GRALLE, a EU initiative for a GALILEO-based Emergency Warning System
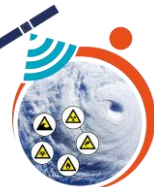
Uberto Delprato
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Agenda

- Who we are

- The vision behind GRALLE

- A new concept for Emergency Warning

- The system and its functionalities

- Where we are now...

- ... and a timeline for GRALLE

GRALLE in a nutshell

- **G**alileo-based **R**eliable **A**utomatic and **L**ow **L**atent **E**mergency warning service

- Funded by **European Commission**
  - Start: February 2017
  - End: December 2018

- Objective: to investigate the potential interest for a global service broadcasting alerts/warnings to populations using the European Galileo satellites

Who we are

- Thales Alenia Space, France
  - European leader in Satellite & Satellite systems design and manufacturing
- Telespazio, France
  - European leader in Satellite services provider
- Intelligence for Environment and Security, Italy
  - European leader in interoperable solutions for emergency Services
- STMicro-electronics, Italy
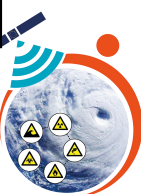 - European leader in products and solutions for Smart Driving and Internet of Things
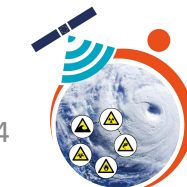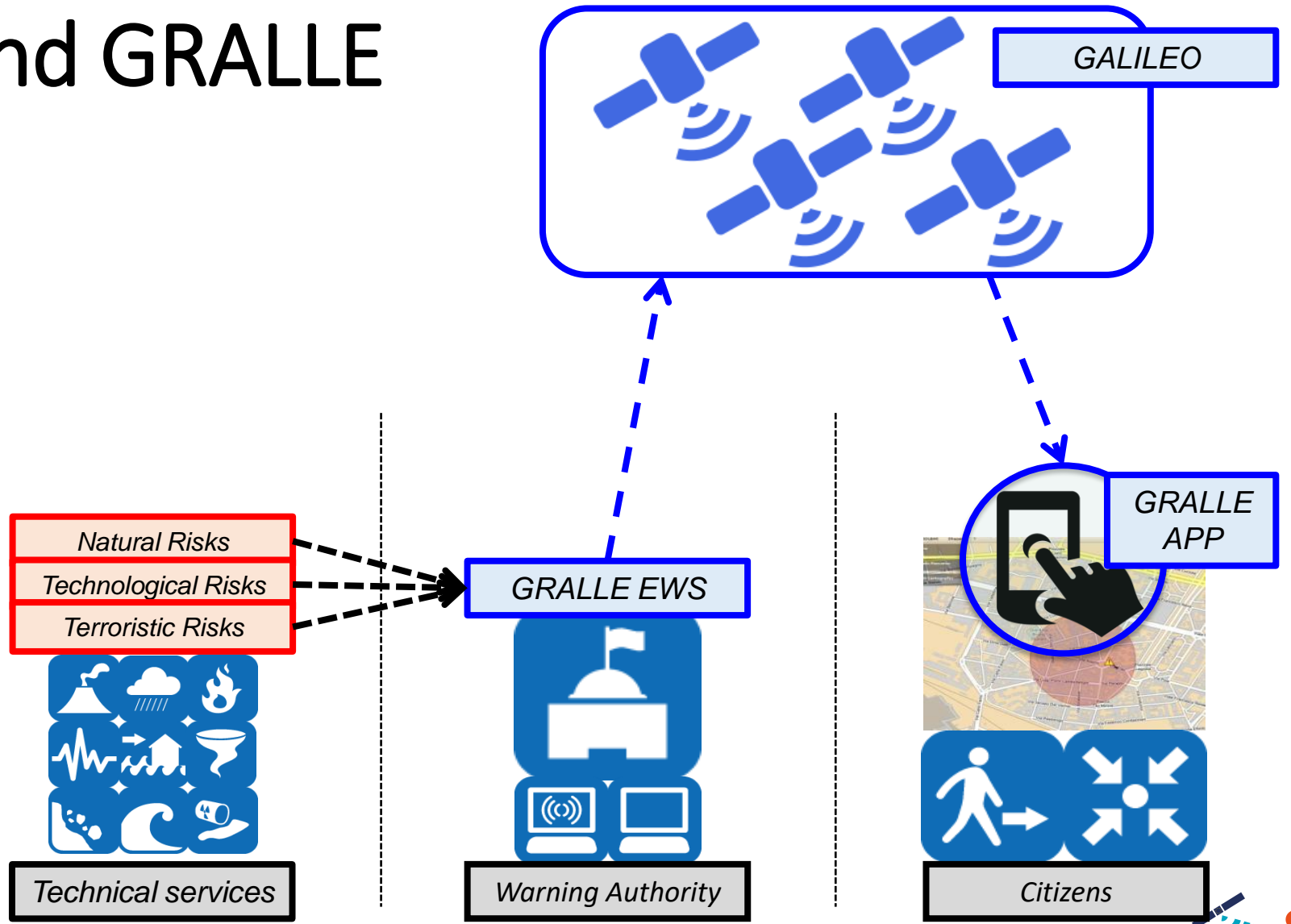
Galileo: European Global Navigation Satellite System

- 30 satellites in Medium Earth Orbit (23 222 km of altitude)

- Worldwide coverage

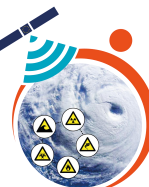- 6 to 10 satellites visible at any time from any place in the world
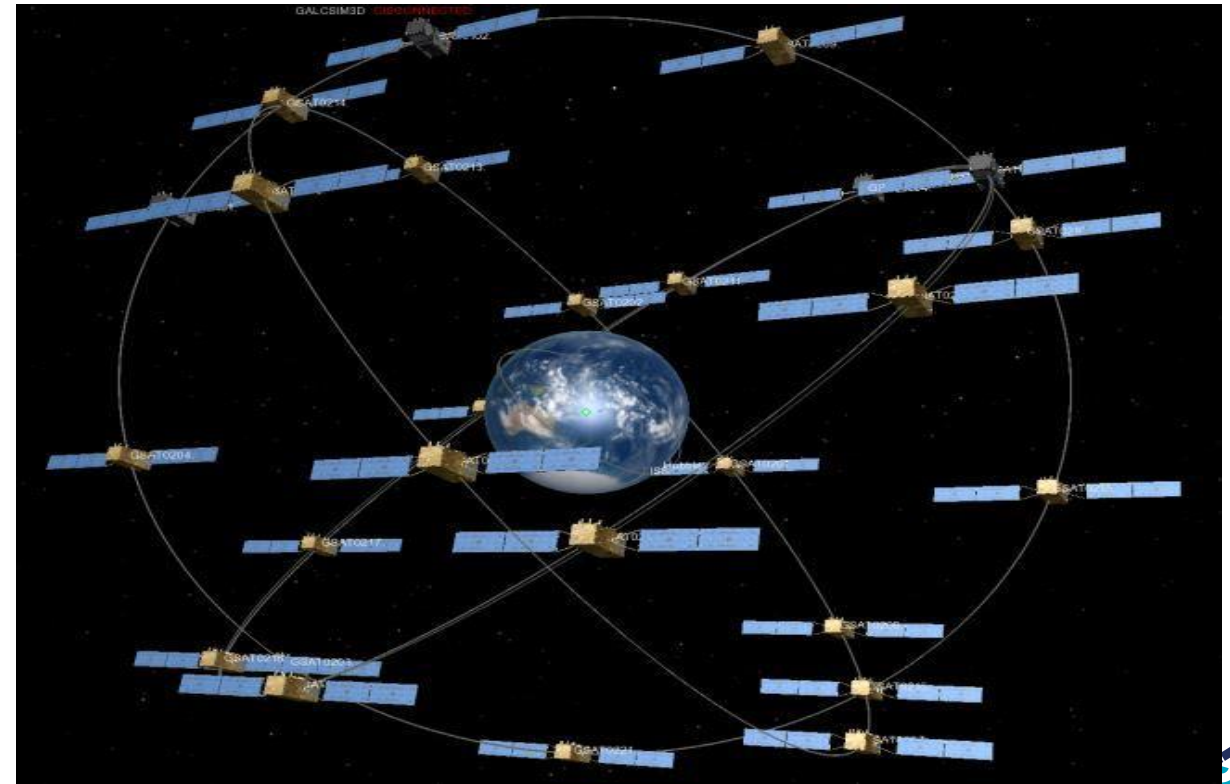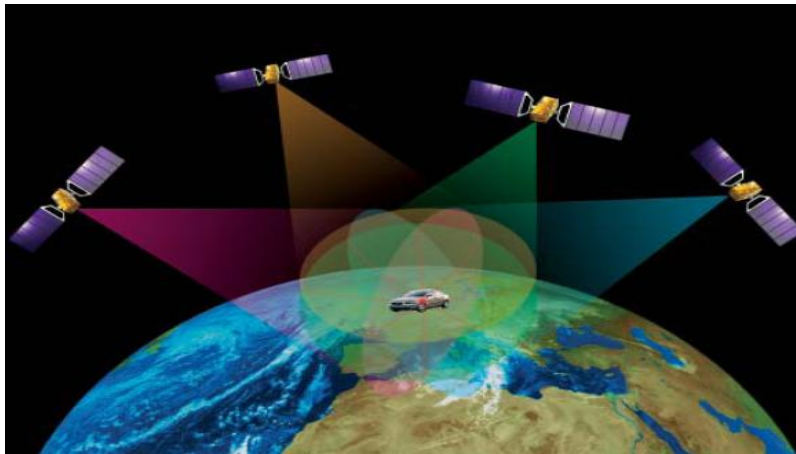
The vision behind GRALLE

GALILEO

GRALLE CONCEPT

- Warning to citizens
- No latency
- Reliable delivery
- Geo-targeting
- Dedicated mobile App
- No internet required
- Group-targeted messages
- Display of guidance to react

Natural Risks

Technological Risks

Terroristic Risks

GRALLE EWS

GRALLE APP

Technical services

Warning Authority

Citizens

A new concept for Emergency Warning

- Low latency to transmit alerts: mainly automatic and global coverage

- High reliability: secured and resilient service to the user

- Global and standardised

- Flexible geographic targeting

- Flexible information delivery

- Multiple-language management

- Delivery of guidance to react

- No access to the internet required for receiving the alerts

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The system and its functionalities

- Galileo Emergency Service Provider (GESP);

- Galileo Core infrastructures, including the Galileo Mission System (GMS) and the Galileo Space Segment;

- GEWS monitoring network (reference Galileo-compatible GNSS receivers distributed over large geographical areas)

- Galileo-compatible GNSS receiver (component of the end-user terminal)
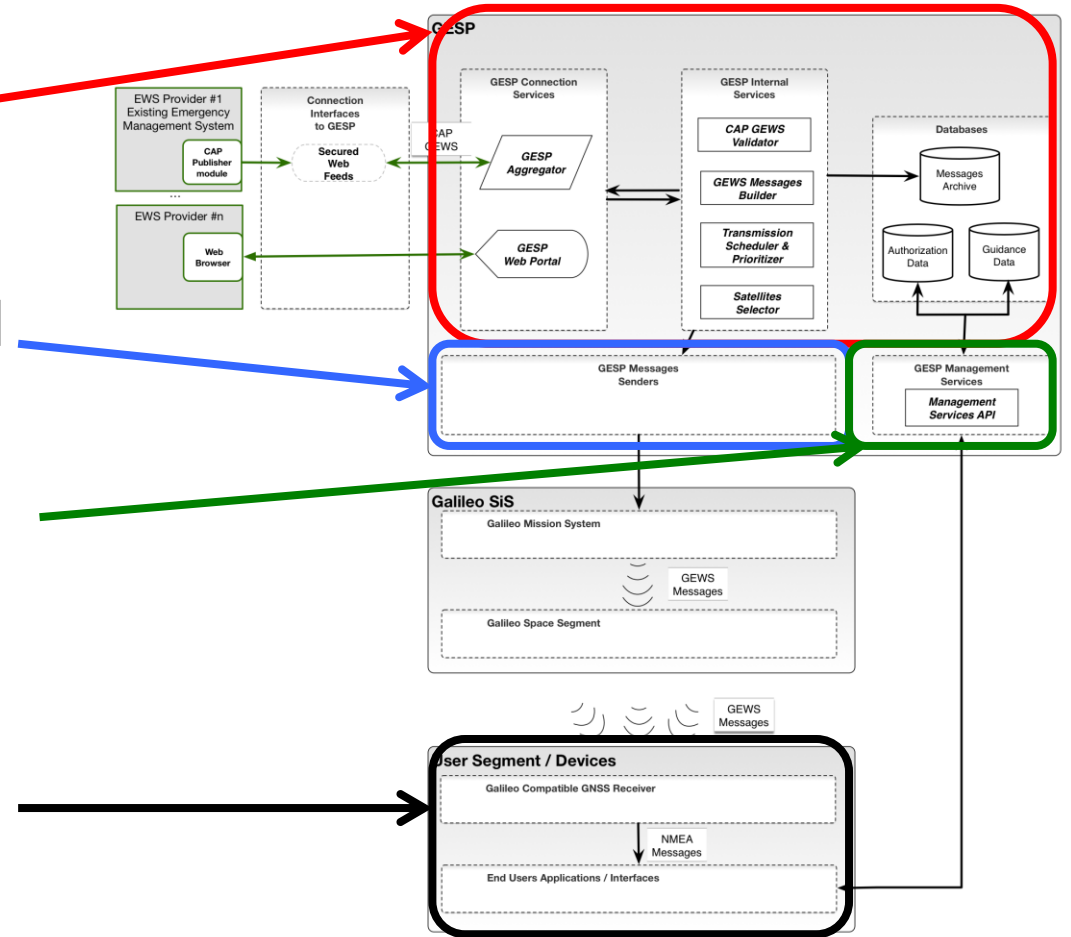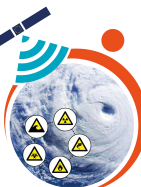
The system interfaces (1)
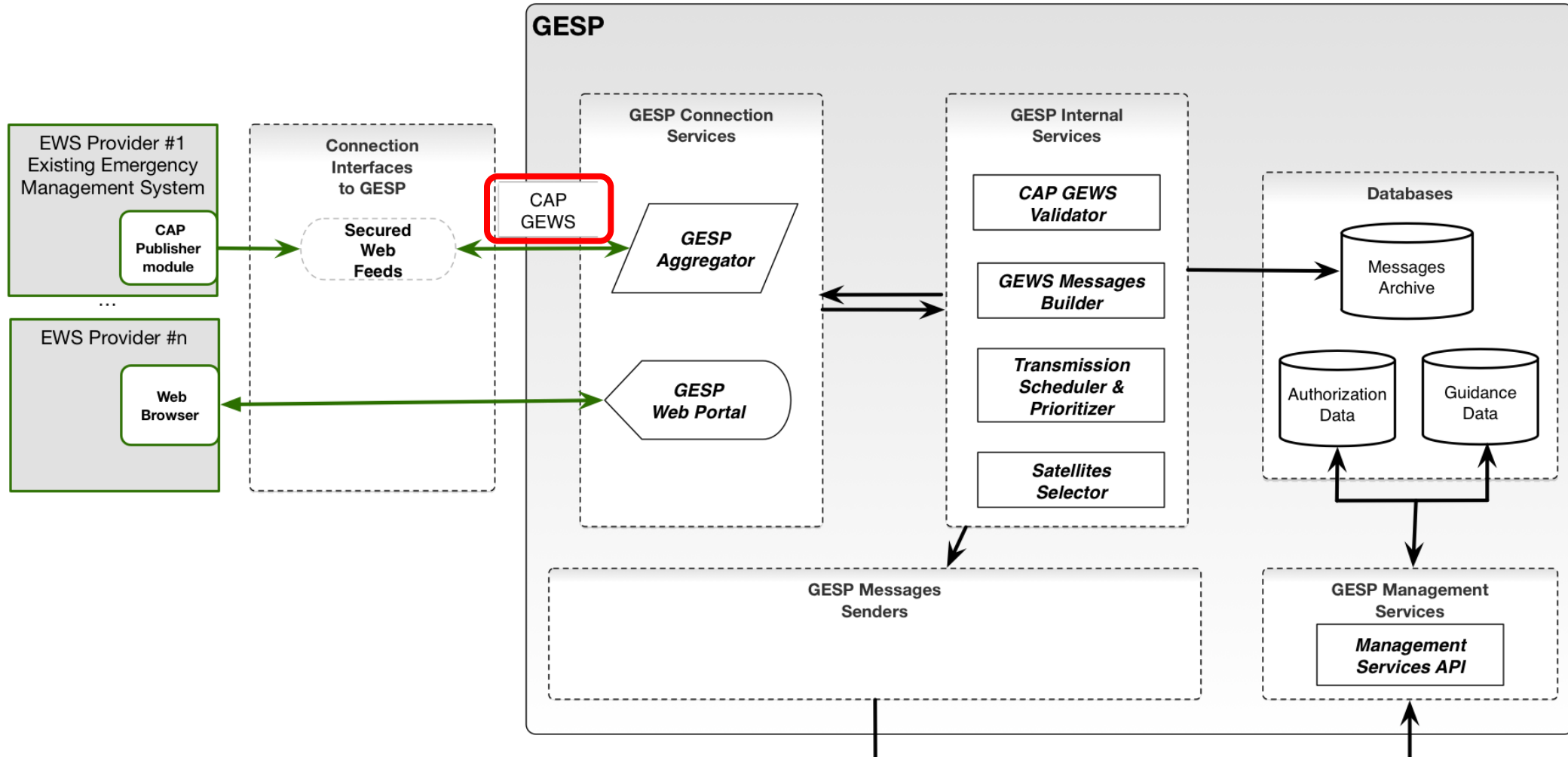
The system interfaces (2)
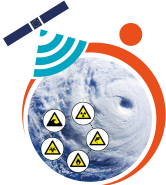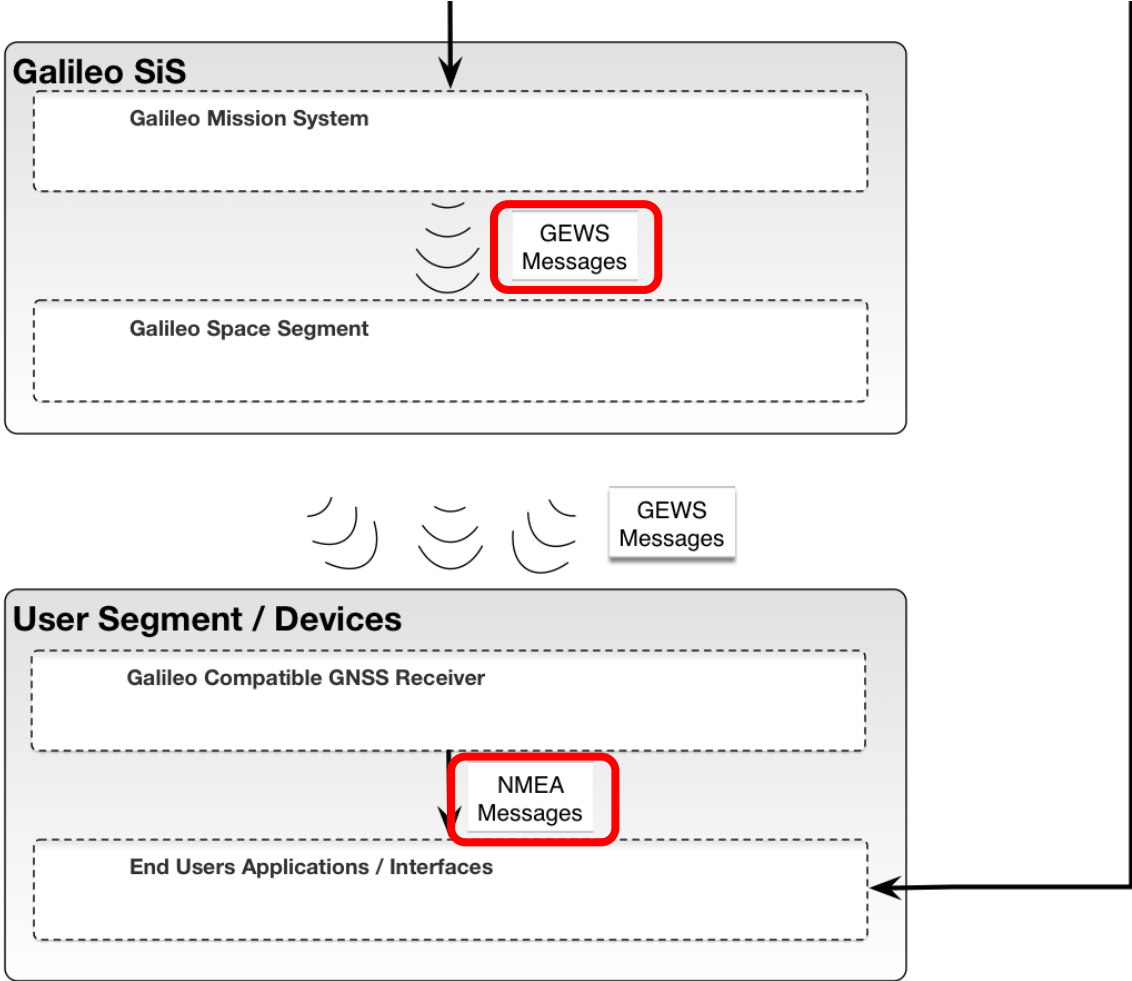
Content of the Signal in Space

- Country
- Provider
- Event Category
- Event sub-category
- Guidance standard
- Response Type

- Instruction
- Severity
- Event Onset
- Expected duration
- Geographic area and Axis
- Parameters (depending on the event)

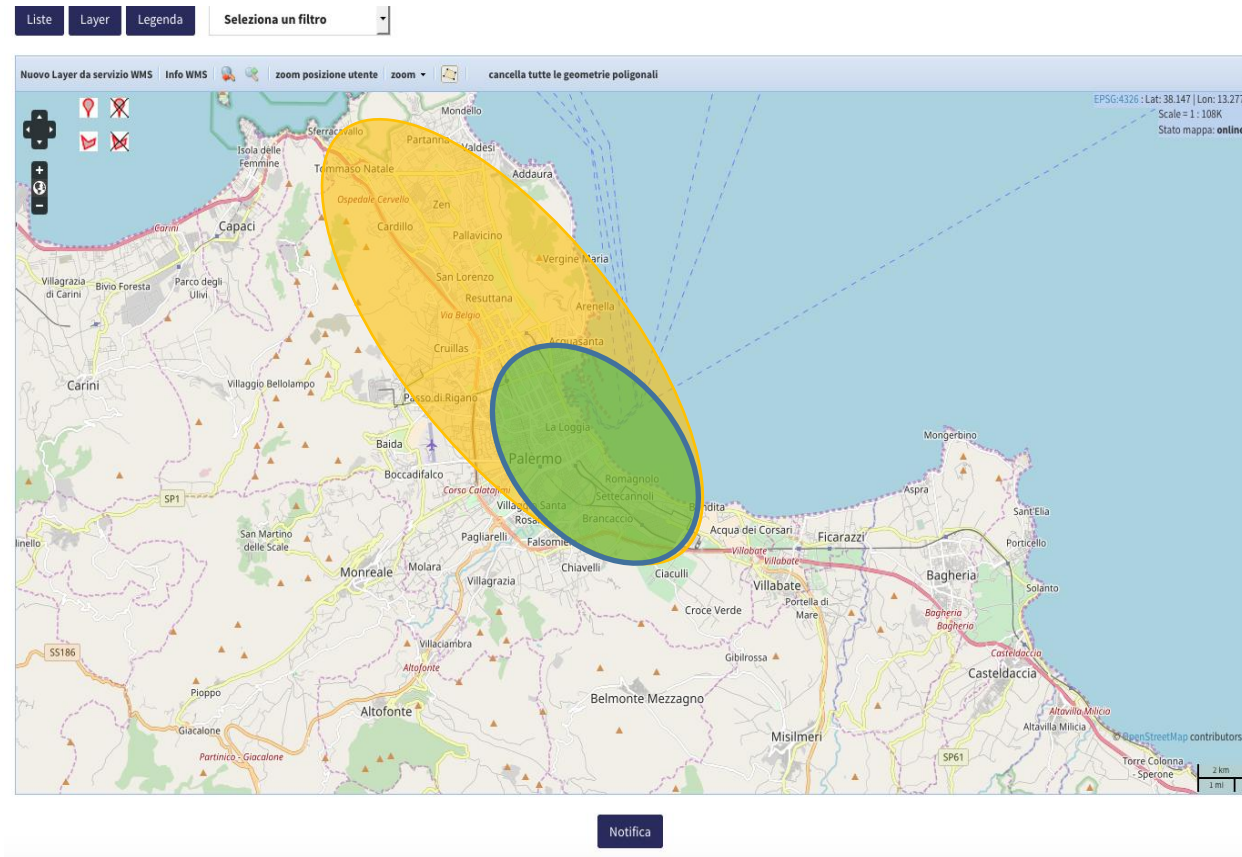The system can address two ellipsis (one contained into the other)

Ability to cope with multiple events

- It is estimated that the system can manage 6 Emergency messages at the same time (thanks to the GALILEO coverage)

- The end-to-end cycle for distributing an alert is estimated in 1 minute.

- Each alert message should stay "in space" for 3 minutes for allowing the terminals to properly receive and decode it.
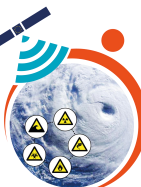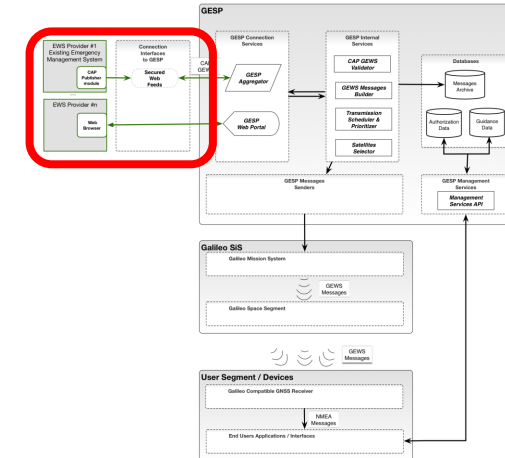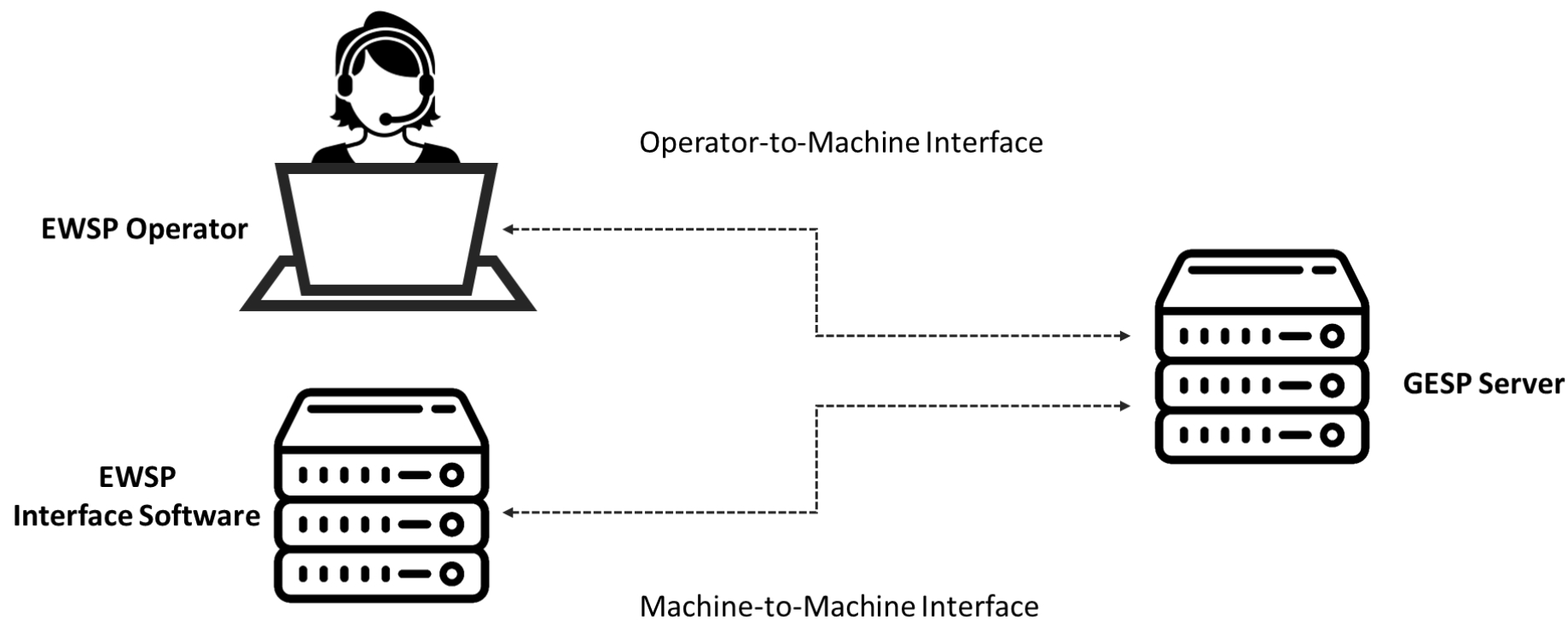
How the system operates (1)

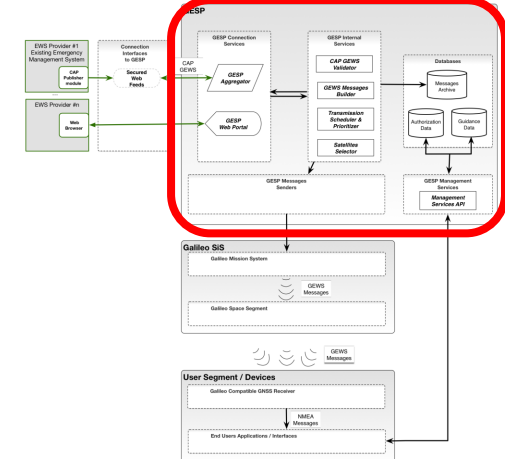- The EWSP creates the alert, with all the needed information

How the system operates (2)

- The EWSP delivers the alert to the GESP

Operator-to-Machine Interface

EWSP Operator

GESP Server

EWSP Interface Software

Machine-to-Machine Interface

How the system operates (3)

The GESP:

- Receives the alerts, validate them and transform them in the GEWS Message format for the Signal In Space

- GEWS Messages are sent to the *Galileo Mission System (GMS)*

- All business logic needed for messages prioritization and scheduling with satellites selection is implemented here, along with alert messages archiving

Specific databases for Authorization Data and Guidance Data are used for the validation and delivery logics.
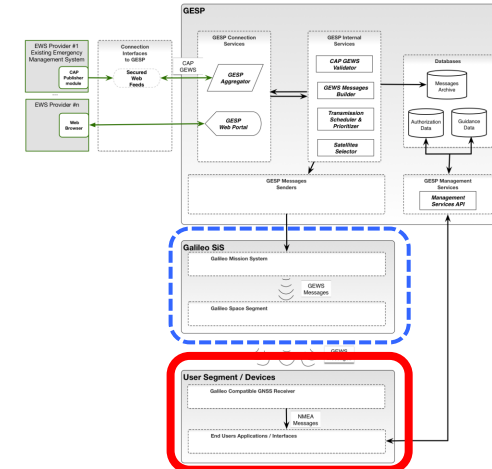
How the system operates (4)

The GNSS receivers:

- Decode the Signal and creates a NMEA message made available to the application layer

The Application layer decodes the NMEA message and builds the appropriate message to be displayed according to:

- Authorisation

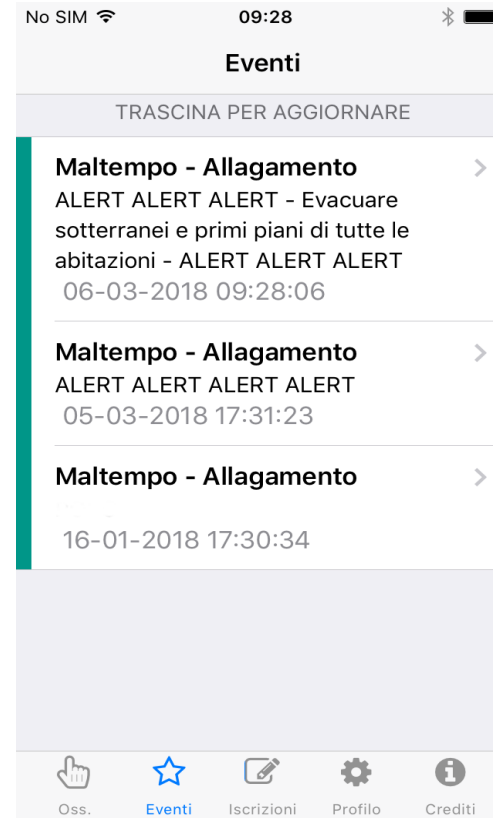- Location

- Language

- Event
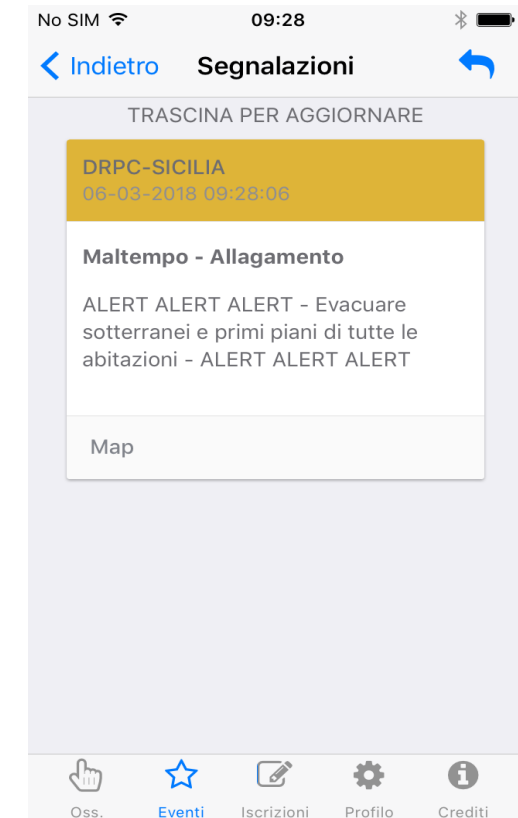
What the user receives

Push notification on lock screen

Active Alerts badge indication

Active Alerts List

Alerts details and instructions

Set up for the demonstration

EVB

NMEA message

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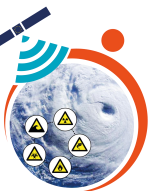
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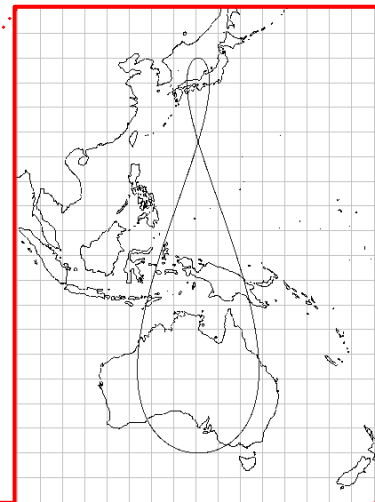
Where we are now…

- System requirements: completed

- Service definition: completed

- Signal in Space definition: completed

- Implementation of the demonstrator: on going

- Dry-runs: planned for May-June 2017

- Demonstrations in Italy, France and Australia*: planned for July-August 2017

*The demonstration in Australia will be implemented in cooperation with the Japanese QZSS

… and a timeline for GRALLE

System design (first half 2019)	→	System development (POC– mid 2020)	→	Preliminary operations (EOC – mid 2021)	→	Final operations (FOD – end 2022)	→	Full operations from 2023

This plan is subject to the decisions of the EC, the Council and the Parliament.

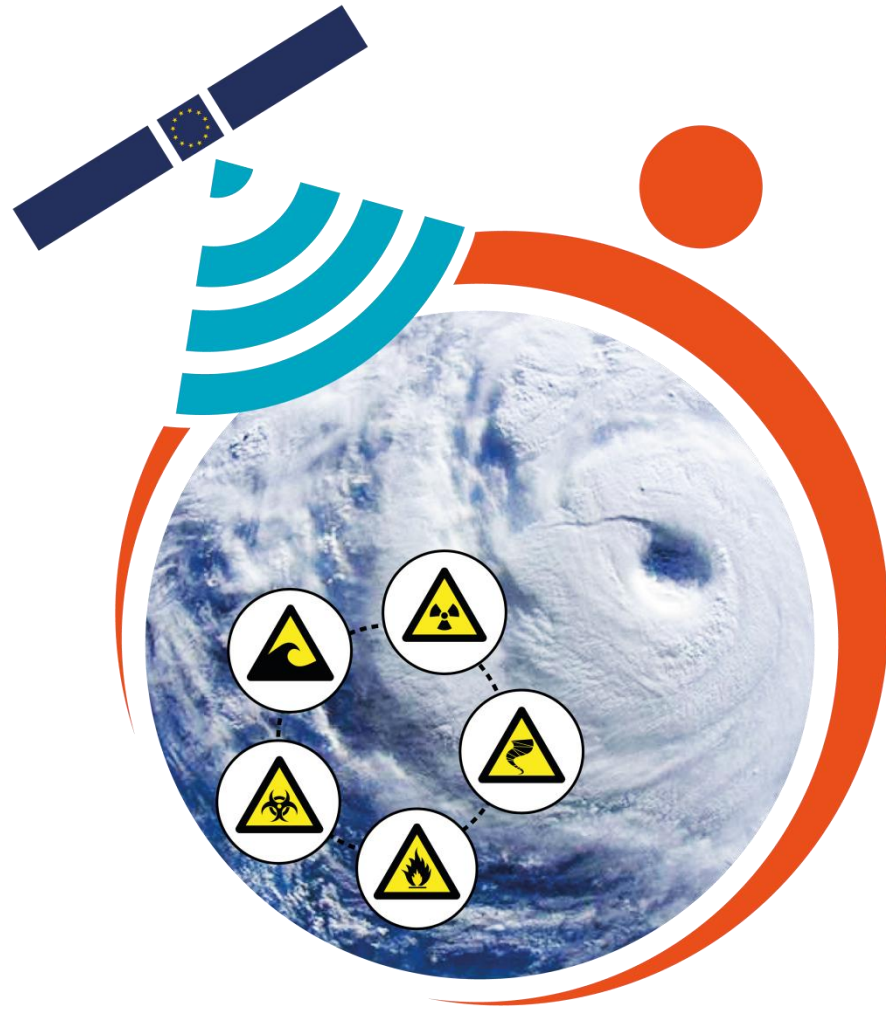**If you consider GRALLE as a useful concept for Emergency Warning, please support it with your National representatives!**

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