyo Odaiba area**

⟶As a result of using V2P terminal, pedestrians and drivers confirm that they take a safer action.



⟶Many people are expecting service of V2P