SeIsmic monitoring and vulneraBilitY framework for civiL protection

Overview of the state of the project

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Project coordinator

The SIBYL Consortium

German Research Centre for Geosciences, Potsdam, Germany (coordinator)

AMRA S.c.a.r.l., Naples, Italy

Aristotle University of Thessaloniki, Thessaloniki, Greece

Technical University of Berlin, Berlin, Germany

Total budget: 637,848 EUR

EU requested contribution: 478,386 EUR (75%)

Civil Protection Authorities SIBYL has endeavored to interact with

Federal Agency for Technical Relief (Germany)
- *Mid term & final meeting, field work in Cologne*

Federal Agency for Civil Protection and Disaster Assistance (Germany)
- *Final meeting*

National Service of Civil Protection (Italy)
- *L'Aquila workshop*

General Secretariat for Civil Protection (Greece)
- *Mid-term meeting*

Aims of SIBYL

SIBYL set out to develop an operational framework for Civil Protection (CP) authorities to rapidly and cost-effectively assess the seismic vulnerability of the built environment.

This framework is intended to advise CP authorities as to the most appropriate preventative actions for cases where:

- There is a need for short-notice vulnerability assessment in a pre-event situation.
- For the monitoring of the build environment's dynamic vulnerability during a seismic sequence.

Aims of this meeting

- Presentation of each groups/tasks results to the consortium as a whole, and, to the representatives of civil protection and EC ECHO in particular.
- Planning the final stages of completing outstanding deliverables and products.
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- Preparation and planning of the final reports (technical and financial). Opportunities to ask the EC ECHO representative questions related to this.
- Discussion of future funding opportunities.

The fundamental problem!

Seismic swarms and foreshocks <u>require CP authorities to rapidly assess the vulnerability of an area's structures.</u>

- Especially important for areas with little or no data about the vulnerability, seismic hazard, etc..
  (The case even for the most developed countries).
- Need for real-time information as the crises unfolds.
- Need to dynamic tag structures in terms of their structural safety.
- Provide advice to the general population as to if they can return home, while helping to plan emergency accommodation.

However, state-of-the-art data acquisition methods generally are costly and expertise intensive.

Work flow and tasks

TASK A: Task management and reporting to the commission.

TASK B: Rapid data collection and integration

TASK C: Rapid and low cost in-situ building vulnerability assessment.

TASK D: Real-time monitoring during a seismic sequence.

TASK E: Training and capacity building

TASK F: Task publicity.

Project meetings and dissemination

- EC ECHO Kick-off-meeting (Jan. 2015, Brussels, Belgium).
- Preliminary planning and technical meeting (Jan. 2015, Potsdam, Germany).
- Website established.

www.sibyl-project.eu

- First period report (Sep. 2015).
- Dissemination plan developed and revised.
- Mid-term meeting (Feb. 2016, Thessaloniki, Greece).
- Civil Protection Workshop (May 2016, L'Aquila, Italy).
- Final meeting (Dec. 2015, Potsdam, Germany).

Comments on first period report (reminder)

- EC ECHO seemed generally satisfied with the progress of the project.
- They expressed some concerns about outstanding deliverables (see list in the next slide).
- Requested we keep updating the webpage

  (see discussion this afternoon)
- Very interested in how the communication with CP was going, and how it could be improved/expanded upon.

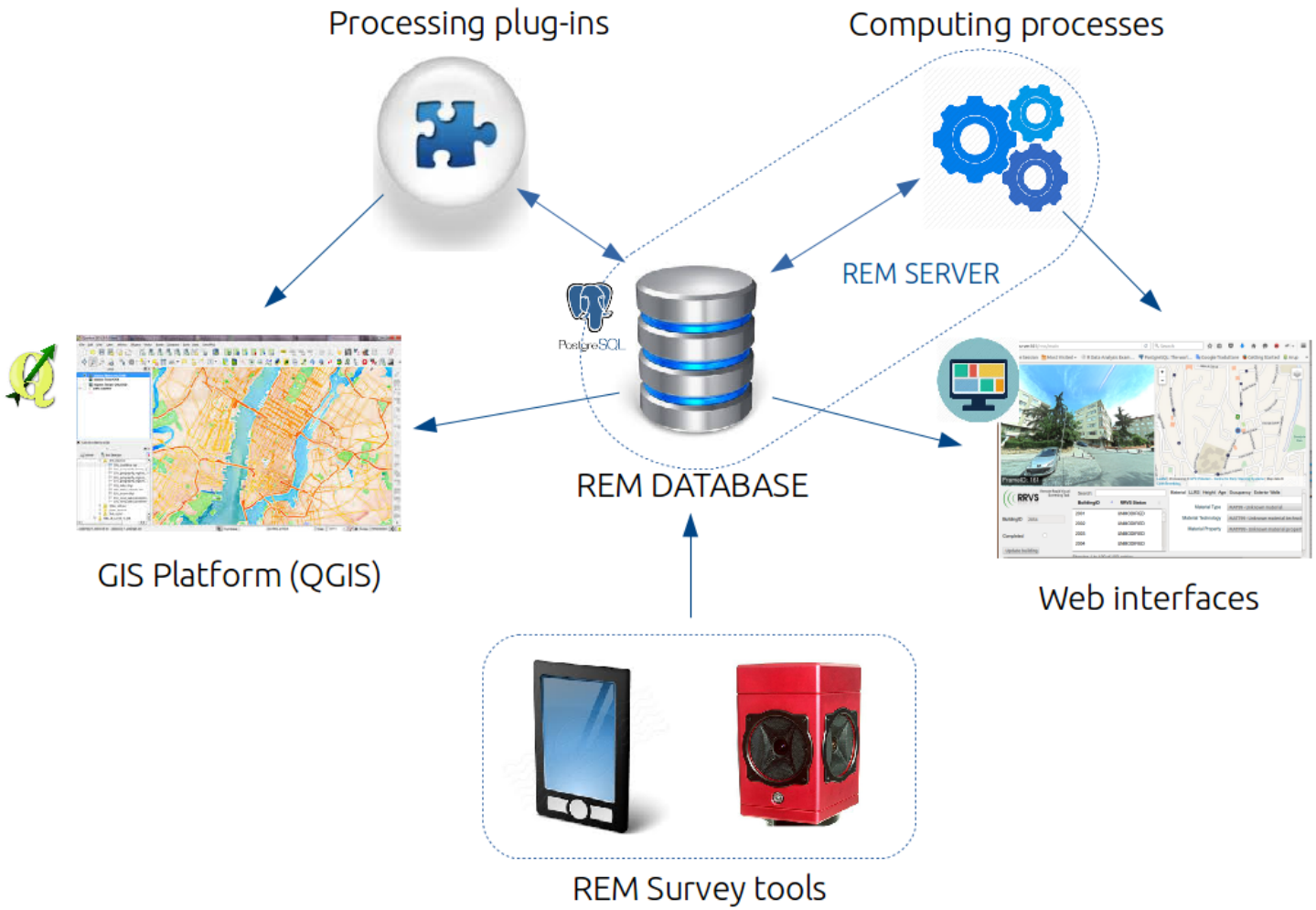
  (topic of discussion this afternoon)
- Some concern at the relatively low amount of spending so far, but this was explained adequately.

Status of deliverables

Due Date	Deliverable	Responsible Partner
2.2015	DA1: Kick-off-meeting report.	GFZ
8.2015	DA2: First progress report	GFZ
4.2016	DA3: Second progress report	GFZ
1.2017	DA4: Final technical and financial report	GFZ
9.2015	DB1: Guidelines for the remote-sensing assessment methodology	GFZ
10.2015	DB2: Software platform including processing tools with related manual	GFZ
10.2015	DB3: Guidelines of the mobile mapping system and remote rapid visual screening	GFZ
6.2016	DC1: Guidelines for the building assessment procedure and short-term monitoring	TU-BERLIN
6.2016	DC2: Guidelines for undertaking site-effect surveys	AUTH
6.2016	DC3: Documentation for the developed software tools	TU-BERLIN
11.2016	DC4: Reports on the case studies	TU-BERLIN
12.2016	DD1: Guidelines for the assessment of time-variant seismic risk of monitored single structures	AMRA
06.2016 – Preliminary 12.2016 – Finalized.	DE1: Training materials for the use of the developed framework and tools	GFZ
12.2016	DE2: Report on the potential for the developed system to be transferred to other hazard types	GFZ
2.2015	DF1: Project website	GFZ
2.2015	DF2: Detailed plan for project publicity	TU-BERLIN
12.2016	DF3: Report on public outreach events/activities	GFZ
12.2016	DF4: Report on technical and professional outreach	AUTH

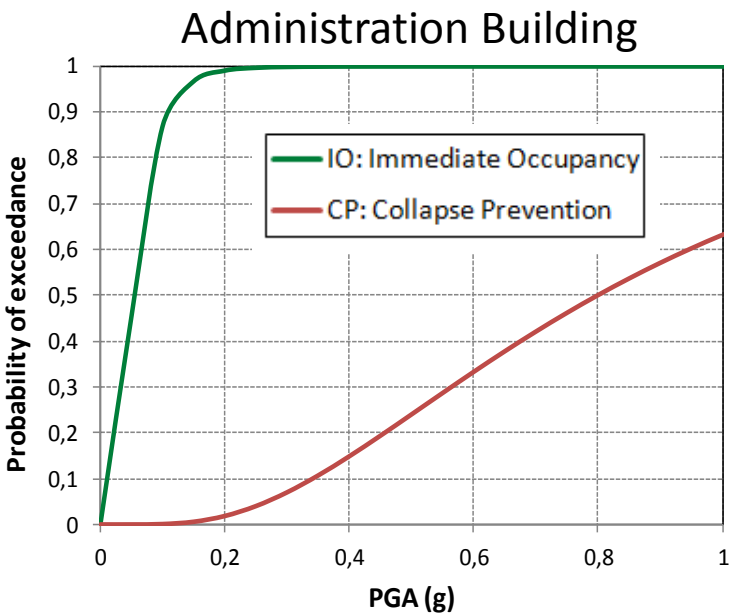
Activities: GFZ

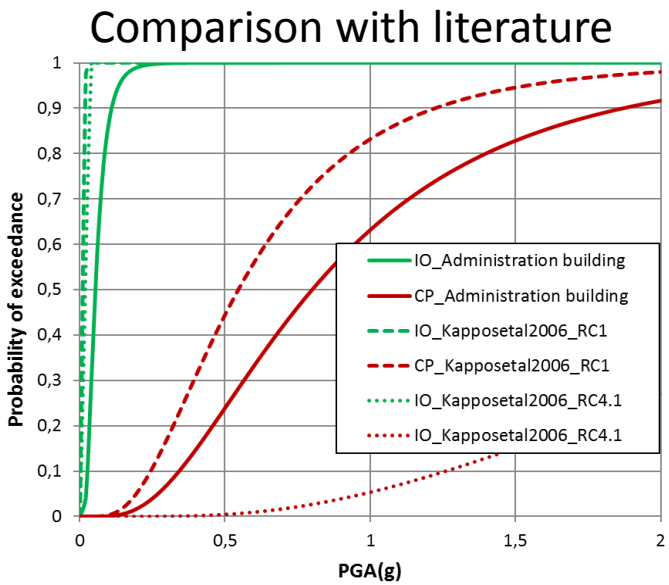
Mainly involved in project management and Task B “Rapid data collection and integration”.



Activities: AUTH

- Seismic vulnerability assessment using data from the monitoring of 2 buildings on the AUTH campus (Administration and Faculty of Philosophy buildings).
- Monitoring data in combination with updating methods are used to build a refined finite element model that represents the actual state of the instrumented building.
- The comparison of the derived building-specific fragility curves with generic curves from the literature show that the selection of conventional curves to represent buildings may lead to inaccurate results.

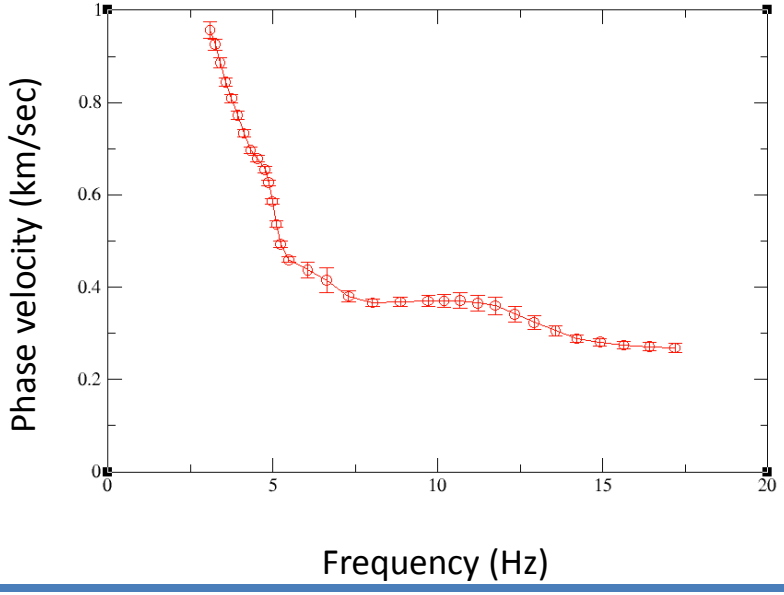




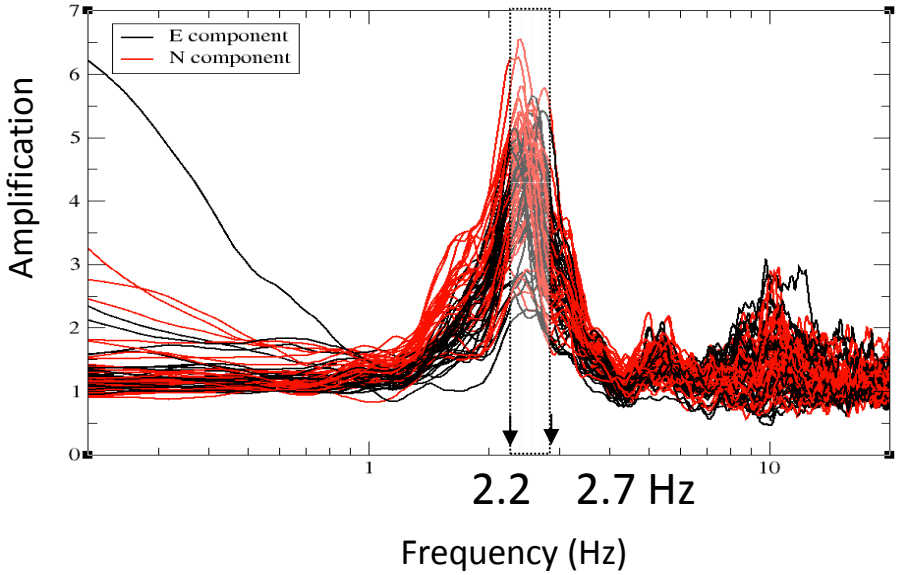
Activities: AUTH

- Ambient noise measurements for site characterization of the foundation soil between 2 buildings at the AUTH campus (in cooperation with Potsdam and Berlin).
- Processing of the noise data using SPAC and HVSR methods.
- Determined the phase velocity dispersion curve of Rayleigh waves and the 1D Vs velocity profile.
- Site response characterization of the foundation soil in terms of resonance frequency, amplification factor and depth to the seismic bedrock.
- Comparison of the results with existing information regarding the dynamic properties and the site response of the foundation soil

Phase velocity dispersion curve of Rayleigh waves



Resonant frequency & amplification of soil



Field activities

- Field work in Thessaloniki, Greece (Sep./Oct. 2015).
  Involved inspections and monitoring of the administration and Faculty of Philosophy buildings of AUTH, 2D array measurements and the maintenance of the network in the AHEPA hospital.

- Field work in Cologne, Germany (Dec. 2015).
  Inspection and monitoring of selected school buildings in the area, and undertaking 2D array measurements in the vicinity.

Next steps

- Next reporting period covers until the end of April, with the report therefore due at the end of June (60 days).
- L'Aquila workshop will be the next major opportunity for end-user interaction.
- A poster will be presented at the EGU.
- Other conference opportunities include the IAHS World Congress on Housing Sustainability and the European Seismological Commission General Assembly.
- Additional field activities??

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Training, capacity building, dissemination

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Dissemination

The deliverable outlining the dissemination plan has been submitted, but it is open for discussion and modification.

Activities proposed/underway include:

- Project website.
- Project brochure (nearing completion).
- Brochures and short movies about the field activities. **??**
- Meetings with CP during field work. **ONGOING**
- Seismic vulnerability assessment workshop (l'Aquilla, Italy). **IN PROGRESS**
- Final project meeting.
- Final project brochures etc.

Project website

The project website is active and is hosted by GFZ.

www.sibyl-project.eu

PLEASE – we require the contribution of all participants to make it as useful as possible (and to remind us to update it)

Brochure

The brochure is nearly completed.

However we still need some "nice" pictures

Civil Protection Interaction

- Discussions were held with a representative of THW (Germany) during field work in Cologne and considerable interest was shown.

- For the workshop in L'Aquila, a preliminary agenda has been sent around to interested parties.

  Engineer Fabrizi from L'Aquila has facilitated access to several schools, but is open to additional suggestions.

Software (tool) licencing

What software licence should be employed for the tools developed within SIBYL has not received much attention.

A free and open software source (FOSS) framework is being adapted by GFZ for the tools they are developing, in accordance with other previous projects (e.g., SENSUM).

The BSD 3-Clause Licence

What is the feeling of the consortium towards this issue?