EPOS PL polish national contribution towards EPOS infrastructure

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EPOS as a pan-European project may be a source of inspiration and motivation for the complex and ambitious efforts of building national research infrastructures (RI). Such a case happened in Poland, where new, national RI is aimed to facilitate research and to improve its outputs in the area of Solid Earth sciences. The areas of interest are anthropogenic seismicity, magnetism and magnetotelluric studies, GNSS observations, gravimetry, radiometry, deep seismic soundings and multiscale laboratories of Solid Earth. The project called EPOS-PL (No POIR.04.02.00-14-A003/16) is co-financed by the European Union from the funds of the European Regional Development Fund (ERDF). The project is run by the Consortium of scientific and industrial partners lead by Institute of Geophysics, PAS (IG PAS). Consortium members are: Academic Computer Centre CYFRONET AGH University of Science and Technology (ACC Cyfronet AGH), Central Mining Institute (CMI), Institute of Geodesy and Cartography (IGC), Wroclaw University of Environmental and Life Sciences (WUELS), The Jarosław Dąbrowski Military University of Technology (MUT) and Polska Grupa Górnicza (PGG) (industrial partner). Multidisciplinary approach to the scientific challenges with the use of the smart R&D environment in the form of web platform including dedicated software and visualization tools is one of the priorities of the project. Following this approach it is possible to conduct the research across the disciplines as well as within specific subject with the use of the EPOS-PL RI.

The first layer of RI is built by so-called Research Infrastructure Centers (RICs). RIC provides a complete dataset concerning given research field (e.g. seismic data, geodetic data, gravimetric data, geological data, geomagnetic data). Each national RIC has its own IT support. This solution ensures an effective data storage and basic computing resources. Data from all of the RIC will be served for EPOS through dedicated TCS's.

The following RICs are included in this layer:

- CIBIS - Induced Seismicity Research Infrastructure Centre,
- CIBOGM - Geomagnetic and Magnetotelluric Observations Research Infrastructure Centre,
- CIBAL - Analytical Laboratories Research Infrastructure
The second layer of innovative EPOS-PL infrastructure concerns the integration of infrastructure in the scale of Poland. Measurement polygons for the integrated observation of geodynamic processes are going to be built. The first polygons from the group of MUSE - Multidisciplinary Upper Silesian Episode - will be developed in mining and post-mining areas of Upper Silesian Coal Basin (Poland).

The first step for the creation of MUSE is to build an integrated geodetic observation system, which uses a combination of various point and surface measurement techniques. Additionally, in MUSE areas an integrated geophysical observation and measurement system will be used for observing physical processes, which take place inside the rock mass. The system will include local and regional seismological, geodetic, gravimetric and geophysical networks. Collected data and products will be integrated as a Multidisciplinary Upper Silesian Episode and shared through the IS-EPOS platform in the form of 3 new episodes forming a multiservice of TCS AH.

EPOS-PL is a multidisciplinary infrastructural project, but in broader perspective there are significant scientific goals, which built RI is aimed for. Data and data products obtained during EPOS-PL realization may be used in specialized research within every specialty represented in the project as well as in multidisciplinary, holistic approach exemplified by MUSE. These three integrated episodes of anthropogenic effects caused by long term underground mining will allow for complex scientific studies based on specialized observations of the geodynamic processes on the mining and post-mining areas. Integrated geodetic observation system is necessary for the purpose of such observations. This system will be a combination of various complementary measurement techniques, which allow validation and scaling. Simultaneously, the geophysical observations of the underground physical phenomena in rockmass and shallow subsurface layers will be carried out. Measurements will be performed with local and regional seismic networks, geodetic, gravimetric and other geophysical networks. Spatial and temporal integration of the various measurement techniques will allow complete geodynamical observations of the area. Multidisciplinary anthropogenic hazard studies of the chosen area will allow better understanding of the complex interaction between industrial operations and the environment. In such case the research and measurements should be carried out with the Polska Grupa Górnicza (PGG) allowance on their facilities. Building the super sites of integrated measurements and research within MUSE is a new way of building RI as well as opens the platform for bilateral knowledge transfer between industry and science. The framework of such
approach as a result of the project may be easily adapted and used in different environments and by different companies.