

# CzechGeo/EPOS

## Distributed System of Permanent Observatory Measurements and Temporary Monitoring of Geophysical Fields

Pavel Hejda and CzechGeo/EPOS Team



# Background

- In 2002 **ESFRI** (European Strategy Forum on Research Infrastructures) was established bringing together the EU Member States and defining the **priorities for developing excellent research infrastructures of pan-European character and impact.**
- **Specific legal instrument for financing research infrastructures of the Czech Republic** was established in 2009. The Ministry of Education, Youth and Sports (MEYS) was entitled to be the national authority for funding the **Large infrastructures for research, experimental development and innovation.**
- In 2009 the Institute of Geophysics was invited to join the initiative towards “preparation” of **Preparatory Phase of the European Plate Observing System – EPOS.**

# CzechGeo/EPOS 2010–2015

- Proposal **CzechGeo/EPOS – Distributed System of Permanent Observatory Measurements and Temporary Monitoring of Geophysical Fields in the Czech Republic – Development and Operation of the National Node of the Pan-European EPOS Project** was submitted in December 2009 and approved by government in March 2010 for financing (together with 14 other projects).
- Participating institutions
  - Institute of Geophysics of the CAS (IG CAS) – Hosting Institution
  - Masaryk University, Faculty of Sciences, Institute of Physics of the Earth (IPE MU)
  - Charles University in Prague
    - Faculty of the Mathematics and Physics, Department of Geophysics (FMP CU)
    - Faculty of Science, Institute of Hydrogeology, Engineering Geology and Applied Geophysics(FS CU)
  - Institute of Geonics of the CAS, Ostrava (IGN CAS)
  - Institute of Rock Structure and Mechanics of the CAS, Praha (IRSM CAS)
  - Research Institute of Geodesy, Topography and Cartography, Zdiby (RIGTC)

# CzechGeo/EPOS

The grant was awarded for six years 2010 – 2015

|              | operational costs | personal costs | overhead     | non-investments total | investments  | Total         |
|--------------|-------------------|----------------|--------------|-----------------------|--------------|---------------|
| IG CAS       | 2 500             | 3 143          | 458          | 6 101                 | 1 500        | 7 601         |
| IRSM CAS     | 2 200             | 3 101          | 400          | 5 701                 | 1 400        | 7 101         |
| IGN CAS      | 70                | 414            | 20           | 504                   |              | 504           |
| IP MU        | 250               | 775            | 150          | 1 175                 | 400          | 1 575         |
| FMP CU       | 300               | 775            | 100          | 1 175                 |              | 1 175         |
| FS CU        | 150               | 216            | 92           | 458                   |              | 458           |
| RIGTC        | 700               | 775            | 100          | 1 575                 |              | 1 575         |
| <b>Total</b> | <b>6 170</b>      | <b>9 199</b>   | <b>1 320</b> | <b>16 689</b>         | <b>3 300</b> | <b>19 989</b> |

Yearly budget (in ths CZK)

19 989 000 CZK is approx. 740 000 €

# Evaluation of RI's

Comprehensive evaluation of RI's in 2014

- to get basis for financing of infrastructures in 2016+
- more than 100 applications
- 58 positively assessed research infrastructures
- financial demands exceeded substantially the allocated budget
- government resolution from December 21, 2015
  - funding non-investments of all positively assessed RI's from the state budget (the budget was cut to 60% - 90%)
  - open a call for investments in the frame of structural funds (cohesion policy), Operational Program "Research, Development and Education"
- update of National Road Map

# National Road Map

Roadmap of Large Infrastructures for Research, Experimental Development and Innovation of the Czech Republic for the years 2016–2022

Ministry of Education, Youth and Sports



  
MINISTRY OF EDUCATION,  
YOUTH AND SPORTS

10.3 | Environmental Sciences

## Distributed System of Permanent Observatory Measurements and Temporary Monitoring of Geophysical Fields

**Acronym:**  
CzechGeo/EPOS

**Hosting institution:**  
Institute of Geophysics, Academy of Sciences of the Czech Republic

**Partner institutions:**

- Charles University in Prague
- Czech Geological Survey
- Institute of Geonics, Academy of Sciences of the Czech Republic
- Institute of Rock Structure and Mechanics, Academy of Sciences of the Czech Republic
- Masaryk University
- Research Institute of Geodesy, Topography and Cartography

**Responsible person:**  
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**Background description**

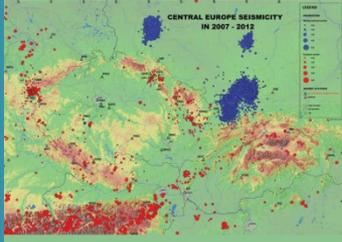
CzechGeo/EPOS is a distributed network of geoscience observations operated by the Czech research organisations. The system consists of permanent observatories (seismic, GNSS, magnetic, gravimetric and geodynamic), usually incorporated into global data networks, local stations or networks in areas significant in the long-term for basic research or applications, and mobile stations, which serve for repeated observations at selected points or for field measurements, usually within the scope of large international projects. CzechGeo/EPOS is closely connected with the pan-European research infrastructure EPOS (European Plate Observing System) and its service covers continuous monitoring of geophysical fields on the Czech territory and in selected areas abroad via long uninterrupted series of measurements on fixed sites, which are vital for understanding of Earth's interior processes. CzechGeo/EPOS provides user-friendly data access to global or regional data bases/repositories, including real-time data access whenever possible, transmits access to high-level products (e.g. waveform data, seismological bulletins and regional catalogues, geomagnetic indices) and integrates data in the frame of the Implementation Phase of the EPOS Project. CzechGeo/EPOS involves nearly all observational activities related to the solid Earth carried out by the Czech geoscience institutions. Through participation in more than 20 global or regional networks CzechGeo/EPOS builds up close cooperation with European partners and contributes substantially to better understanding of the processes in the Earth's interior.

**Future development**

Most of the observatories and networks of CzechGeo/EPOS will require moderate expansions and upgrade of components that are near the end of their working cycle or that have to be innovated in order to respond to the actual demands of the research community and to technological development. In addition to innovation of existing facilities, new components (e.g. West Bohemian Near Fault Observatory, *involving 3 boreholes*) are planned. Cooperation with EPOS will be aimed at contributing to and taking advantage of thematic and integrated core services. According to the strategy of EPOS, geological data will be newly included.

**Socio-economic impact**

CzechGeo/EPOS contributes through seismic and geothermal monitoring to an effective exploitation of geothermal energy. Exposure to shaking due to local and regional earthquakes is the major threat for safety of critical infrastructures, nuclear power plants in particular. Geophysical data are vital for exploration of sites for nuclear waste repositories as well. The research infrastructure also focuses on monitoring slope stability around the deep open pit brown coal mines in West Bohemia and other areas exposed to slope deformation. CzechGeo/EPOS closely cooperates with public authorities, e.g. State Office for Nuclear Safety (SÚJB) and Radioactive Waste Repository Authority (SÚRAD), as well as with companies in energetics or the mining industry.



▶ 70

# CzechGeo/EPOS 2016–2019

CzechGeo/EPOS – Distributed System of Permanent Observatory Measurements and Temporary Monitoring of Geophysical Fields

- Czech Geological Survey was invited to join the RI team (in accordance with the EPOS strategy)

The Infrastructure (about 20 networks and data centres) was divided into five Sections:

1. Section of seismology (IG CAS)
2. Section of GNSS and gravimetry (RIGTC)
3. Section of Geodynamics (IRSM CAS)
4. Section of Geomagnetism (IG CAS)
5. Section of geological and geophysical databases (CGS)

# Management

The CzechGeo/EPOS bodies are:

- The Board
- The Chair
- International Scientific Board

# Management

## The Board

- consists of representatives of the host and partner institutions appointed by their statutory authorities
- meets at least twice per year; section leaders are invited with consultative voice to the Board meetings.

## The Board

- takes care about the purpose the infrastructure was established for, about the application of public interest in its activities, and about its proper economic activities,
- determines the course of the infrastructure's activities and makes decisions on its future development with respect to recommendations of the European EPOS Infrastructure,
- approves budgets and its changes,
- appoints section leaders,
- approves annual reports.

# Management

## The Chair

- represents the infrastructure with respect to the Ministry of Education, Youth and Sport (MEYS) and other external bodies,
- represents the infrastructure especially in negotiations on accession to the European EPOS-ERIC infrastructure,
- is responsible for the preparation of annual reports and other documents according to the demands of MEYS, and, after being discussed in the Board (and approved, if needed), delivers these documents to the MEYS,
- submits project proposals to the funding agencies.

# Management

## **International Scientific Board**

- monitors the activities of the Infrastructure, in particular with respect to the quality of the offered data products and services and their significance for the scientific community,
- provides recommendations towards the development of the services and improvements of their quality,
- discusses project proposals, annual reports and draft budgets.

## **Members of the ISB**

- Carla Braitenberg, Dept. of Earth Sciences, University of Trieste
- Carine Bruyninx , Chair of the GNSS research group, Royal Observatory of Belgium, Chair of the EPOS Implementation Phase Council
- John Clinton, Director of Seismic Networks, ETH Zürich
- Jaroslava Plomerova, IG CAS, Leader of the Seismic Anisotropy Team
- Alan W.P. Thomson, Head of the Geomagnetism Team of BGS, Chair of INTERMAGNET Executive Council
- Jørgen Tulstrup, Geological Survey of Denmark and Greenland, Geological Datacentre, Head of Department

# Budget 2016–2019

## Funding by State Budget

|              | personal costs | membership fees in intl. organizations | operational costs incl. overhead | investments | Total         |
|--------------|----------------|--|----------------------------------|-------------|---------------|
| IG CAS       | 2 797          | 720                                    | 2 422                            |             | 5 939         |
| IRSM CAS     | 2 484          | 50                                     | 2 087                            |             | 4 621         |
| IGN CAS      | 261            |  | 62                               |             | 323           |
| IP MU        | 907            | 25                                     | 349                              |             | 1281          |
| FMP CU       | 838            |  | 398                              |             | 1236          |
| FS CU        | 248            |  | 186                              |             | 434           |
| RIGTC        | 2 012          |  | 3 227                            |             | 5 239         |
| CGS          | 2 050          | 220                                    | 2 083                            |             | 4 353         |
| <b>Total</b> | <b>11 597</b>  | <b>1 015</b>                           | <b>10 814</b>                    |             | <b>23 426</b> |

Yearly budget (in ths CZK)

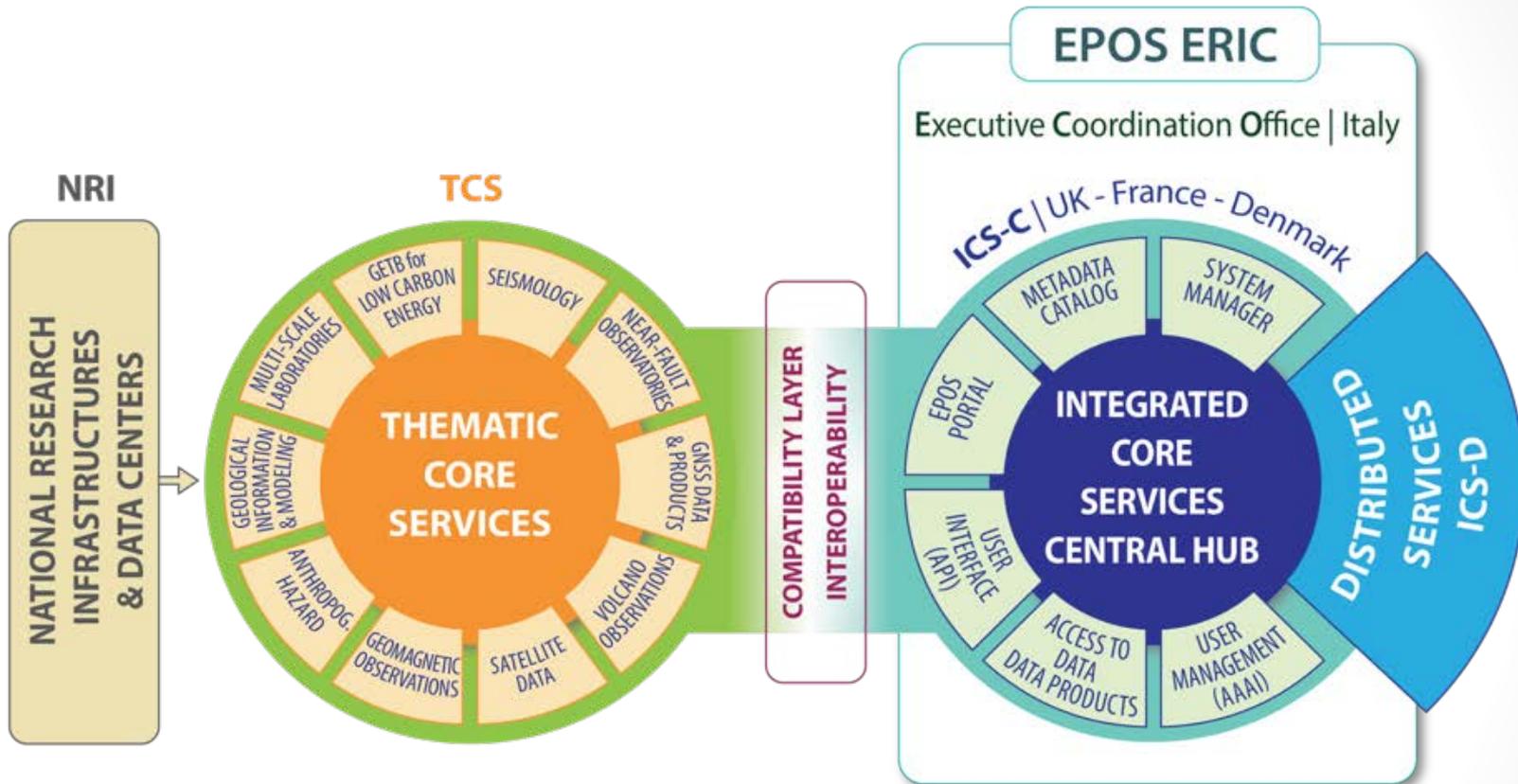
# CzechGeo/EPOS–Sci

- Application to the Operational Programme Research, Development and Education, Call 02\_16\_013, **Research Infrastructures**
- Dead-line for applications: 2 August 2016
- Supported activities:
  - the completion, construction, modernization and upgrade of infrastructure (investments)
  - the support of quality original research by the host institution, and possibly partner institutions, with the utilization of the research infrastructure
  - project management
- Our application passed successfully the formal check, objective evaluation is in progress

# CzechGeo/EPOS–Sci

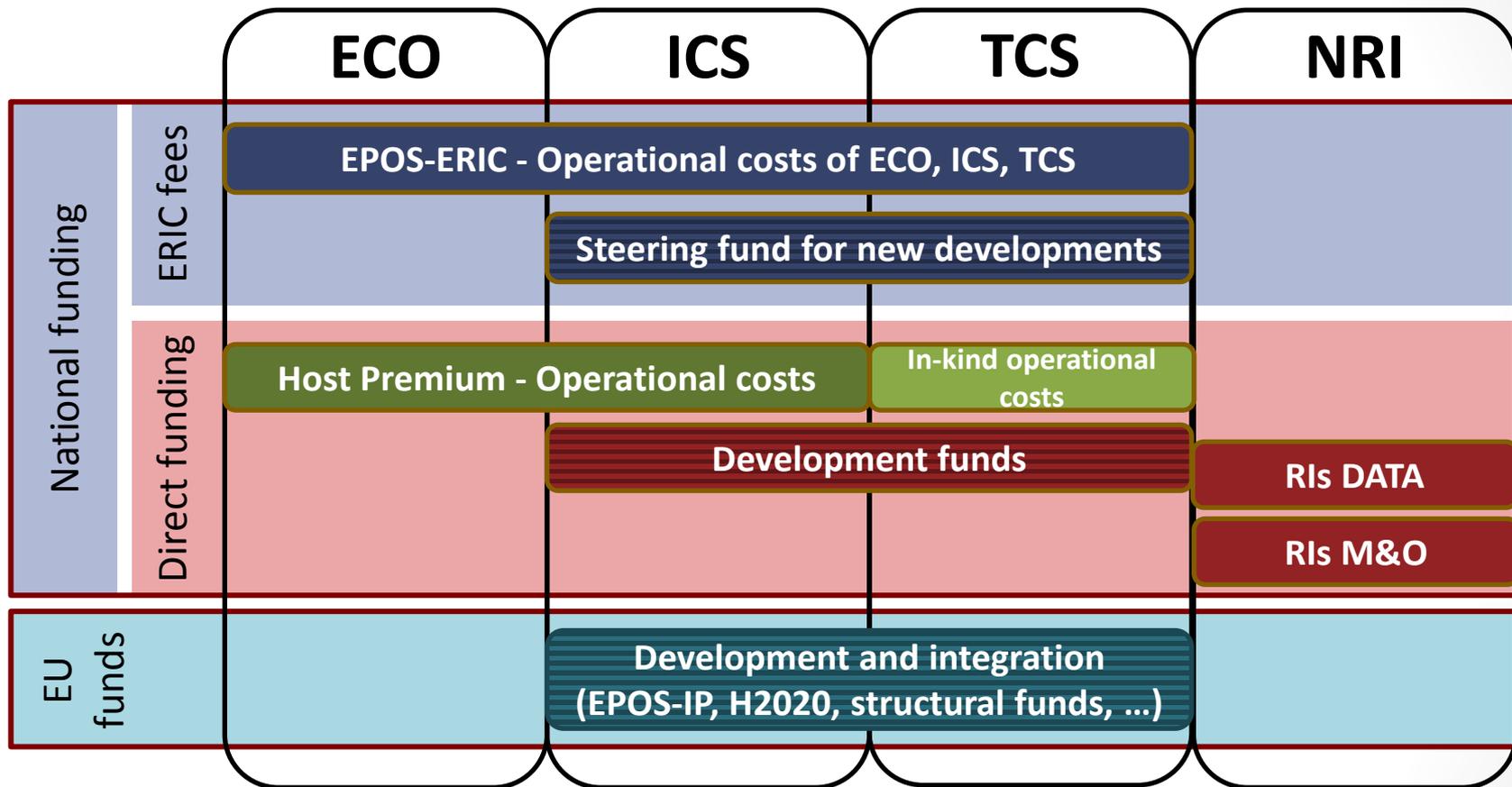
- Research programmes
  1. Investigation of intraplate seismicity on the territory of the Czech Republic and in close surroundings (SEIS)
  2. Structure of continental lithosphere and mapping LAB boundary in a broader surroundings of the Alps (DeepAlps)
  3. Development of infrastructure in the field of GNSS, gravimetry and Earth tides (GNSSgrav)
  4. Geodynamics
  5. Geological and Geophysical Data Infrastructure to Support Research
- Total budget for the period 2017–2020
  - Investments 42 820 000 CZK
  - Non-investments – direct activities 15 418 175 CZK
  - Indirect costs 5 991 825 CZK

# EPOS and CzechGeo/EPOS



CzechGeo/EPOS Participating Institutions create the Consortium that operates the National Research Infrastructures and Data Centers. It was the first National Consortium (established already in 2010) among all EPOS Countries.

# EPOS and CzechGeo/EPOS



Financial support of Large Research Infrastructures includes also mechanism for paying membership fees to ERIC.

# Evaluation of RI's 2017

- called on 1<sup>st</sup> November 2016
- dead-line for submission of completed forms 31<sup>st</sup> January 2017
- a separate form for International Scientific Board – dead-line 28<sup>th</sup> February 2017
- evaluation of existing RI's
- new applications possible

# Large Research Infrastructures

Act No 130/2002 Coll. on the Support of Research, Experimental Development and Innovation from Public Funds:

- “a unique research facility, including its acquisition and related investment costs and the costs of ensuring its activities that are essential for comprehensive research and development with heavy financial and technological demands and which is approved by the Government of the Czech Republic and established by one research organisation for the use of other research organisations”.

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- **⇒ open access**