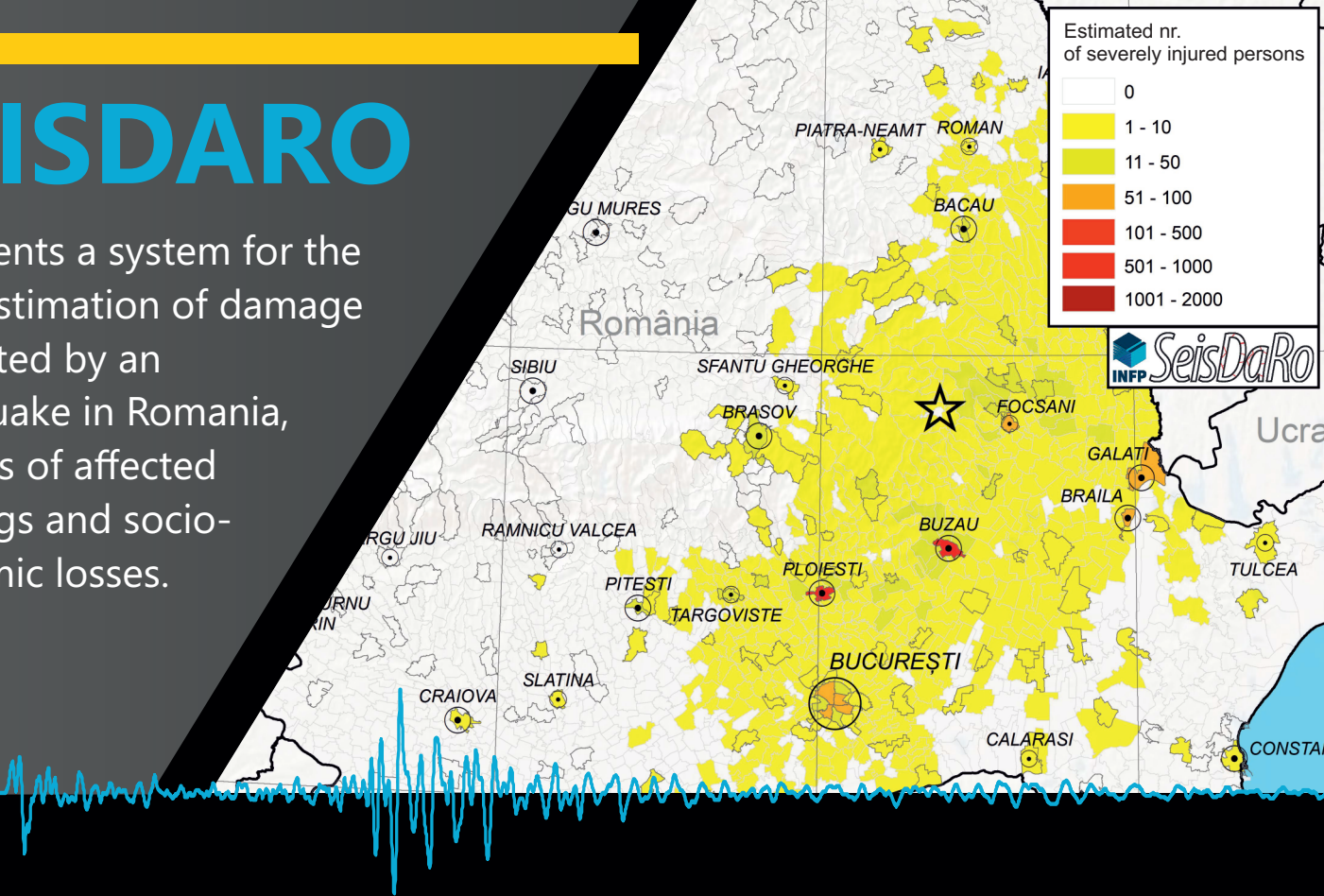# SEISDARO

Represents a system for the rapid estimation of damage generated by an earthquake in Romania, in terms of affected buildings and socio-economic losses.

Estimated nr. of severely injured persons
- 0
- 1 - 10
- 11 - 50
- 51 - 100
- 101 - 500
- 501 - 1000
- 1001 - 2000

Characteristics

SEISDARO (version 3) allows the rapid estimation of damage generated by earthquakes ≥ 4.0 M_L in Romania and nearby, using **two methodologies**:

PAGER

estimates at national level the probability of casualties for a certain severity interval, based on instrumental intensity values and correlations with previous earthquake casualty records.

SELENA

estimates, at commune/city/sector level, the number of residential buildings affected (more or less) and based on this the number of casualties (from slight injuries to potential deaths) and direct economic losses. The estimation is based on fragility functions for more than 49 representative building typologies (taking into account building material, construction period and height), acceleration values, analytical methods such as I-DCM or MADRS and consequence models. The computation can be adapted also to individual structures, also in conjunction with structural monitoring procedures.

Results of the PAGER module, for a scenario of the 4 March 1977 earthquake
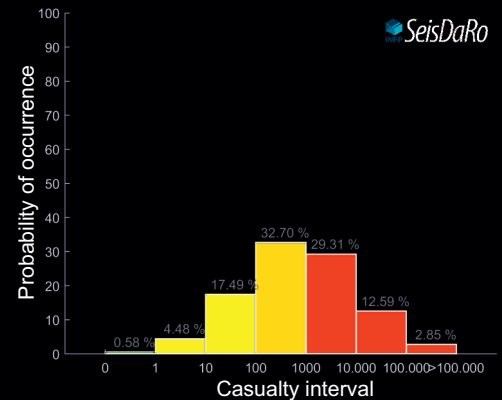
Both methodologies use as input **enhanced exposure data from the Romanian National Census in 2011** and **intensity measures and earthquake parameters from REWS or Shakemap** systems of INFP, which use data from the stations of the Romanian Seismic Network. Seisdaro also has a custom Shakemap module allowing direct scenario simulation and new methodologies for ground motion estimation.

Results (maps, graphs and GIS data) are generated, after receiving input data from REWS or Shakemap, in:
- **10-15 seconds (PAGER module)**
- **2-3 minute (SELENA module)**

Seisdaro was developed within important research project (such as DACEA, SERA, TURNkey or RO-RISK), with important contributions from top experts.

National Institute for Earth Physics, Romania
INFP

www.infp.ro

SEISDARO

Examples of applications

- Assistance in **emergency decision making and intervention planning**.
- In the elaboration of seismic risk maps (deterministic or probabilistic) and **the development of more efficient seismic risk reduction strategies.**
- **Contribution to risk modelling and business continuity planning**, for companies in industry or insurance and reinsurance.
- **Adaptation to specific facilities and assets**, allowing also for integration with other methodologies (such as the analysis of debris impact or network performance indicators).

Stakeholders relying on Seisdaro

- General Inspectorate for Emergency Situations in Romania (IGSU)
- S.C. OMV PETROM S.A.
- 4 prefectures in Romania, for Defense plans against earthquakes and landslides
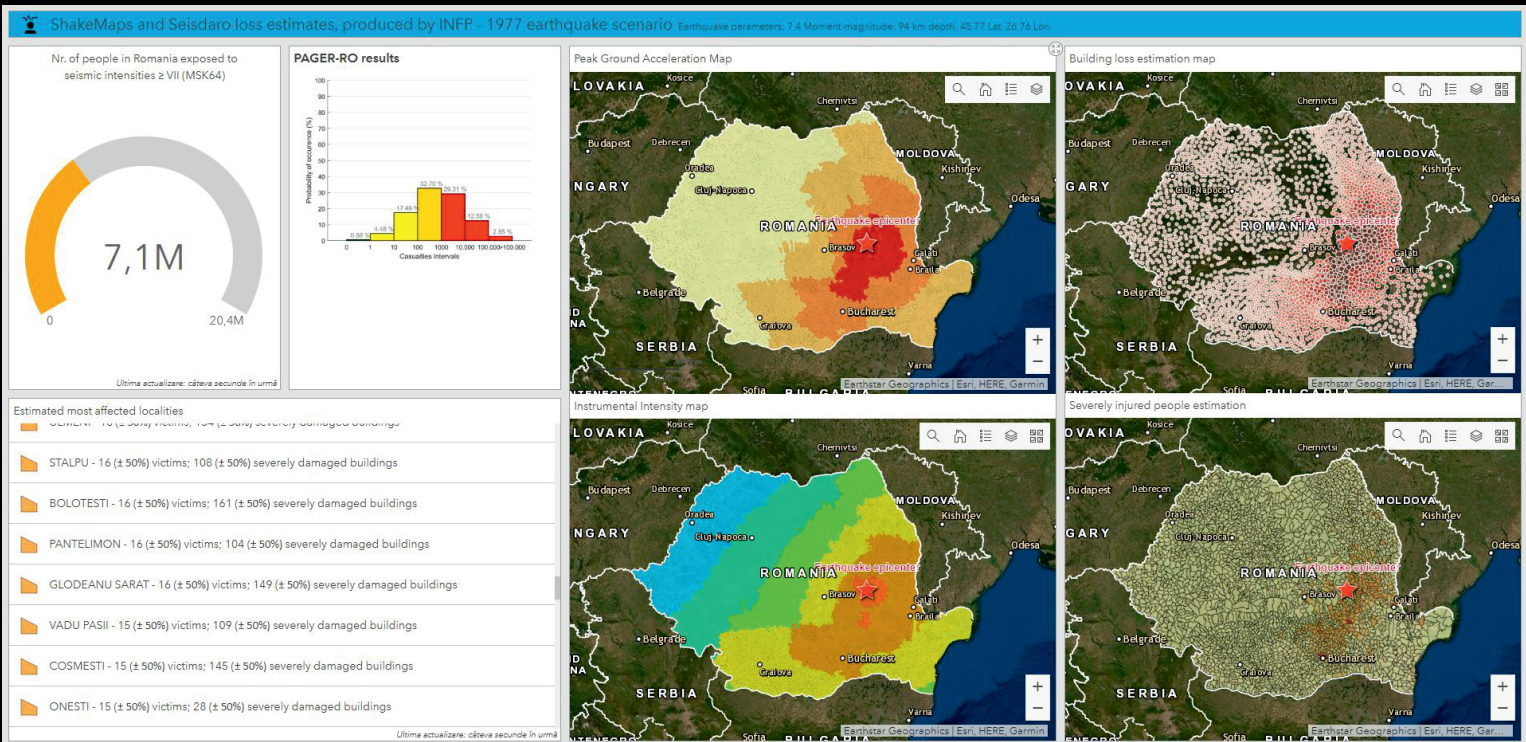
Example of Operational webGIS Dashboard created for a scenario of the 4 March 1977 earthquake (7,4 Mw, 94 km depth), bringing together decision support products from ShakeMap and Seisdaro.

Within INFP's collaboration with the Center for Risk Studies (CRMD) of the Faculty of Geography, University of Bucharest, Seisdaro was used for the estimation of residential buildings (at census unit level) which can be affected by strong Vrancea earthquakes; results were later used in the evaluation of socio-economic vulnerability (Armas et al., Vulnerability to Earthquake Hazard: Bucharest Case Study, Romania. International Journal of Disaster Risk Science, 8(2):182-195, 2017) .
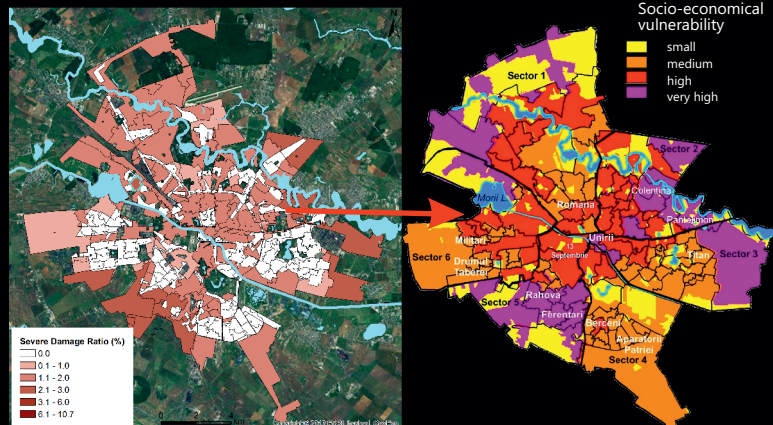
For a detailed offer and collaboration proposals, contact us at:
contact@infp.ro or +40722698438

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