

*United Nations International Conference on Space-based Technologies for Disaster Risk Reduction  
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# **GNSS for Early Warning Information Platform**

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# Asian Disaster Reduction Center (ADRC)

- ✓ Regional Center for DRR in Asia and the Pacific
- ✓ UNIDNDR, 1987
- ✓ Yokohama Strategy, 1994
- ✓ Established in 1998
- ✓ Turkey joined as 31<sup>st</sup> member country
- ✓ Asian Conference on Disaster Reduction 2019, Nov 25 - 27 Turkey





# Positioning Satellites

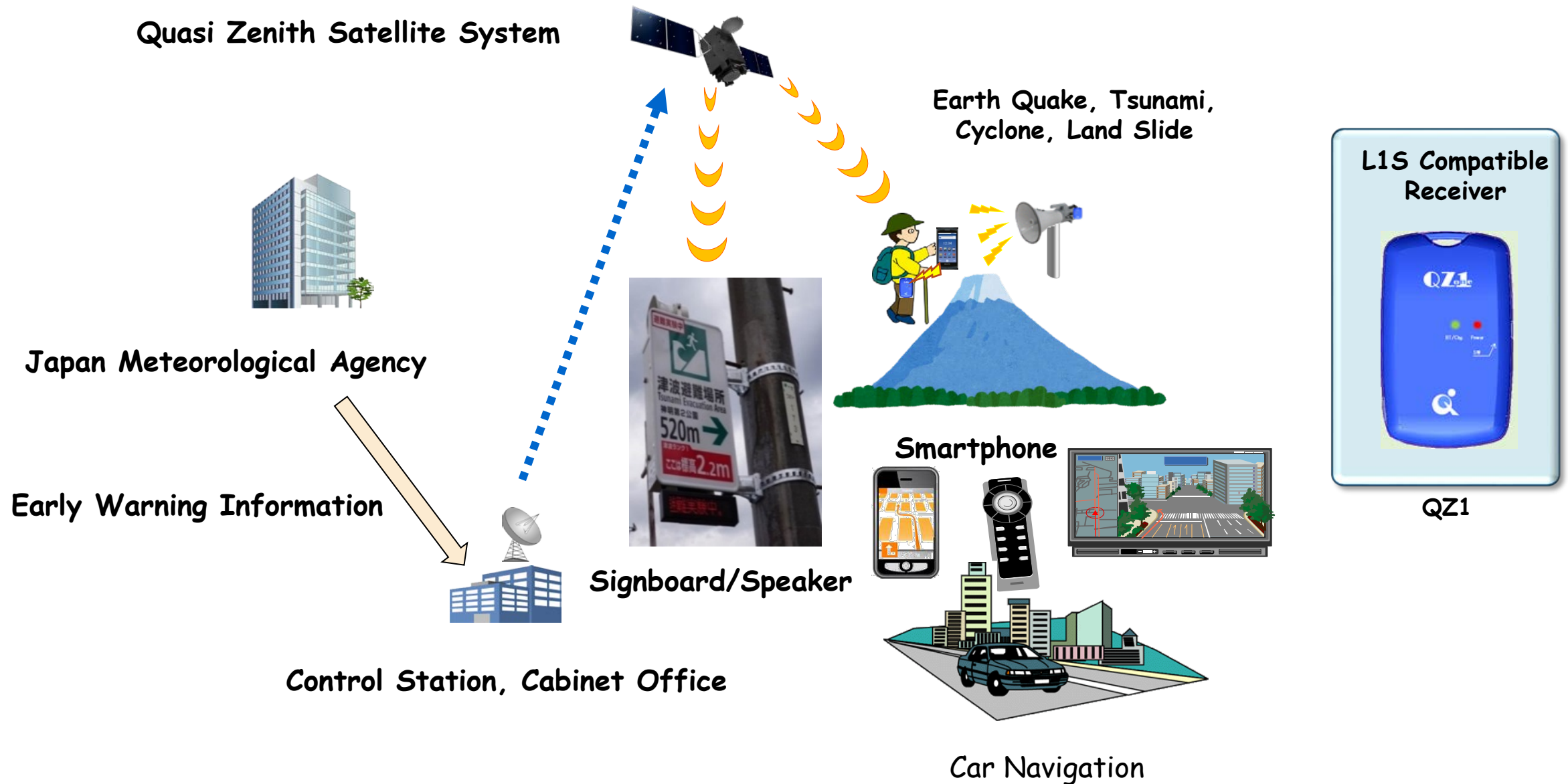


QZSS

## GALILEO

- ✓ USA : GPS (Global Positioning System) 【 ~10m】
- ✓ Russia : GLONASS (year2011~, 24units) 【50~70m】
- ✓ Europe : Galileo (year2016~, 30units) 【~1m】
- ✓ China : BeiDou (year2000~, 3units, year2020~ 32unite) 【~10m】
- ✓ India : IRNSS (year2016~, 7units) by ISRO 【~5m】
- ✓ Japan : QZSS (year2018~, 4units / year2023, 8units) 【~cm】

# QZSS for Early Warning Information Platform



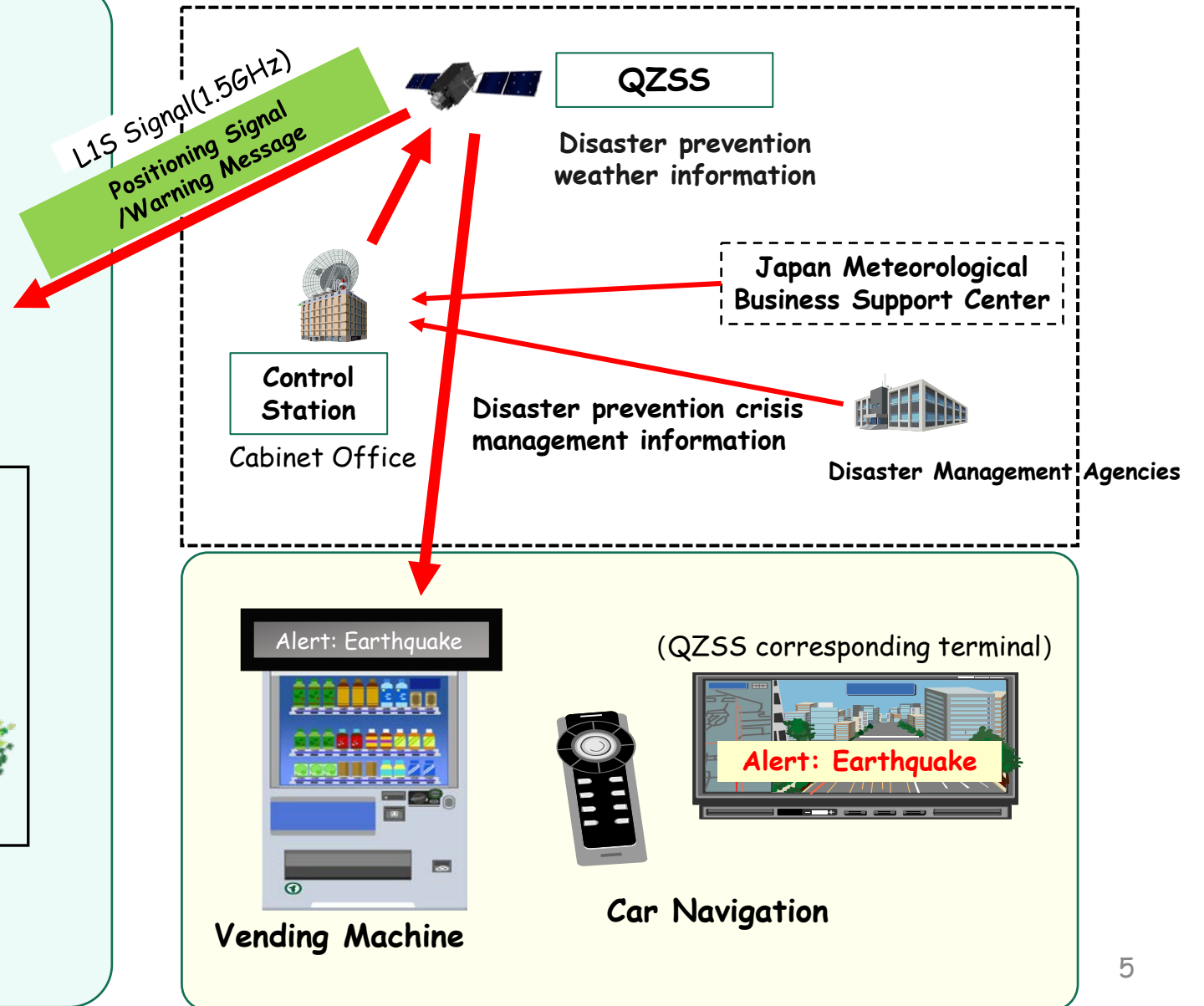
# Applications



**Coastal Area**  
(Earthquake, Tsunami)

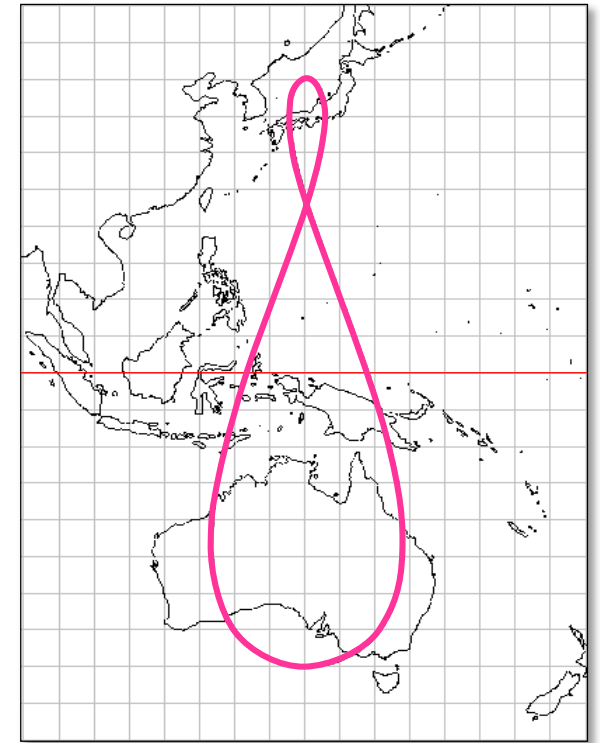
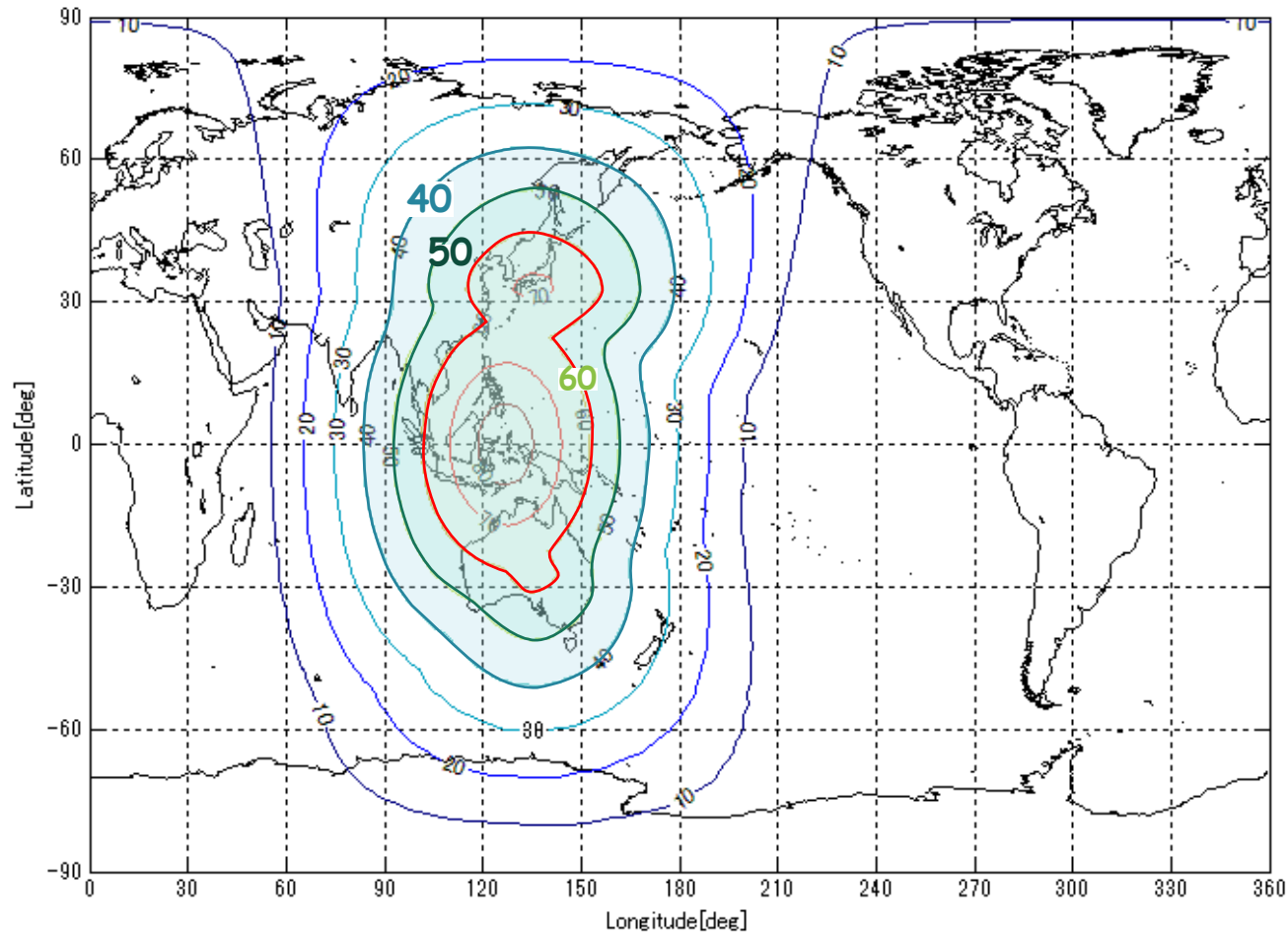


**Mountain, River**  
(Eruption · Flood)





# QZSS signal is available with each elevation angle



QZSS orbit;  
one geostationary  
and  
tree figure-eight

# EWI Platform with QZSS

- Redundancy & robust in case ITC system is not available
- Affordable, GNSS signal receiver 100 US\$/unit
- Flexible with smart phone case, with loud speaker, car navigation
- Message available in local language, text and voice, and beep sound
- Collaboration with European Space Agency for wider coverage

# Progress

- Common information protocol with European Space Agency
- GNSS signal receiver installed in smart phone case, less than 100 US\$
- Validation study, done in Japan with car navigation
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- Preparing for feasibility studies in ASEAN in the 1<sup>st</sup> stage