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11\textsuperscript{th} CoU, 4-7 June 2018, PANEL 3, Long Term GEO Supersites lessons learned
Perugia, 30 October 2016

6.6 magnitude on the Richter scale
Step 1: Sectorisation & Team Management
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Step 2: Work on Site using INACHUS Tools
(Robots can go where humans can’t)
Step 2: Work on Site using INACHUS Tools (Living victim localisation tools)
Step 2: Work on Site using INACHUS Tools (COP and Mobile app)
Perugia, 30 October 2016
6.6 magnitude on the Richter scale
The RECONASS Concept at a glance

The RECONASS Monitoring and Assessment System

1. The Local Positioning System
2. Strain, Acceleration and Temperature sensors
3. The Communication Module
4. Air and Space-borne Remote Sensing
5. Post Crisis Needs Assessment Tool in regards to Construction Damage and Related Needs (PCCDN)
6. Structural and Economic Loss and Needs Assessment Modules

"RECONASS provides the stakeholders with near-real time and updated assessment of damage, loss and needs"

Local positioning tags, Strain sensors, Accelerometers, Temperature sensors, Data hubs, Gateway module
The RECONASS Tools—The Sensors for earthquakes, explosions and fires

A total of **68 tags and 16 accelerometers** installed in the RECONASS building

A total of **40 strain sensors** installed in the RECONASS building

A total of **9 temperature sensors** installed in the RECONASS building

- Miniaturised, low cost, low powered, high accuracy tags
- ±5g fullscale || 0.5 – 100Hz bandwidth || < 150μg noise
- Max strain: up to 50,000με
- 0 to 1500 °C, accuracy: ~ 1 °C

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The RECONASS Tools – The Interoperable & Resilient Comms

Multiple, multiband WAN Interfaces integrated so as building information are sent under any circumstances.

The Gateway – Industrial PC with multiple interfaces for gathering all sensor data and transmitting outside of the building.

The PCCDN tool receives all sensor data and runs assessments.

Analogue and wireless interfaces to the sensors integrated - the building is interconnected.

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The RECONASS Tools– The Remote Sensing

UAV detected damage annotated on the CAD model and corresponding images for reference

Debris volume quantification

1.08 m³

Analysis of how distributed sensors coupled with meteorological data can model a gas dispersion field to:

1) Identify an unknown source of contamination
2) Identify affected buildings
3) Make predictions about gas cloud movement

RECONASS Enhancement for chemical/explosion events

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The RECONASS Tools – The Information System for Crisis Response, Reconstruction and Recovery Planning (PCCDN)

- The PCCDN Tool embeds Structural, Loss and Needs Assessment Modules

- Visualizes building status (conveying the common operational picture) at all circumstances, sensor information, structural information, economic needs information and external data (e.g. UAV images, meteorological data, newsfeeds, etc.)

- Can be used for training, response and reconstruction/recovery
1. USaR delegates (UN-OCHA/INSARAG) endorsed INACHUS Victim detection Technologies and INACHUS tools are to be showcased in INSARAG World Conference in October 2018, Bucharest (PCP Strategy in progress at national levels)

2. Common Operational Picture (integrated with the tools) reduces coordination effort and supports quick deployment and collaborative USaR

3. USaR Tools need to be standardized – INACHUS on CWA
INACHUS & RECONASS IMPACTS AND RECOMMENDATIONS

At policy level (since advancing and adopting Monitoring of Buildings for Crisis Management contributes) to all 4 priorities for actions of Sendai Framework for Disaster Risk Reduction 2015-2030:

- changes to the regulations of structural design are in order coupled with associated legal framework that brings such monitoring systems into the planning and design process.
- Ensuring investments strategies (e.g. pre-deployment actions for monitoring old and new built infrastructure)

Standardisation recommendations:

- EN Eurocodes should be revisited or new categories to be introduced for monitoring buildings
- Privacy by design standards for such monitoring system

R&D recommendations:

- Miniaturisation, low cost and low power advances of sensor technologies and comms
- Edge computing advances to accommodate hyper-connectivity

Source: European Commission
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