“RECONASS Monitoring System & the Damage Assessment Platform”

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ICCS – PROJECT MANAGER

RECONASS

Programme funded by the EUROPEAN UNION

Presentation Overview

RECONASS

Project Concept

- RECONASS facts & figures
- The RECONASS Concept

RECONASS Modules

- The Sensing System
- The Structural Assessment
- The Remote Sensing Assessment
- The PCCDN

The Pilot Test

- Instrumentation and Testing
- Visualisation of results

RECONASS Facts & Figures

- RECONASS is a **Collaborative project (STREP)** funded under FP7 - SEC
- Theme:

Next generation damage and post-crisis needs assessment tool for reconstruction and recovery planning

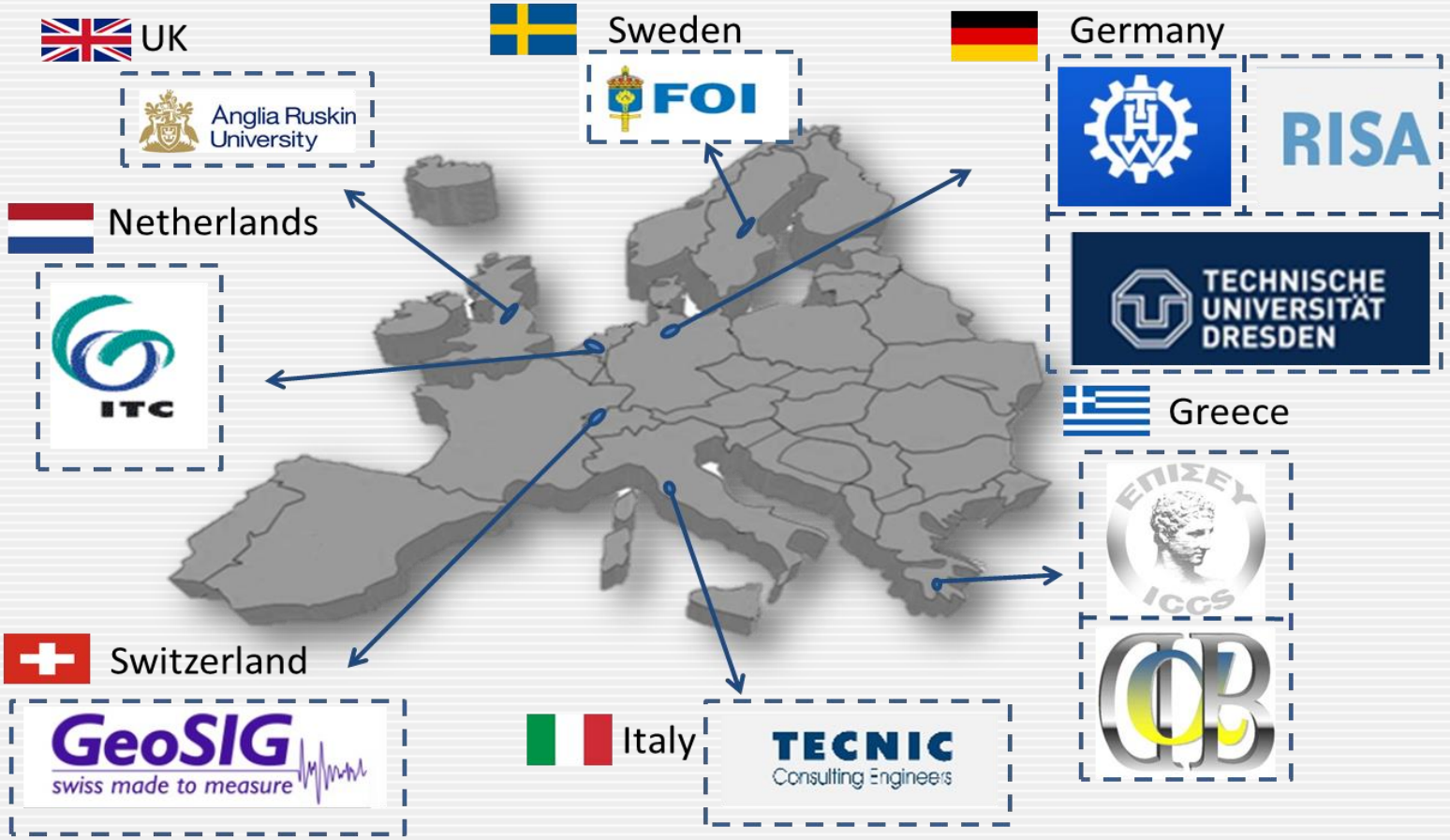
- Project Full Title:

Reconstruction and **RE**covery Planning: Rapid and Continuously Updated **CO**nstruction Damage and Related **N**eeds **ASS**essment

- Project Facts :

10 partners, 7 countries, 42 months, 4,260,240.00 requested EU contribution

Consortium Synthesis



The Problem

Current needs for **structural damage and post-crisis awareness assessment tools** with enhanced capabilities in:

- **required time**
- **updating processes**
- **post-crisis reconstruction** & **recovery planning**
- **international interoperability**
- **collaborative work** including mobile assets and integration of earth observation data

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 will provide 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 Sensing System (in-building & UAV)

RECONASS

GATEWAY

PCCDN TOOL

Security and tunneling layer

- IPSEC or SSL/TLS, tunnel authentication and user authorization, private key support, etc.

Smart routing layer

- Customized and adaptive routing protocols for the best utilization of WAN interfaces

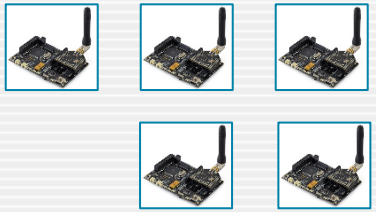
Data management layer

- Local collection, validation and storage of sensor networks data (measurements, events, configurations etc.)

Sensor Management

- Queries, status update, abnormal behavior alert, etc.

WSN (Waspmotes)

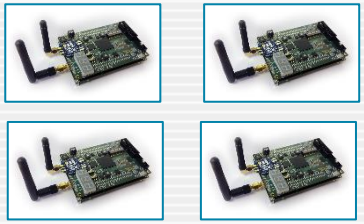


DATA HUBS

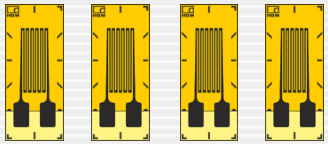
ACCELEROMETERS

LPS COORDINATOR

LPS TAGS



STRAIN SENSORS



TEMPERATURE SENSORS

The Sensing System (in-building & UAV)

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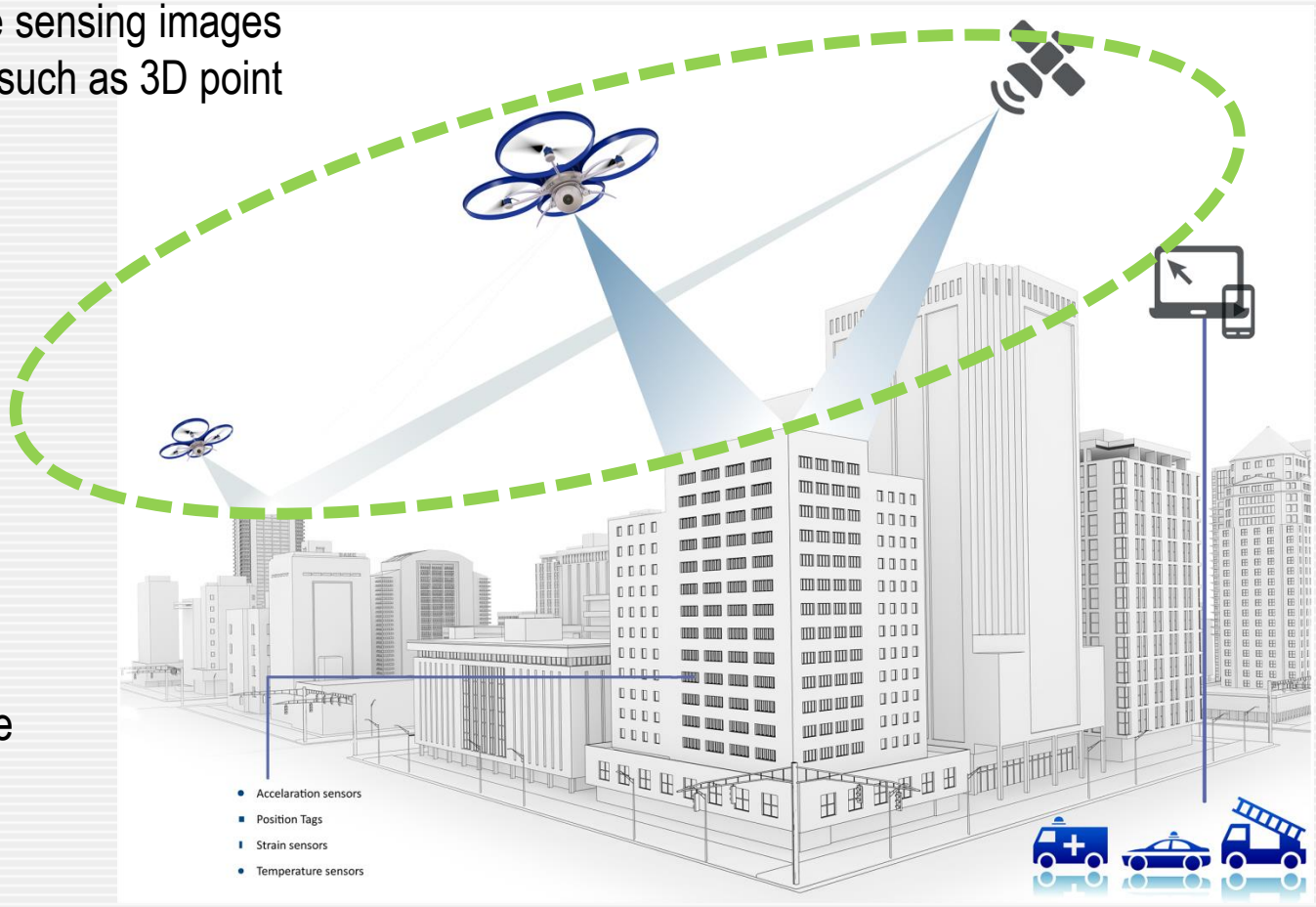
Damage mapping of exterior building elements using remote sensing images and derived products, such as 3D point clouds

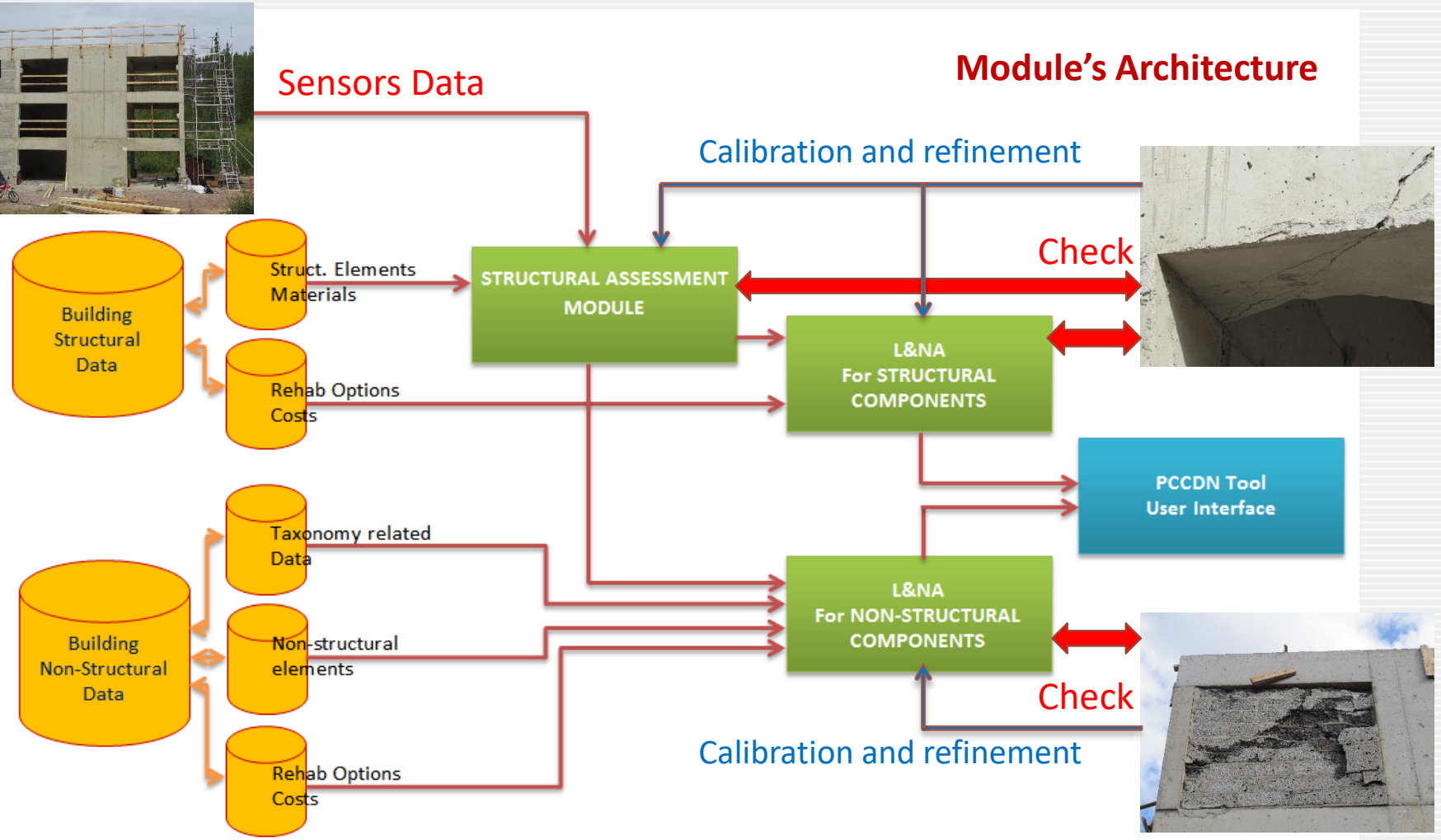
Macro-perspective

Information integration to improve assessment level



The Structural Assessment

Module's Architecture



The Remote Sensing Assessment

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Step 1: generation of 3D point cloud from UAV images

3D point clouds

The Remote Sensing Assessment

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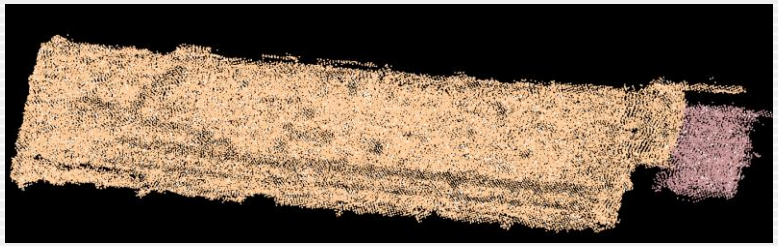
Step 2: Automated building detection

3D point cloud of the scene

Detection of roof segments of individual buildings



Detection of below roof elements

Delineated building

The Remote Sensing Assessment

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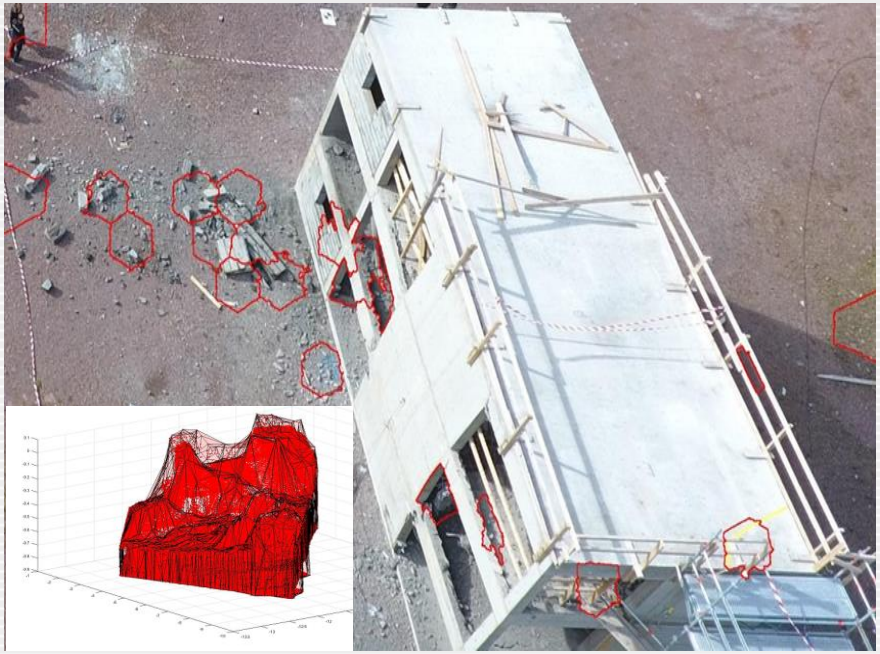
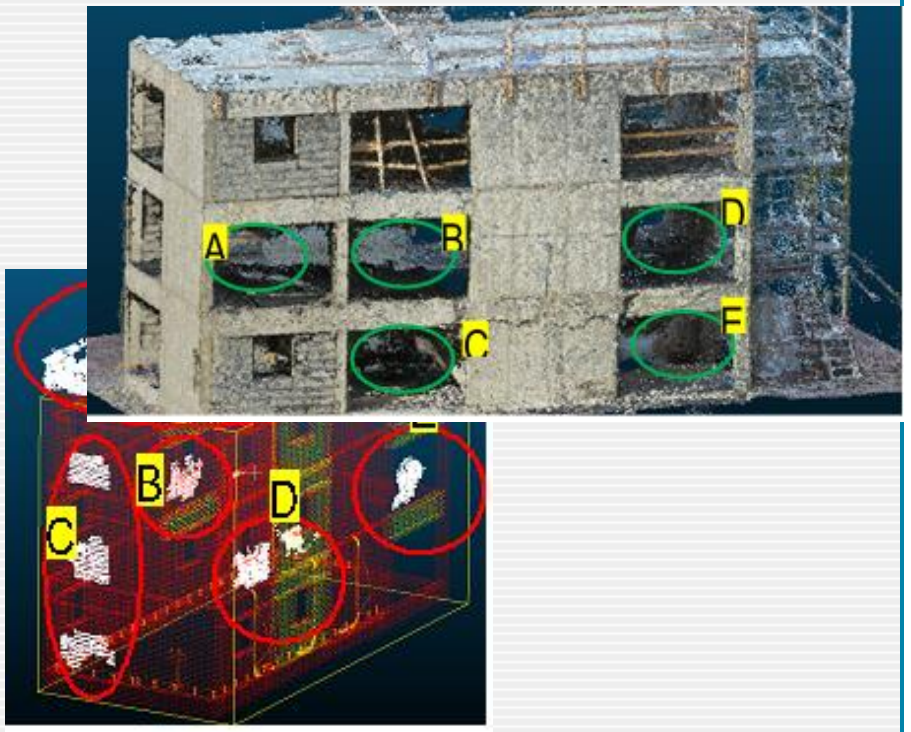
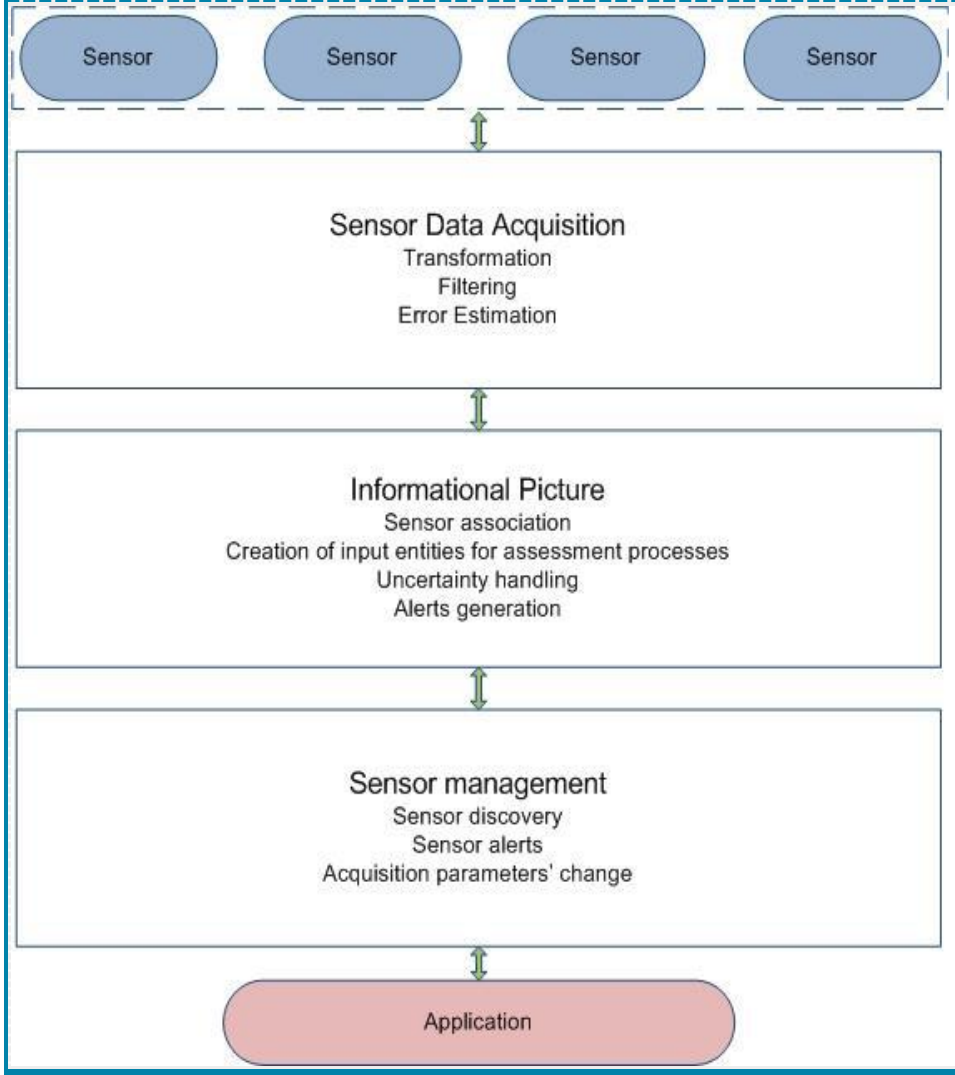
Step 3: Spalling and debris detection and quantification using machine learning-based classification

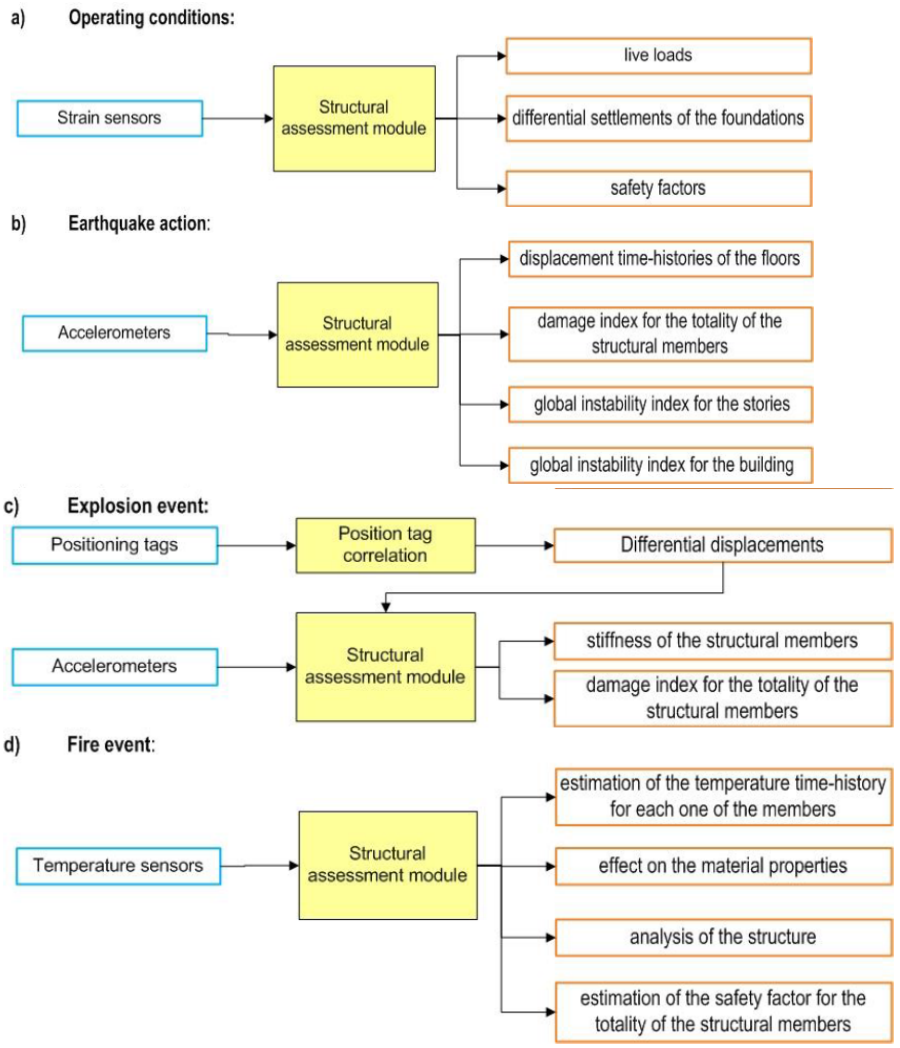


Step 4: Broken element detection based on post-event data alone:



The Post-Crisis Damage & Related Needs Tool





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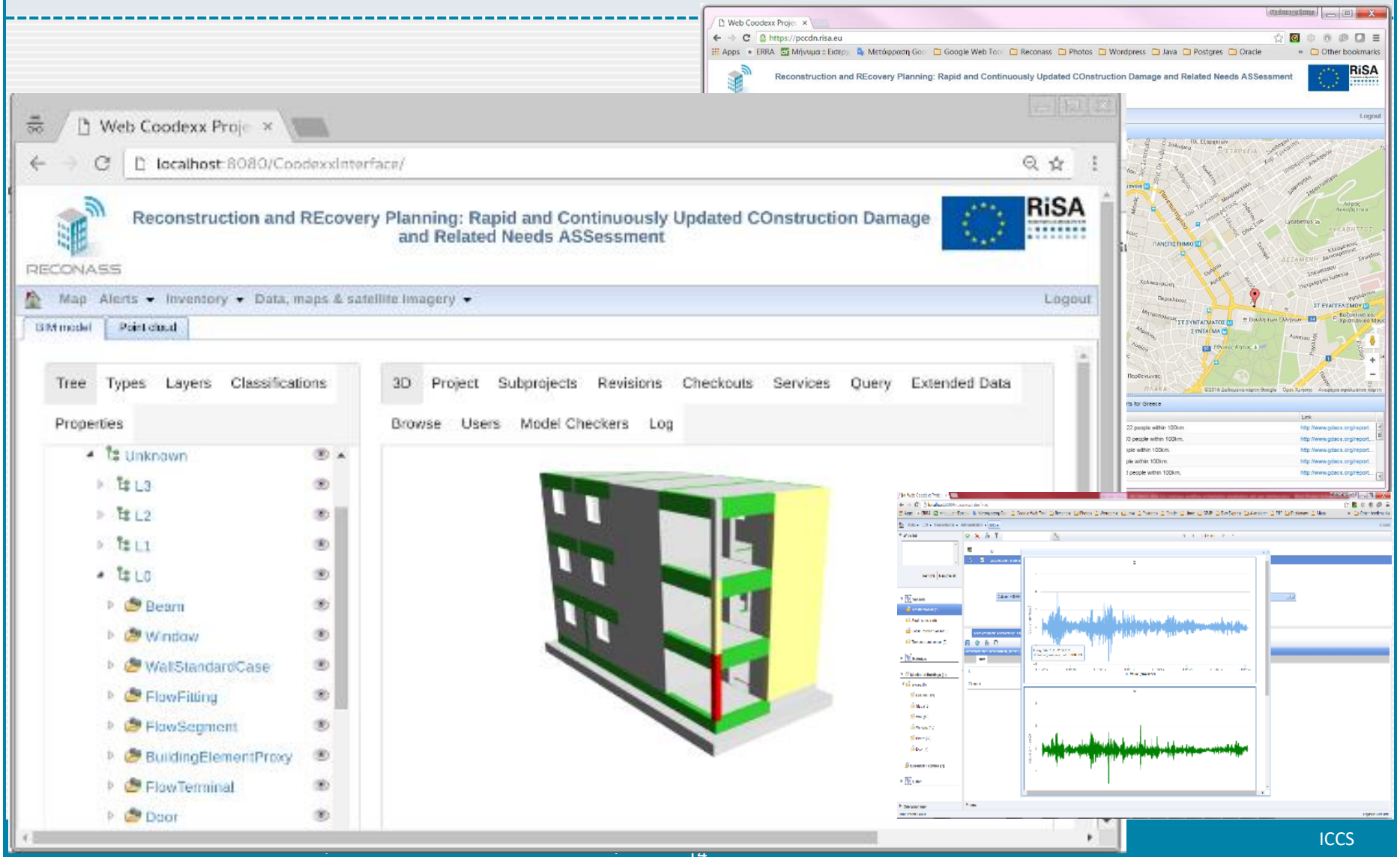

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The RECONASS Pilot – Test Building

- ✓ Building construction
- ✓ Strain Instrumentation
- ✓ Full building instrumentation

  25th of August 2016

Pilot Tests Detonations:

1. exterior 26th of August
2. interior 31th of August

The RECONASS Pilot – Test Building

The RECONASS Pilot – Test Building

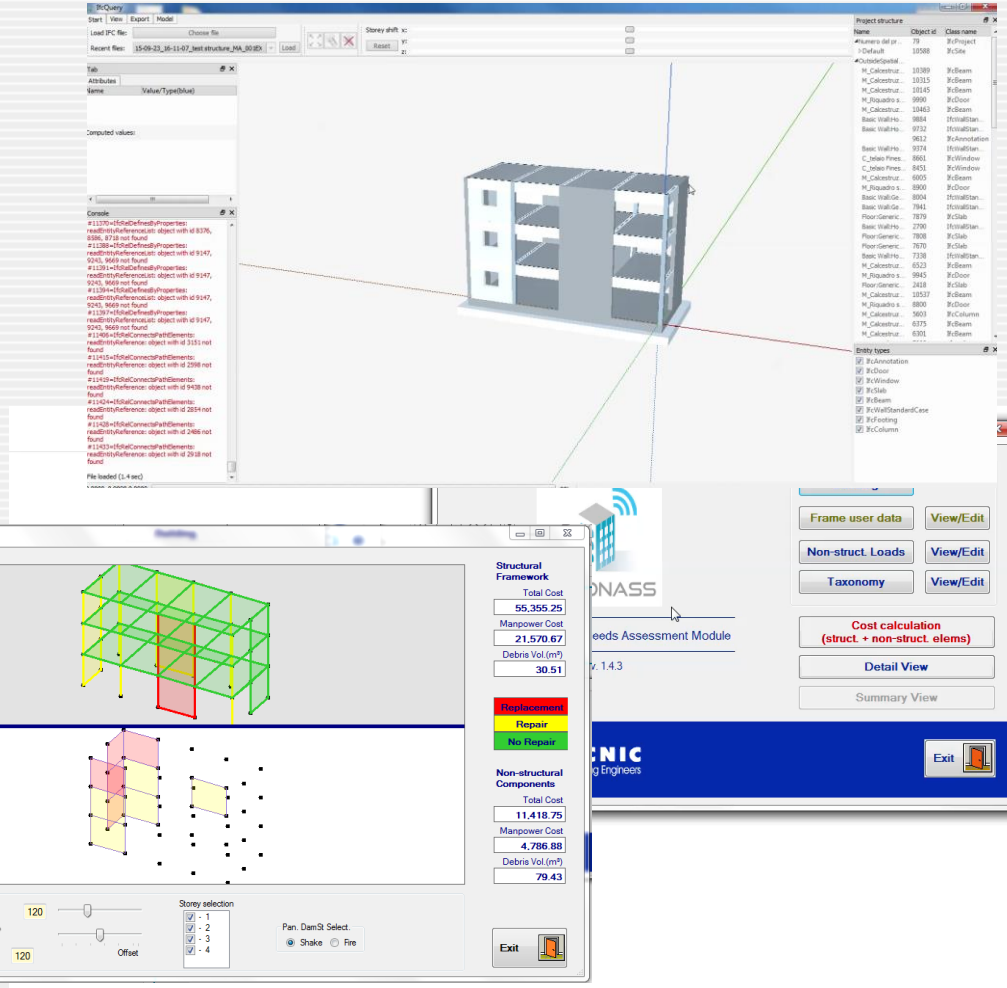
- RECONASS Pilot Test External
- RECONASS Internal Explosion – GoPro camera
- RECONASS Internal Blast – Aerial view

The RECONASS Pilot – Test Building

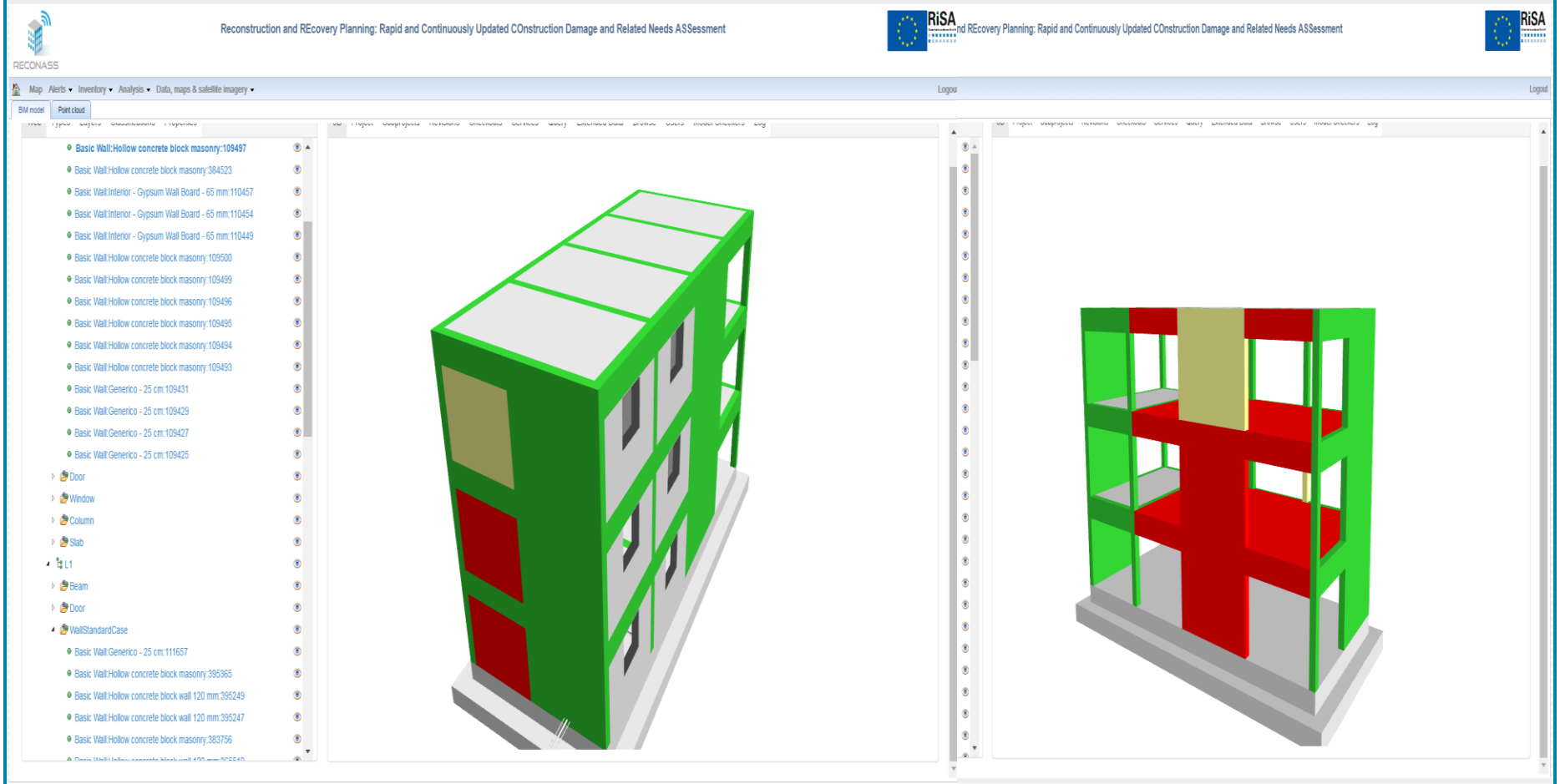
The RECONASS Pilot – Test Building

BEFORE

AFTER



The RECONASS Pilot – Test Building



Expected Results and their Applicability at EU level

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EU enhancement in Civil Protection and Disaster Management

1. Relief organizations can **begin funding restoration efforts at a much earlier date.**
2. ER crews will receive **critical information promptly to pinpoint danger** respond in precision
3. **Disaster cost will be reduced** by preventing monitored structures from collapsing
4. Knowing **functionality of CIs** immediately after the disaster enhances asset utilisation
5. All **major recovery stakeholders** will acquire **a common picture of the situation.**
6. **Training operations** can be enhanced
7. Early, effective handling of the **reconstruction and recovery process** will have long term financial repercussions.

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RECONASS End-User Group

NGOs/Governmental Emergency Services, Building Owners and Operators, Damage Evaluators, Insurance companies

1st Review Meeting, 30 April 2015, Brussels, Belgium

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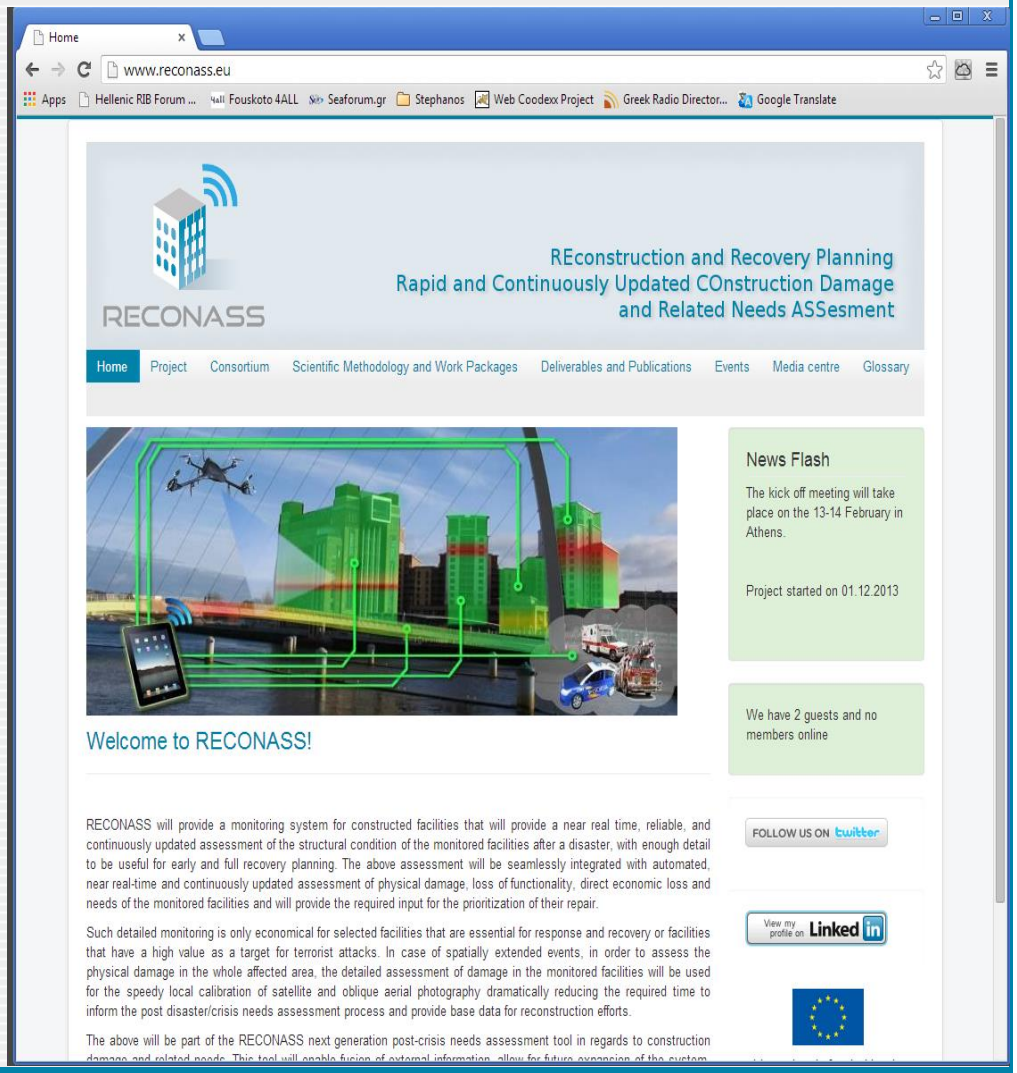
- twitter.com/reconass

- Group “RECONASS”

http://www.shoxsolutions.com/

SHOX – Structural Health Monitoring in a Box



Thank you!
Any questions?

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