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EUROPEAN PROGRAMME for CRITICAL INFRASTRUCTURES PROTECTION
Ispra – Italy
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Morning session on 13th December 2012
EU-wide certification and accreditation for security solutions

**Qualification
of
Large Seismic Research Facilities
in
Europe**

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COMMISSION OF THE EUROPEAN COMMUNITIES
FP7- INFRASTRUCTURES-2008-1
SP4-Capacities



SERIES
SEISMIC ENGINEERING RESEARCH INFRASTRUCTURES
FOR EUROPEAN SYNERGIES

SERIES PROJECT OVERVIEW

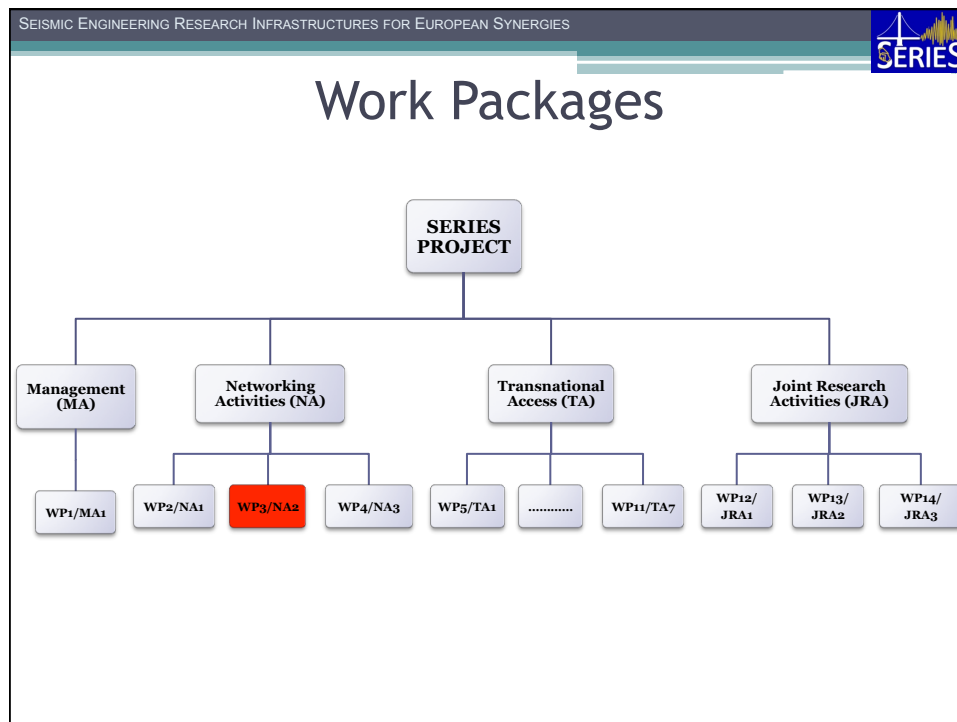
Michael N. Fardis (General Coordinator of the Project)
University of Patras (GR)



SEISMIC ENGINEERING RESEARCH INFRASTRUCTURES FOR EUROPEAN SYNERGIES

SERIES PROJECT GOALS
(Grant Agreement No. 227887)

- **Bridge the gap** between Europe and US/Japan in experimental seismic engineering.
- Establish **protocols and criteria for qualification** of RTD infrastructures in earthquake engineering.
- **Bring together European countries** with high seismicity but no research infrastructures and those with large infrastructures but low seismicity.
- **Foster co-operation** of labs and teams active in European Earthquake Engineering.
- **Provide access to researchers** to the most powerful European Infrastructures.
- Collaboration of research infrastructures towards **new testing technologies**.




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JOINT RESEARCH ACTIVITIES

- **Joint innovative research** toward new fundamental technologies and techniques.
- Three areas where the beneficiaries excel at world level:
 - **JRA1:** Concepts, technical requirements and prototyping for **new-generation electro-magnetic or electro-mechanical actuators** for real-time testing with high-performance and enhanced-quality.
 - **JRA2:** **New instrumentation and sensor techniques**; Dedicated software for data collection, processing and communication.
 - **JRA3:** New capabilities and techniques for experimental study of **soil-structure-interaction and seismic wave propagation** phenomena.


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TRANSNATIONAL ACCESS

- **Free-of-charge access**, together with full infrastructural, logistical, technological and scientific support,
- Users of access attracted, chosen and **trained** via Networking Activity.
- **Dissemination** of RTD results to the widest possible audience through the NAs.
- Tests conducted during transnational access will always use **telepresence** and **distributed testing**.
- In these tests, **new techniques** to be developed by the project's Joint Research Activities will be tried on a pilot basis and validated/calibrated.

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NETWORKING ACTIVITIES

- **Telepresence and geographically distributed testing** → Very large virtual European research laboratory.
- **Wide sharing of data** and knowledge through web portal and distributed database, to live and grow after the end of SERIES.
- **Common European standards, protocols and qualification criteria** for similar research infrastructures. 
- **Training** of technical and research personnel.



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SERIES PROJECT WP3 – NA2

Qualification of research infrastructures

Maurizio Zola (Task Leader)
P&P LMC, Italy

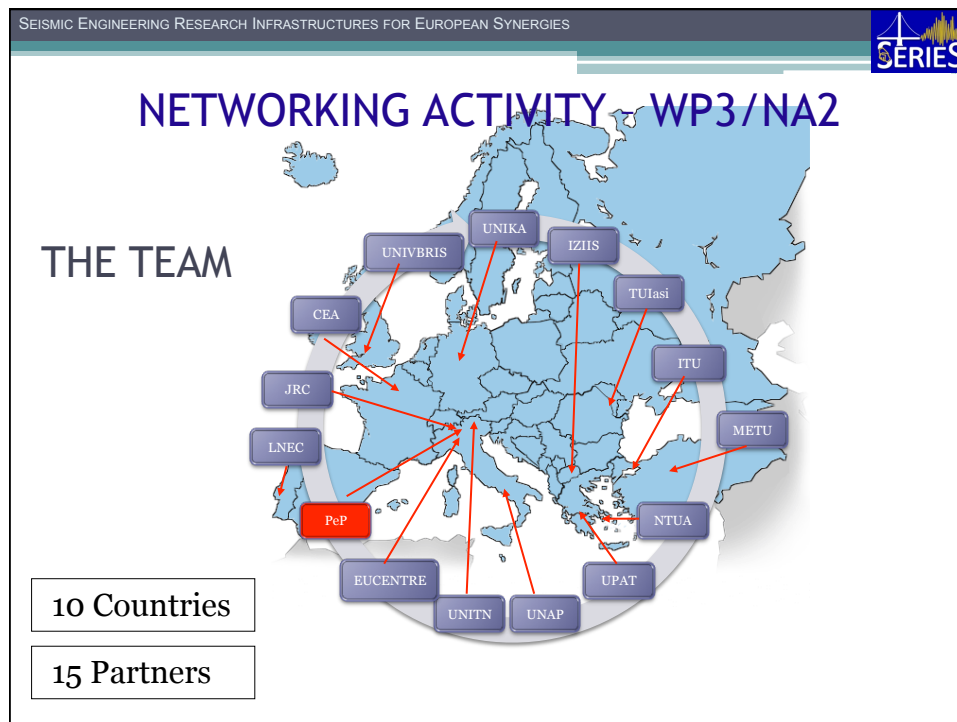
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NETWORKING ACTIVITY - WP3/NA2

KEY POINTS OF WP3 – NA2

- 4 years (March 1st 2009 – Feb. 28th 2013)
- 15 European partners
- Largest Earthquake Engineering labs in Europe
- 47,2 person-months
- € 287.484 Total Budget
- € 197.833 Contribution of European Community




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4 SERIES

NETWORKING ACTIVITY - WP3/NA2

Goal


Development of a **Common Protocol for the qualification of earthquake engineering research infrastructures** in Europe.

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NETWORKING ACTIVITY - WP3/NA2

Work Progress


- **Task NA2.1:** Evaluation and impact of qualification of experimental facilities in Europe
 - Started on March 1st 2009 – Ended on Oct. 26th 2010
- **Task NA2.2:** Assessment of testing procedures and standards requirements
 - Started on Aug. 3rd 2009 – Ended on March 15th 2011
- **Task NA2.3:** Criteria for instrumentation and equipment management
 - Started on Aug. 3rd 2009 – Ended on March 15th 2011
- **Task NA2.4:** Development and implementation of a common protocol for qualification
 - Started on Sept. 2nd 2010 – End on Feb. 28th 2013

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NETWORKING ACTIVITY - WP3/NA2

Performed activities


- **Task NA2.1**
 - Activities planning
 - Draw-up & Circulation of questionnaires
 - Analysis of data and Issue of Task Report
- **Task NA2.2**
 - Draw-up & Circulation of questionnaires on testing procedures.
 - Analysis of responses and Issue of Final Report (Deliverable D3.1)
- **Task NA2.3**
 - Draw-up & Circulation of questionnaires on instrumentation and equipment management.
 - Analysis of responses and Issue of Final Report (Deliverable D3.2)
- **Task NA2.4**
 - Kick-off with Workshop on “Qualification of research infrastructures” (Ohrid, MK, Sept. 2010)
 - Preliminary Draft of Common Protocol for Qualification with Specific Technical Requirements for On-site Testing, Shaking Table Testing, Reaction Wall Testing, Data Acquisition and Processing

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NETWORKING ACTIVITY - WP3/NA2

ISSUES


- Qualification of a **research and technological development (RTD)** infrastructure in earthquake engineering implies a process different from the qualification of a **Conformity Assessment Body**.
- **International or European Standards** dealing with certification or accreditation are **not specifically devoted** to the RTD laboratories.
- **Lack** of International or European standard or regulation **requesting the qualification of RTD** infrastructures.
- **Lack** of international **recognition** of the large capacities and associated human resources of the European RTD infrastructures.

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NETWORKING ACTIVITY - WP3/NA2

OBSTACLES


- Lack of specific Standards for the qualification of RTD infrastructures;
- Lack of specific Standards covering RTD seismic testing;
- Lack of specific Standards covering special seismic testing with multi-axial large shaking tables, quasi-static and pseudo-dynamic techniques or hybrid experimental & mathematical modelling techniques;
- Lack of a qualification-oriented mentality of the high level management of the RTD infrastructures;
- Underestimation by the laboratory staff of the benefits of an official qualification of the RTD infrastructures;
- Reduced investment capabilities of RTD infrastructures.

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NETWORKING ACTIVITY - WP3/NA2

Then a **road map** towards the Common Protocol was conceived.

1. Evaluation of the suitability of the General Management Requirements of EN ISO/IEC 17025 for RTD infrastructures;
2. Evaluation of the suitability of the General Technical Requirements of EN ISO/IEC 17025 for RTD infrastructures;
3. Identification of Specific Technical Requirements (STR) for the RTD seismic testing;
4. Identification of Specific Technical Requirements relevant to documentation and data sharing to guarantee repeatability and reproducibility of test results with the development of a Common European Database;
5. Issue of a draft Common Protocol for the qualification with respect to the Management and Technical General Requirements;
6. Drafting of RTD specific testing procedures;
7. Implementation on a voluntary basis of the draft Common Protocol in some SERIES laboratories;
8. Development of the Final Common Protocol for the Qualification.


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NETWORKING ACTIVITY - WP3/NA2

After the completion of the first two points of the road map it was recognized that:

- the **general management requirements** of EN ISO/IEC 17025 are suitable also for the management of RTD infrastructures, and
- the same conclusion can be drawn for the suitability of the **general technical requirements** of EN ISO/IEC 17025 for the RTD infrastructures, **but not for the requirements of clause 5.4.2**, selection of methods.


To overcome this situation, in accordance with EA 2/15, **Specific Technical Requirements for the RTD seismic testing were identified** with reference to the requirements of clauses 5.4.3, 5.4.4 and 5.4.5 of EN ISO/IEC 17025. This choice will lead to the **qualification with "flexible scope"** of the RTD infrastructures.

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NETWORKING ACTIVITY - WP3/NA2

Protocol for the Qualification

1. Issue of a **Draft Common Protocol** for the qualification with respect to the Management and Technical General Requirements
2. Issue of a **check list** for the audits
3. Drafting of **Specific Technical Requirements** for:
 - On-site Testing
 - Shaking Table Testing
 - Reaction Wall Testing
 - Data Acquisition and Processing


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NETWORKING ACTIVITY - WP3/NA2

Implementation of the draft Common Protocol for Qualification

The following Partners participated to the peer tests to implement the Common Protocol for the Qualification on a voluntary basis:


- reaction wall
 - JRC
 - UNITN
- shaking table
 - CEA
 - NTUA
 - UNAP
 - IZIIS
 - EUCENTRE
- on site testing
 - UNITN

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Common Protocol for the Qualification

After the completion of the peer tests three activities of the RTD Facilities were identified:


- ***Research Engineering Activities***
- ***Measurement Activities***
- ***Research Testing Activities***

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Common Protocol for the Qualification

- ***Research Engineering Activities***
 - ***general specifications for the research***
 - ***design and planning of the research***
 - ***test specifications***
 - ***supervision of experimental research activities***
 - ***mathematical modeling***
 - ***experimental data processing***
 - ***design of the experimental rig***
 - ***research reporting.***
- ***The Research Engineering Activities may be performed in three steps:***
 - ***general study of the problem and identification of the research activities needed***
 - ***supervision of the experimental activities***
 - ***experimental data processing, results interpretation and final reporting***


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Common Protocol for the Qualification

- **Measurement Activities**
 - *these activities are performed in accordance to standard or internal methods*


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Common Protocol for the Qualification

- **Research Testing Activities**
 - *The experimental testing activities are performed by following a test specification issued by the research engineer.*
 - *The research testing activities are concluded by issuing the test report.*
 - *The test report should include the raw data and pre-processed data.*

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Common Protocol for the Qualification

The qualification of the research testing facilities may be achieved:

- for **Research Engineering Activities** by the certification of the Management System after ISO 9001;
- for **Measurement Activities** by the accreditation of the Laboratory after ISO/IEC 17025;
- for **Research Testing Activities** by the accreditation of the Laboratory after ISO/IEC 17025 with flexible scope.

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Common Protocol for the Qualification

*As far as the operation of the **Research Testing Laboratories** after ISO/IEC 17025 with flexible scope*

1. the Laboratory (**Supplier of tests**) should receive a Testing Specification
2. issued by the Research Engineer (**Customer**)
3. and the **Specific Technical Requirements** (Annexes to the Common Protocol) should be applied.

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FUTURE WORK

1. *The Common Protocol was presented to **the Laboratory Committee of EA (European cooperation for Accreditation)** in Oslo on Sept. 19th for consideration as a **Guide for the accreditation***
2. *Contacts are in progress with **CEN** for the presentation of the Common Protocol and its Technical Annexes during a **CEN International Workshop** for consideration as starting proposal for the development of standards.*

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Thank you Work in progress

