

A brief introduction to NERA – NA3
work package ‘Networking
accelerometric networks and strong-
motion data users’

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(EMSC, INGV, ISTerre, METU, ORFEUS)

Major objective of NERA-NA3

- NERA-NA3 takes over from the initiative launched by NERIES-NA5 that focused on archiving the continuous accelerometric and broadband waveforms (RRSM db) recorded by high quality seismometer stations in and around Europe.
- In this context one of the major outcome of NERIES is the **European Integrated Data Archive (EIDA)** system. The core group of EIDA consists of ORFEUS, INGV and SED. The communication protocol is Arclink.
- In the most general sense, NERA-NA3 aims at improving the already established RRSM db infrastructure and integrating it with the traditional (static) engineering strong-motion databases (ESM db).

Tasks in NERA-NA3

- Network the main accelerometric observatories in the larger Euro-Mediterranean region, and expand the collection, storage and access to strong-motion data for the whole region.
- Foster the interaction between accelerometric networks in Europe through exchange of data, knowledge and experience.
- Improve accelerometric data documentation and station information.
- Build European integrated data banks of strong-motion records and associated metadata relevant to earthquake engineering and seismology communities reflecting the state of the art and research needs in these fields.
- Spread information to the seismological and engineering community in Europe and surrounding countries.

Rapid Raw Strong-Motion (RRSM) Database

- The major objective is the rapid dissemination of continuous accelerometric and broadband data
- Rapid = within minutes after an event;
- Raw = automatic parameterization, unprocessed waveforms;
- database needs to be stored and should show the results of the waveform parameterization process;
- The entire structure is based on SeisComp3 architecture.

Core processing in RRSM

Waveform extraction for SM and BB data

- **Scheduling**
 - automatic start
 - offline start
- **Waveform query**
 - magnitude
 - distance
- **Check on new waveforms**
- **Selection of waveforms to be processed**
 - saturation check
 - sta/Ita check
 - co-location check
- **Differentiation of velocity traces**

Processing scheme

- **Aftershock removal** (Figini, 2006; Paolucci et al., 2008)
- **Pre-event cut-off**
- **Baseline removal**
- **Restitution / sensitivity correction**
- **Bandpass filtering** (zero padding after Boore, 2005)
- **Computation of PGA**
- **Integration**
- **Computation of PGV**
- **Processed waveform archival (optional)**

Computation of engineering parameters

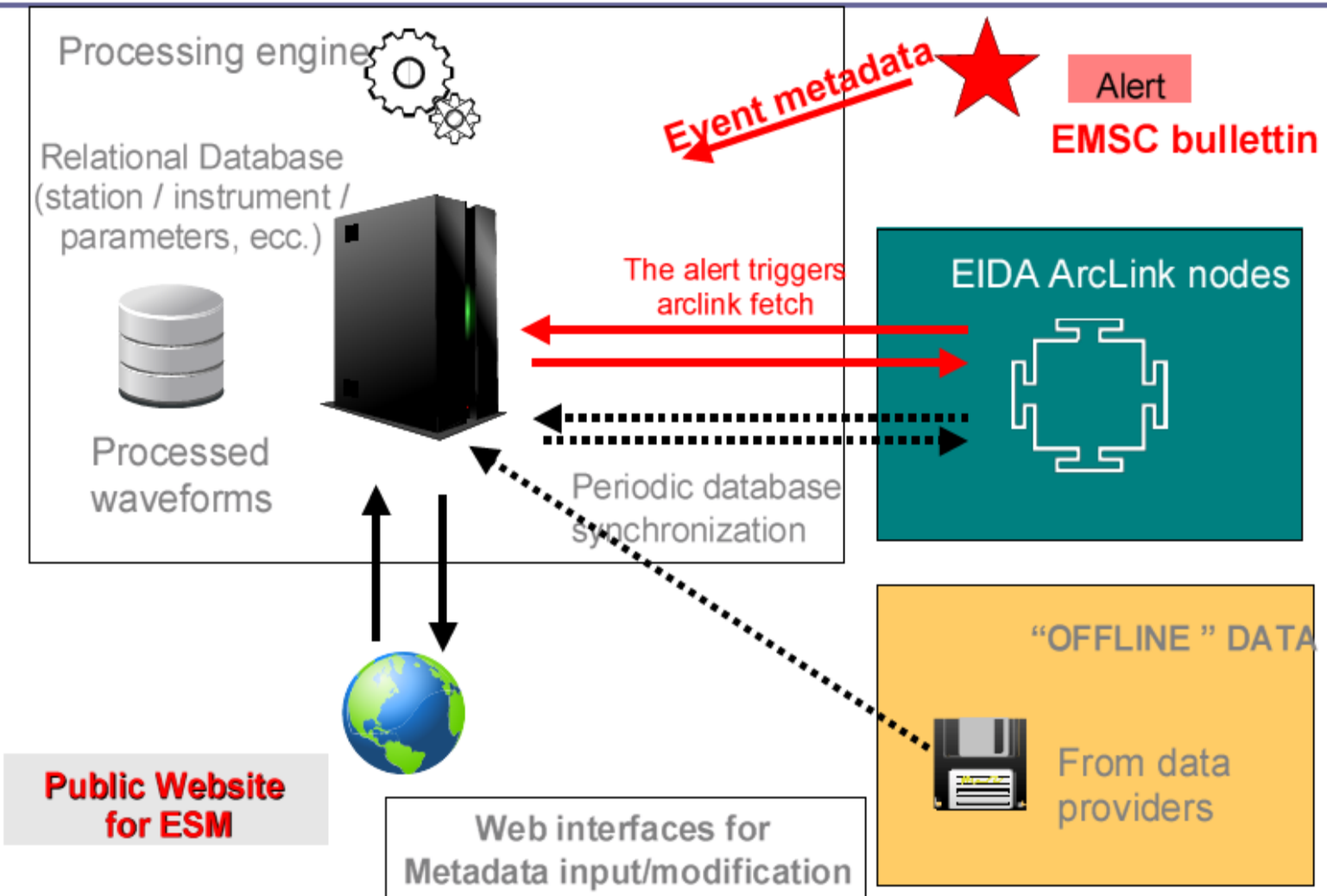
- **Displacement response spectra**
- **Pseudo-acceleration response spectra**
- **Duration based on Arias intensity**
- **USGS Shakemap input**

Near real-time event-based products available through Web frontend, including waveforms in different formats (SEED, SAC, ASCII..)

Engineering Strong-Motion (ESM) Database

- The major objective is to design a prototype infrastructure to store static (conventional) strong-motion databases from Euro-Mediterranean region and to retrieve accelerometric data ($M > 4.5$) from RRSM to elaborate it for engineering-related studies. (A dynamic engineering strong-motion database)
 - Establish a database structure (preference: ITACA model)
 - Initial population with existing data (from continuous archives or static archives) by setting standards for metadata information and data processing
 - Retrieve accelerometric waveforms from the EIDA nodes after receiving an alert from the EMSC
 - Uniform processing and metadata compilation of retrieved events to incorporate them to ESM

Overall Scheme of ESM



- The entire progress in NERA-NA3 as well as its objectives will be discussed in detail at the ORFEUS Observatory Coordination Workshop that will be held in Istanbul on November 12-14, 2012. The meeting will be hosted by the Kandilli Observatory and Earthquake Research Institute (KOERI).

Useful link to follow the workshop schedule:

www.pektas.net/orfeus