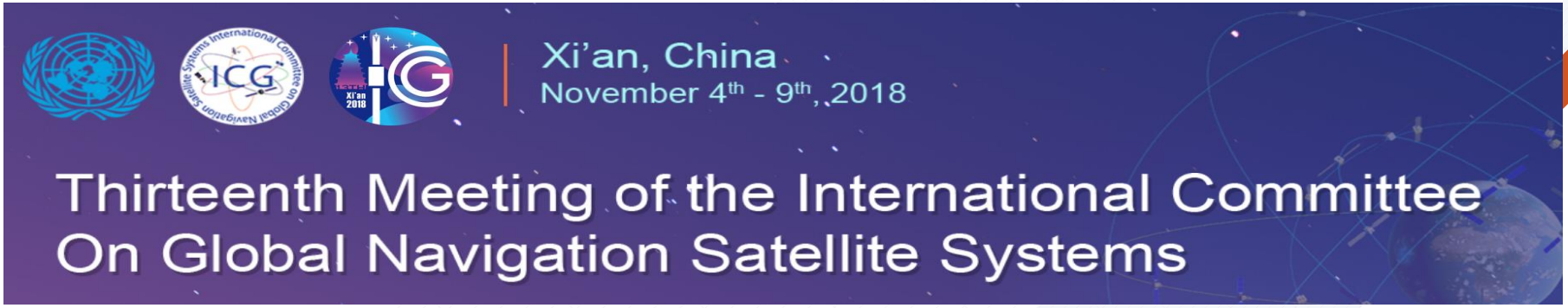
EMERGENCY WARNING SERVICES via GNSS signals

Cabinet Office
National Space Policy Secretariat

European Commission



European Commission and National Space Policy Secretariat, Cabinet Office, Japan
Frédéric Domps, European Commission
Yasuhiko KAWAZU, Cabinet Office, Japan

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

L1S Receiver
Now on Sale!

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

Cabinet Office
National Space Policy Secretariat

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.

TSUNAMI

VOLCANO

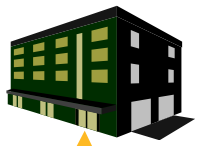
EARTH QUAKE

WATER FOOLD

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

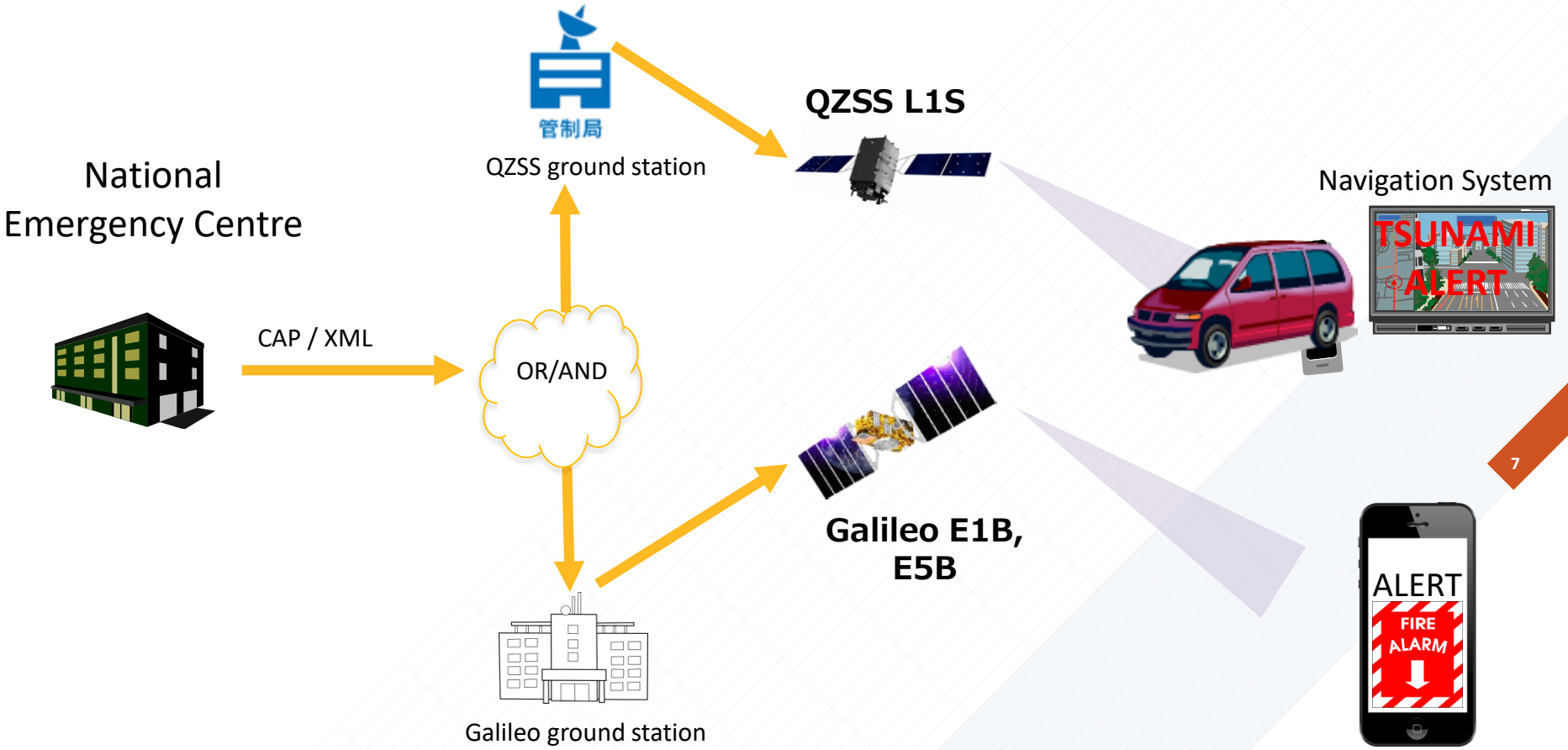
JOINT QZSS Galileo Emergency Warning Service ICD !

QZSS Activity for Common Message Definition

- **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:



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

Logan
QUEENSLAND

Melbourne
VICTORIA

Australian Government
Geoscience Australia

EMV
EMERGENCY
MANAGEMENT
VICTORIA

TELESPAZIO
a LEONARDO and THALES company

Upper Swan
WESTERN AUSTRALIA

DFES
Department of Fire & Emergency Services

Kingscliff
NEW SOUTH WALES

SES
NSW STATE EMERGENCY SERVICE

Australia Demonstration Organization

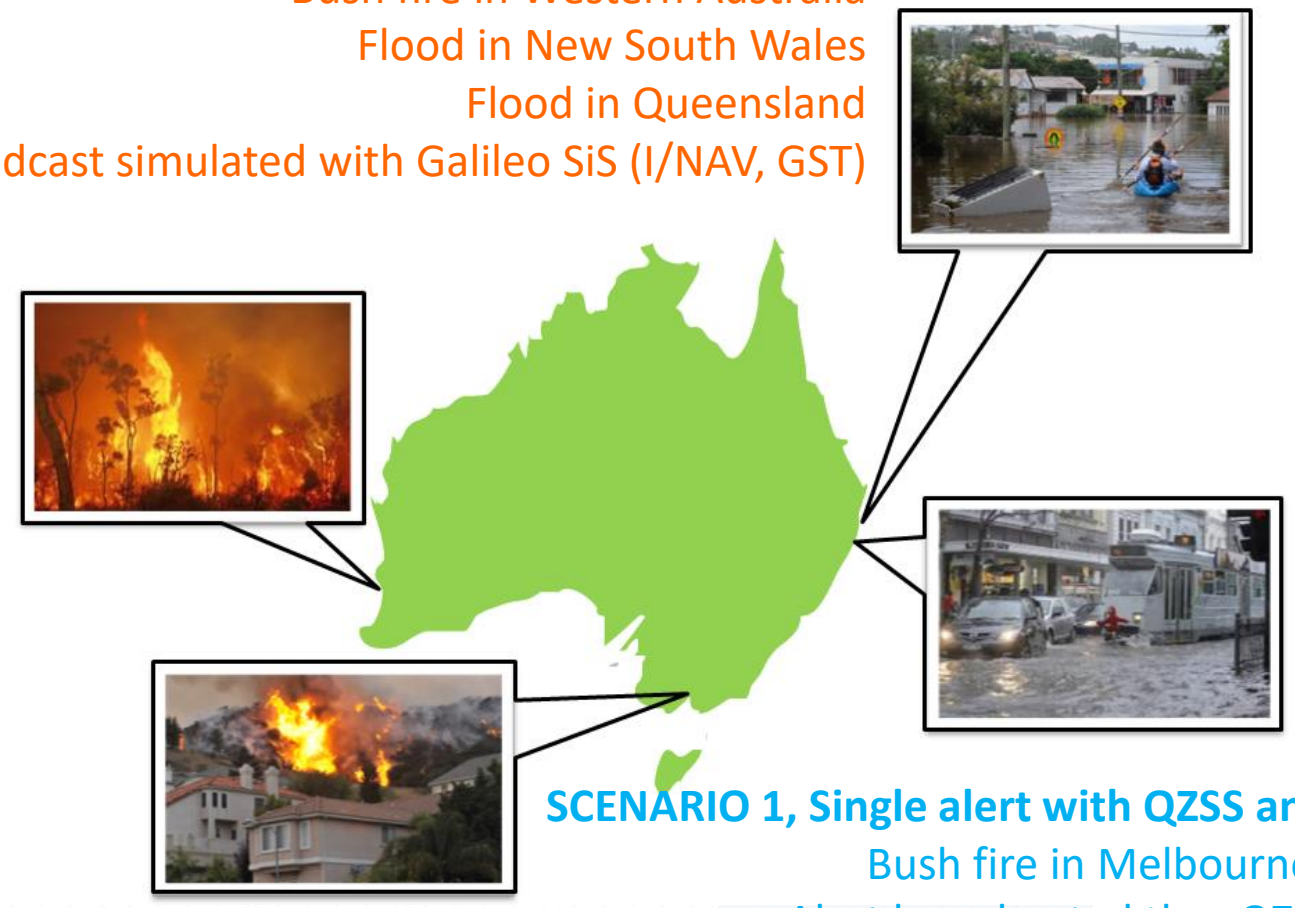
SCENARIO 2, Multiple synchronous alerts with Galileo

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

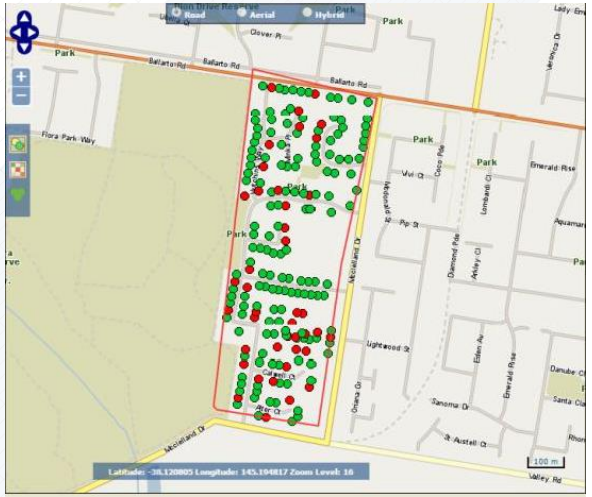
Bush fire in Melbourne suburbs

Alert broadcasted thru QZSS L1S SiS

Alert broadcast simulated with Galileo SiS (I/NAV, GST)

JOINT Galileo QZSS test trial: 16-19 /09/2018

- 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.



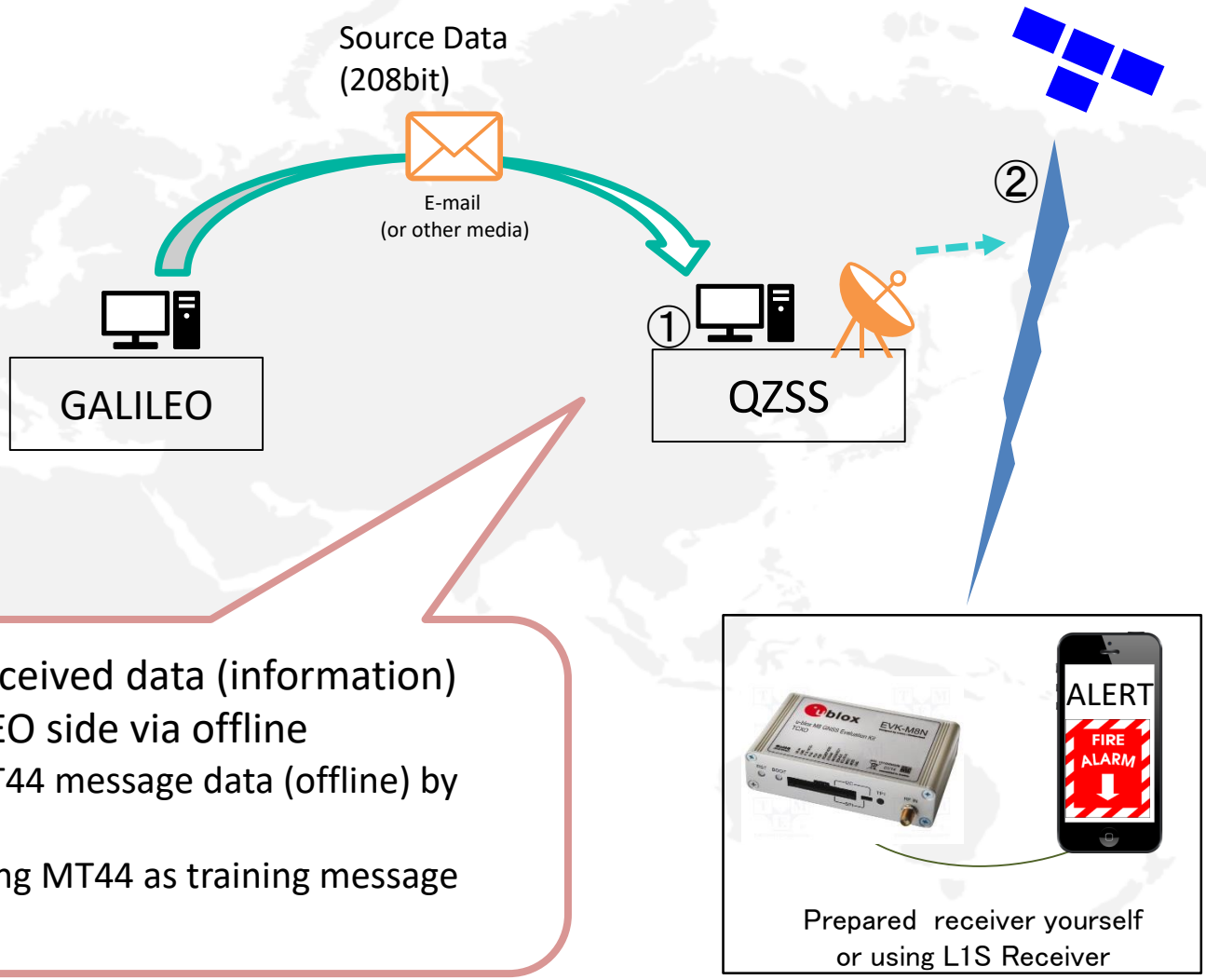
JOINT Galileo QZSS test trial: 16-19 /09/2018

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

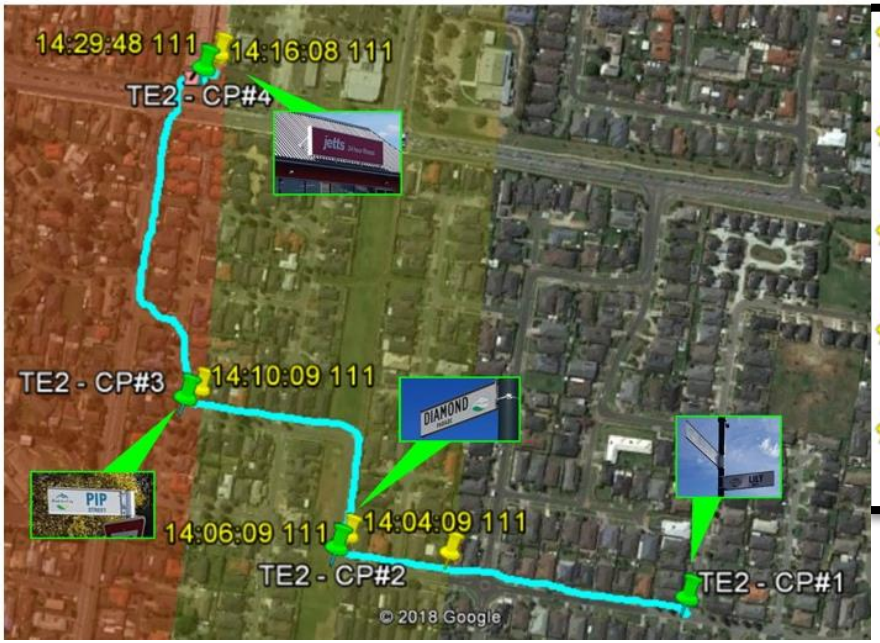


Based on received data (information) from GALILEO side via offline

①Making MT44 message data (offline) by QZSS

②Broadcasting MT44 as training message via satellite.

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

Frédéric Domps, European Commission
Yasuhiko KAWAZU, Cabinet Office, Japan

THANK YOU

© EC/ECHO/Viktorija Jeras