EMERGENCY WARNING SERVICES via GNSS signals

Thirteenth Meeting of the International Committee On Global Navigation Satellite Systems

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Emergency Warning Service Background

- **Japan Cabinet Office, National Space Policy Secretariat**
  - QZSS Satellite Report for Disaster and Crisis Management (DC Report)
  - DC Report service has been started in November 1, 2018

- **European Commission:**
  - Completion of a Galileo based EWS study foreseen for December 2018
  - EWS concept to be further refined and discussed with our stakeholders

L1S Receiver
Now on Sale!
QZSS DC-REPORT Service provision concept

★ QZSS DC Report service

DC Report is the service which Disaster Prevention Information (Earthquake, Tsunami, etc.) and crisis management are delivered. Supply sources of information are JMA (Japan Meteorological Agency) and the other organizations.
Galileo EWS Service provision concept

Competent Emergency Centre

DECISION

Galileo EWS Interface

EWS Message
Bit level

Galileo Ground Segment

Population
Common Message Definition:

- QZSS Message Type 44:
  - Use 120 Bits out of 184 for broadcast on L1S

- Galileo EWS I/NAV Word:
  - Use 120 Bits for Broadcast on E1B and E5B

Common Alerting Protocol (CAP):

- Could be used by EWS provider worldwide:
  - To encode their alert messages (Fire/Tsunami/Floods/...)
  - Then send to QZSS and/or Galileo for broadcast

JOINT QZSS Galileo Emergency Warning Service ICD!
Japanese government is budgeting to R&D activity for Common Message Definition

- It is part of Cross-ministerial Strategic Innovation Promotion Program (SIP) (SIP is existing 5 years program)
- Construct Information Architecture of Disaster Information under constrained data volume (184bit)
- Common Message Format definition activity is included

2018-2020:
- Making common message format with Galileo
- Demonstration experiment using common message format

2021-2022:
- Making improved edition reflecting demonstration experiment
- Progress deployment strategy to Asian countries
Common Operational Concept:

National Emergency Centre

QZSS ground station

OR/AND

QZSS L1S

Galileo E1B, E5B

Navigation System

QZSS ground station

Galileo ground station
JOIN QZSS AND GALILEO TO WORK ON
A COMMON GNSS EMERGENCY
MESSAGE DEFINITION !

JOIN QZSS AND GALILEO TO WORK ON
A COMMON GNSS EWS
OPERATIONAL CONCEPT!
Australia Demonstration Teams

Melbourne VICTORIA

Logan QUEENSLAND

Upper Swan WESTERN AUSTRALIA

Kingscliff NEW SOUTH WALES

Australian Government Geoscience Australia

EMV Emergency Management Victoria

TELESPAZIO

SES NSW State Emergency Service
Australia
Demonstration
Organization

QZSS

Galileo

ThalesAlenia
Space
TELESPAZIO

GEOSTATIONARY SATELLITE Observational System

Australian Government
Geoscience Australia

Queensland Fire and Emergency Services

Department of Fire and Emergency Services

NSW State Emergency Service

Emergency Management Victoria

STAKEHOLDERS
SCENARIO 2, Multiple synchronous alerts with Galileo
Bush fire in Western Australia
Flood in New South Wales
Flood in Queensland
Alert broadcast simulated with Galileo SiS (I/NAV, GST)

SCENARIO 1, Single alert with QZSS and Galileo
Bush fire in Melbourne suburbs
Alert broadcasted thru QZSS L1S SiS
Alert broadcast simulated with Galileo SiS (I/NAV, GST)
Objectives: Test the joint QZSS Galileo Emergency Warning Service ICD concept with QZSS

Test Scenario:

- A bush fire occurs in Carrum Downs in the suburb of Melbourne, close to residential areas
- The test scenario is based on a true bush fire managed by EMV in 2017.
- An EWS message broadcasted through QZSS MT44 is received by a smartphone
- The alert message is decoded on the smartphone and displayed to the smartphone user.
Our first EWS message of 120 bits sent from a GNSS Satellite!

HEX: 4B452D0CE3734E4E3A1AF788240018

- Message type: initial alert
- Country ID: Oceania/Australia
- Provider ID: EMV
- Event category: Environment
- Event sub-category: Forest Fire
- Severity: Severe
- Event Onset: 2:30 PM local time
- Expected duration: 1 hour
- Guidance library: National/Australia
- First Ellipse: Evacuate
- Second ellipse: Stay inside
JOINT GALILEO QZSS TEST TRIAL: 16-19 /09/2018

Based on received data (information) from GALILEO side via offline
① Making MT44 message data (offline) by QZSS
② Broadcasting MT44 as training message via satellite.

Prepared receiver yourself or using L1S Receiver

Australia
14:04:09 111
Forest fire Execute Stay inside
14:06:09 111
Forest fire Execute Stay inside
14:10:09 111
Forest fire Evacuate to reach meeting point Carrum Downs Plaza
14:16:08 111
Forest fire Evacuate to reach meeting point Carrum Downs Plaza
14:29:48 111
Forest fire Evacuate to reach meeting point Carrum Downs Plaza

14:01:04 111
Forest fire Execute Stay inside
14:01:42 111
Forest fire Evacuate to reach meeting point Carrum Downs Plaza
14:02:13 111
Forest fire Evacuate to reach meeting point Carrum Downs Plaza
14:03:03 111
Forest fire Evacuate to reach meeting point Carrum Downs Plaza
14:09:03 111
Forest fire Evacuate to reach meeting point Carrum Downs Plaza
14:11:32 111
Forest fire Evacuate to reach meeting point Carrum Downs Plaza
14:15:33 111
Forest fire Evacuate to reach meeting point Carrum Downs Plaza
14:16:13 111
Forest fire Evacuate to reach meeting point Carrum Downs Plaza
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THANK YOU