Nordic EPOS – a FAIR Nordic EPOS Data Hub

Annakaisa Korja & Niina Junno

51st Nordic Seismological Seminar
September 30th 2020, on Zoom

https://www.helsinki.fi/en/infrastructures/nordic-epos

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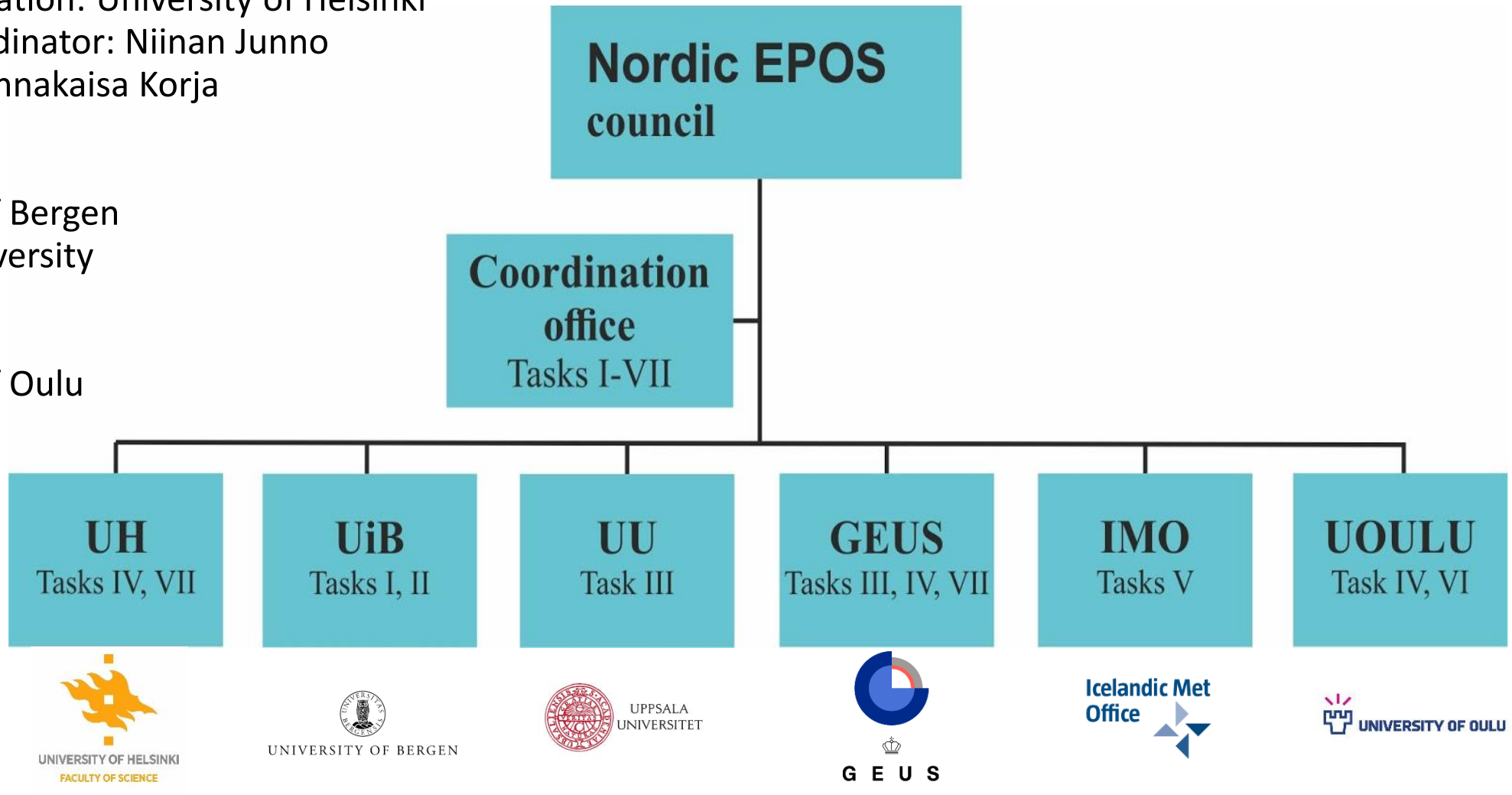
Nordic EPOS - A FAIR Nordic EPOS Data Hub

- Planned at Uppsala Nordic Seismological Seminar 2019
- Has been funded for 2 500 000 NOK by NordForsk
- Grade: 7 - Outstanding

- Host organization: University of Helsinki
- Project coordinator: Niinan Junno
- Project PI: Annakaisa Korja

- Partners:
- University of Bergen
- Uppsala University
- GEUS
- IMO
- University of Oulu



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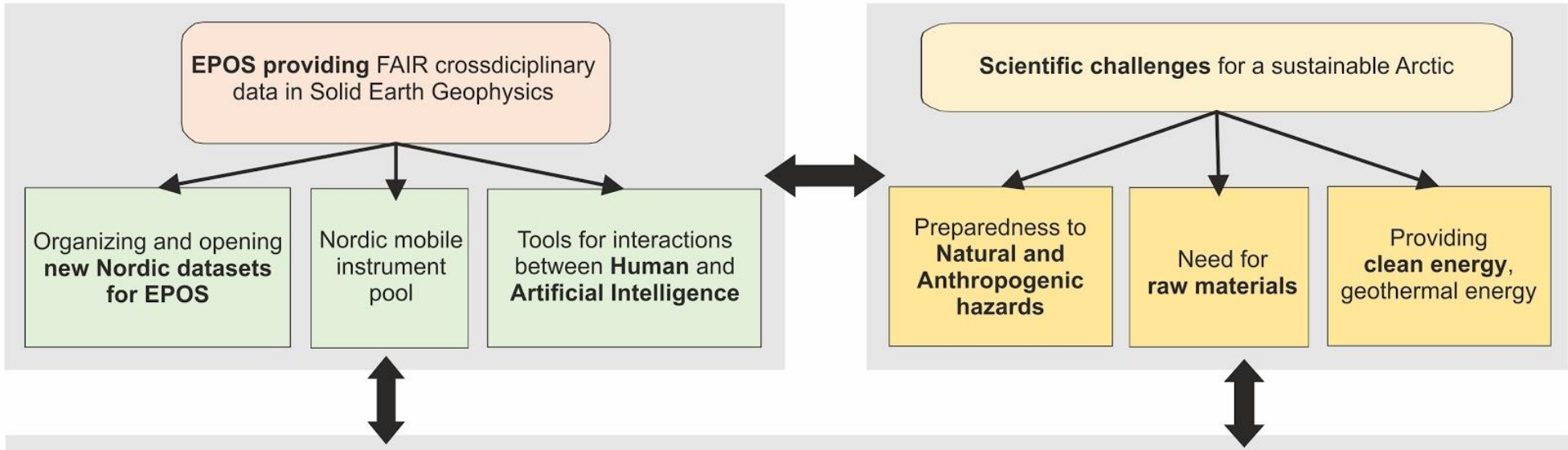

Nordic EPOS OBJECTIVES

OBJ-1 Unifying Nordic observatory practice to meet the EPOS quality standards
OBJ-2 Training of Nordic RI operators in FAIR principles and in EPOS data and metadata standards
OBJ-3 Promoting Open Access by expanding open data sets
OBJ-4 Formation of Nordic hubs for data delivery to EPOS TCSs
OBJ-5 Organizing a Nordic instrumentation pool and brokerage tool
OBJ-6 Education of Nordic scientists and students in EPOS data and metadata standards
OBJ-7 Advancing scientific and societal expertise in safe and sustainable Arctic
OBJ-8 Advancing Nordic interests in EPOS governance and science policy
OBJ-9 Increase the usage of EPOS data in academia, governmental agencies, municipalities, general public
OBJ-10 Suporting mobility for sharing knowledge in NRI operations

Contributing to the **Sustainability in the Arctic** societies
by using integrated Solid Earth Geophysics Big Data

Nordic EPOS ten main objectives

- Increase the awareness and the usage of Nordic EPOS data, data products, software and service
- Increase the amount of Open Access data and cross-border usage of portable instruments
- Support the building of expertise in data and methods needed for safe and sustainable societies.

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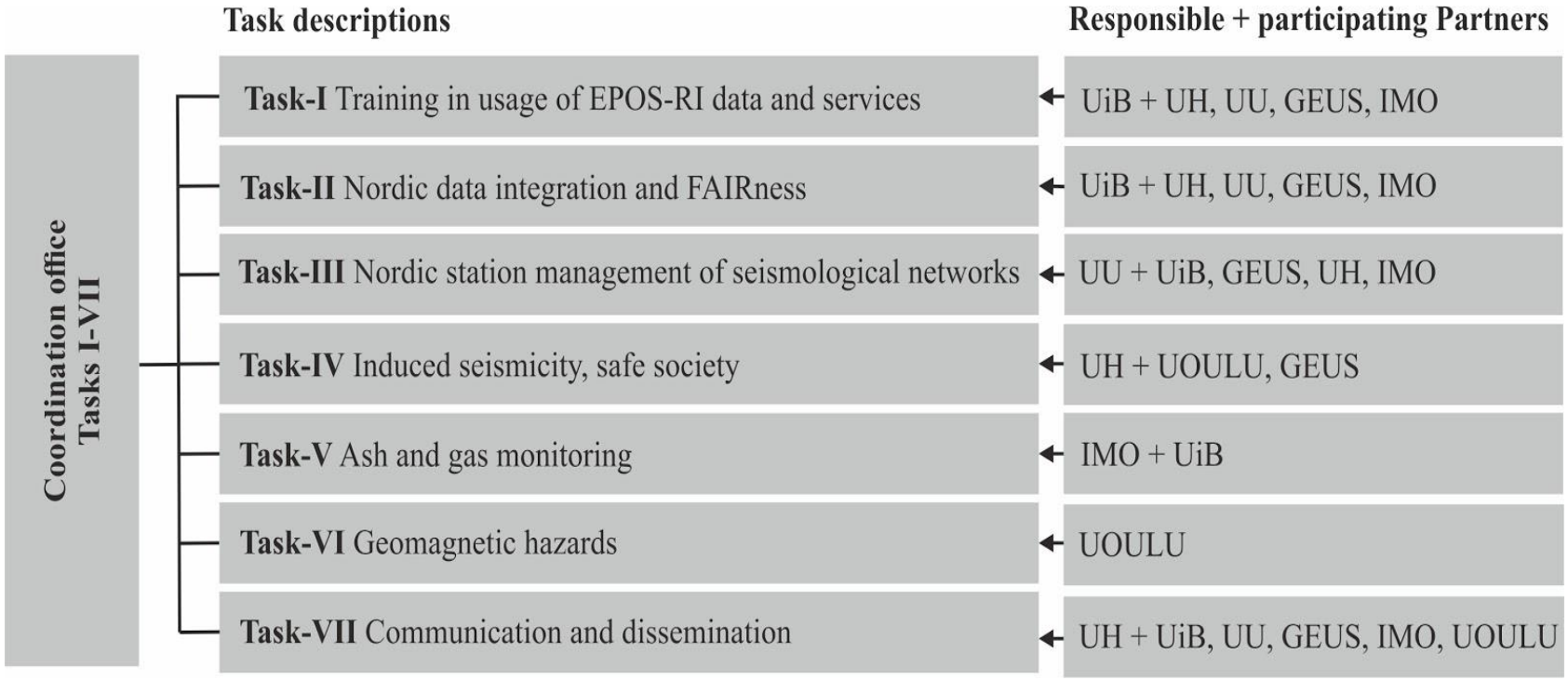
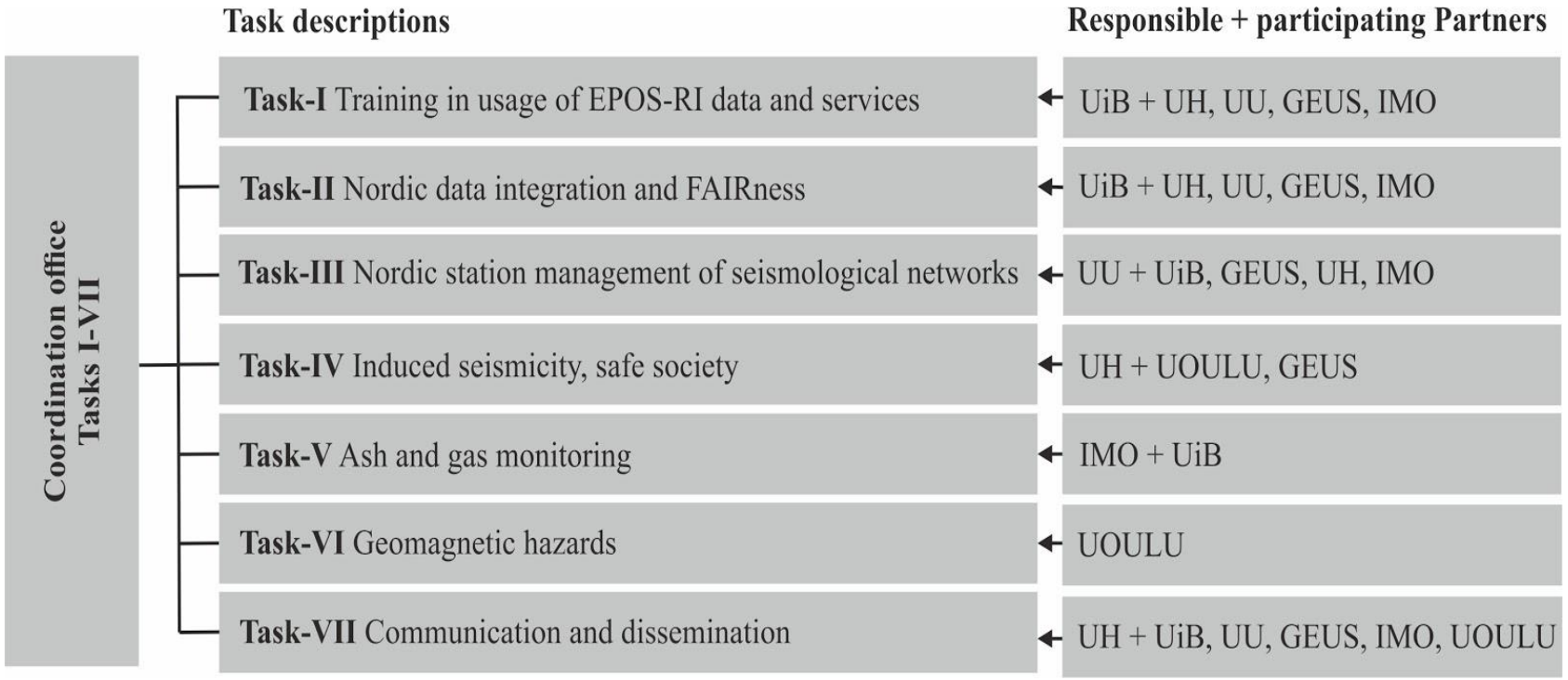


Organizing Tasks I-VII

- Advance the usage of multi-disciplinary Solid Earth data sets on scientific and societal problem solving
- Increase the amount of open, shared homogenized data sets
- Increase the scientific expertise in creating sustainable societies in Nordic countries and especially in the Arctic region.
- Developing services better suited for Nordic interest for EPOS
- Bring forward Nordic research interest, such as research of Arctic areas in TCS and EPOS-ERIC governance and scientific boards.

Tasks I-VII & Activities



- **Six infrastructure TASKs I-VI**
- **One transversal TASK VII on communication**
- Each of the main partners is responsible for several Activities in one or several TASKs. Many of the TASKs are addressing several objectives.
- The **activities** within the TASKs are
  - Workshops, tutorials, demos and actual and virtual training sessions,
  - Website
  - Communication and dissemination of EPOS data and metadata information
    - at local, national and international workshops, meetings, conferences

Nordic-EPOS timetable of TASKs, activities and milestones Tasks I-III

	2020	2021	2022
Task-I **Training in usage of EPOS-RI data and services**		**Activity 1:** EPOS-N portal **demo and training** during EPOS-Norway Project Final Workshop (organized in January 2021)	
		Activity 2: Workshop on EPOS-RI for the countries around Baltic	
Milestone		Arctic Usercase material becomes Open Access	
Task-II **Nordic data intergration and FAIRness**	**Activity 1: Virtual training session 1** in data quality, archiving and curation	**Activity 1: Virtual training session 2** in data quality, archiving and curation	**Activity 1: Virtual training session 3** in data quality, archiving and curation
	Activity 2: ONLINE training session 1 in implementation of FAIR principles and metadata standardization and harmonization.	**Activity 2: Training session 2** in implementation of FAIR principles and metadata standardization and harmonization.	**Activity 2: Training session 3** in implementation of FAIR principles and metadata standardization and harmonization.
	Activity 3: Development of **tutorials** on DMP and FAIR principles.		
Milestone	Virtual training material is published	FAIR principles and metadata standardization and harmonization matrial on line	New project data becomes FAIR and Open Access
Task-III **Nordic station management of seismological networks**	**Activity 1:** The procedure of establishing a EIDA-node within EPOS Seismology	**Activity 2:** Delivery of appropriate parametric earthquake data to the EPOS Seismology	**Activity 3:** Interactions with the EFEHR
	Activity 4: Workshop and **technical tutoria**l on Best practices for RI applications during the Seismological Seminar in Sept 30 - Oct 2 in Copenhagen, Denmark (participation possible also remotely (Online))	**Activity 5: Seminar** on efficient RI management and services during the Seismological Seminar in Reykjavik, Iceland	**Activity 6: Workshop** and **technical tutorial** on best practices for data management during the Seismological Seminar in Helsinki
Milestone		FENCAT database link to EMSC/EPOS database	

Nordic-EPOS timetable of TASKs, activities and milestones Tasks IV-VI

Task-IV **Induced seismicity, safe society**		**Activity 2: Workshop** Beyond earthquake counts: How to improve reservoir characterization? (Helsinki)	
	Activity 4: ONLINE workshop on geophysical monitoring of critical infrastructures in the Arctic environment, multi hazard assesment and social license to operate (Pyhäsalmi)	**Activity 3: Workshop** on Fractures in Complex Rock, Fluid connectivity, Borehole seismology and Enhanced Geothermal Systems (Helsinki)	
	Activity 6: Advanced processing of seismological data (workshop organized during Seismological Seminar in Copenhagen in Sept 30 - Oct 2)	**Activity 5: Training** on mining geophysics in seismic hazard assesment in underground mines (Pyhäsalmi)	**Activity 6:** Advanced processing of seismological data (Copenhagen)
		Activity 7: Tutorial on innovative technologies for monitoring underground infrastructures; preparation of muon monitor data for EPOS (Oulu)	
Milestone	A wotrkshop together with regulator community	Training of young experts on induced seismicity data for societal benefits	Training of RI technical staff in best practises
Task-V **Ash and gas monitoring**		**Activity 1: Training sessions** on volcanic gas and tephra, Iceland	**Activity 2: Training sessions** on volcanic gas and tephra, Iceland
Milestone		Volcanic Usercase material becomes Open Access	Volcanic Usercase material becomes Open Access
Task-VI **Geomagnetic hazards**		**Activity 1:** Digitalization **workshop** on Historical geomagnetic data recovery and magnetic shield	**Activity 3:** Drone campaig for magnetic environment monitoring
		Activity 2: Field course on new activity indicators for monitoring long-term changes (participation also possible remotely (Online))	**Activity 2: Field course** on new activity indicators for monitoring long-term changes
Milestone		Magnetic usercase material becomes Open Access	Training of young experts on

Nordic-EPOS timetable of TASKs, activities and milestones
Task VII

Task-VII **Communication and dissemination**	**Activity 1:** Communication & dissemination activities Arcticle in EPOS news letter, university news letters	**Activity 1:** Communication & dissemination activities Arcticle in national expert journals,	**Activity 1:** Communication & dissemination activities Articles in scientific journals
	Activity 2: Developing a web-site for Nordic EPOS Hub	**Activity 3:** Promoting Nordic EPOS Hub, national meetings, session in EGU 2021	**Activity 3:** Promoting Nordic EPOS Hub, Nordic Geological Winter Meeting Reykjavik, national meetings, Lithosphere 2022 meeting
			Activity 4: Brokerage of Mobile instrument pool
	Activity 5: Advancing Nordic research agendas and data needs. EPOS GA, national road map proposals	**Activity 5:** Advancing Nordic research agendas and data needs. EPOS GA, national road map proposals	**Activity 5:** Advancing Nordic research agendas and data needs. EPOS GA, national road map proposals
		Activity 6: Mobility of young scientist, students, guest researchers, operators	**Activity 6:** Mobility of young scientist, students, guest researchers, operators
Milestones	Nordic EPOS web page is launched	Standard promotional material available on line	Brokerage system is publiched on-line
	Nordic EPOS data become more widely recognised within Nordic academia and students.	Nordic EPOS data become more widely recognised within industry and academia.	Nordic EPOS data become more widely recognised within environmental scientists.

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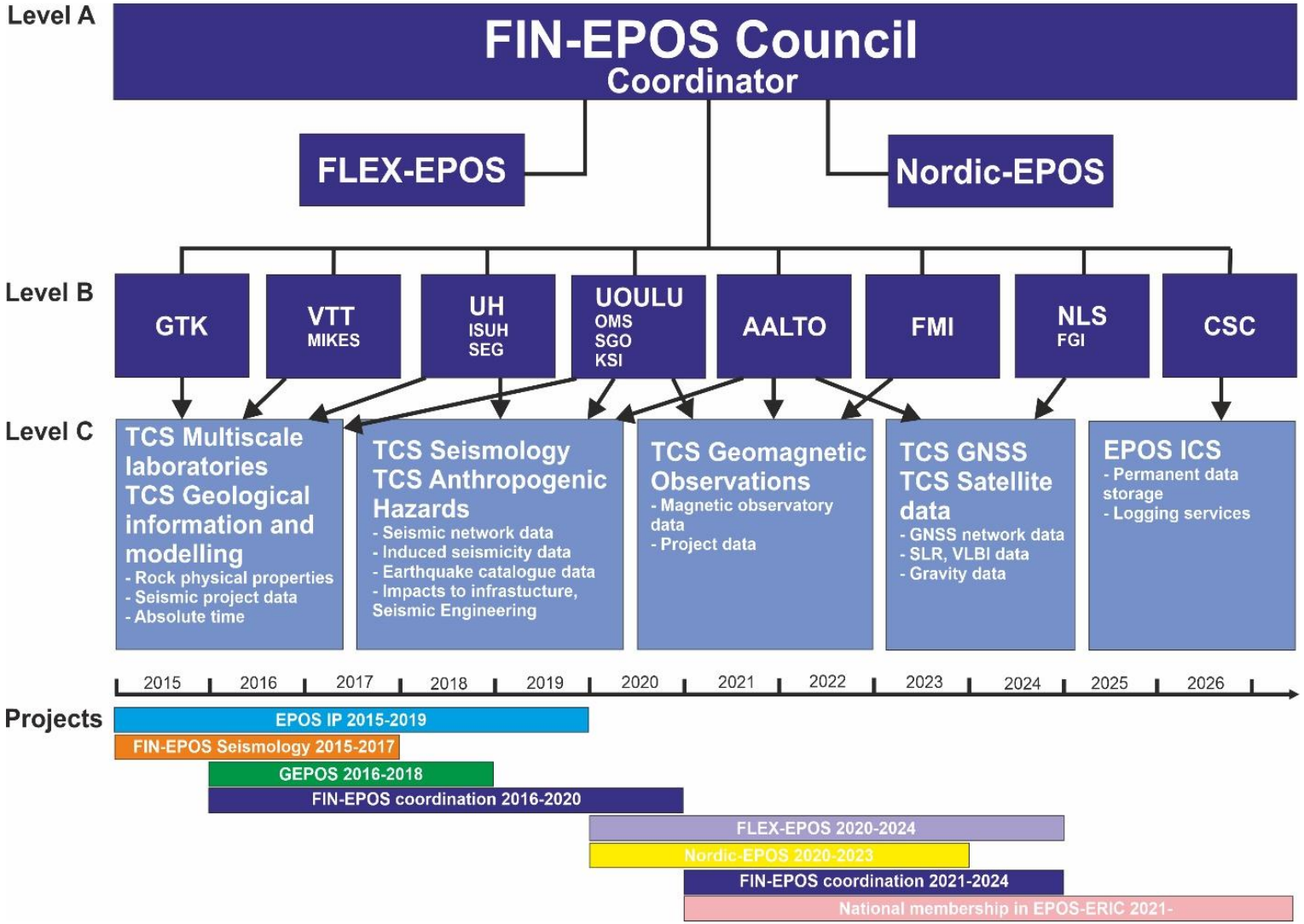
News from FIN-EPOS

- A new FIN-EPOS Consortium agreement signed in May 2020
- Roadmap application submitted; evaluated 5/6, now to be prioritized by organizations
- National membership negotiations in EPOS-ERIC to be started.
- Funding for national coordination and participation in EPOS funded for 2021-2024.
- FLEX-EPOS funded 2020-2024; total funding 4,1 M€



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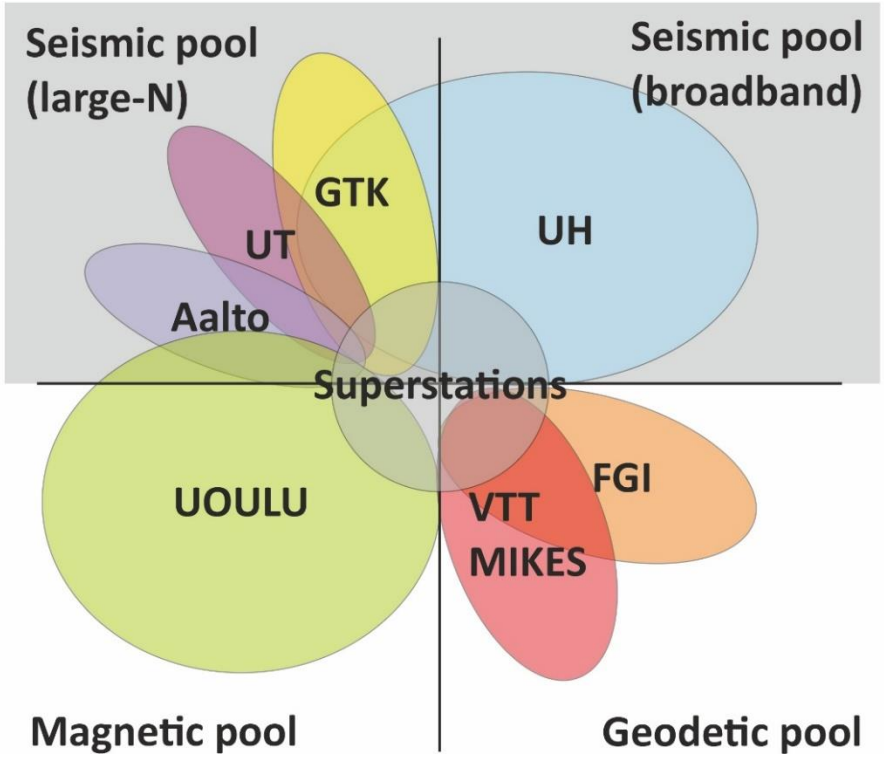
FLEX-EPOS Flexible instrument network for enhanced geophysical observations and multi-disciplinary research

Active seismic studies
Passive seismic studies
Noise measurements
Engineering seismology
Mining and exploration



Passive seismic studies
Seismicity studies
Earthquake monitoring
Noise measurements
Engineering seismology

Aerogeophysics (drones)
Magnetic storms
Magnetic field changes
Space weather

Potential fields
Atomic clocks (UTC)
Glasio-isostatic uplift
Crustal deformation

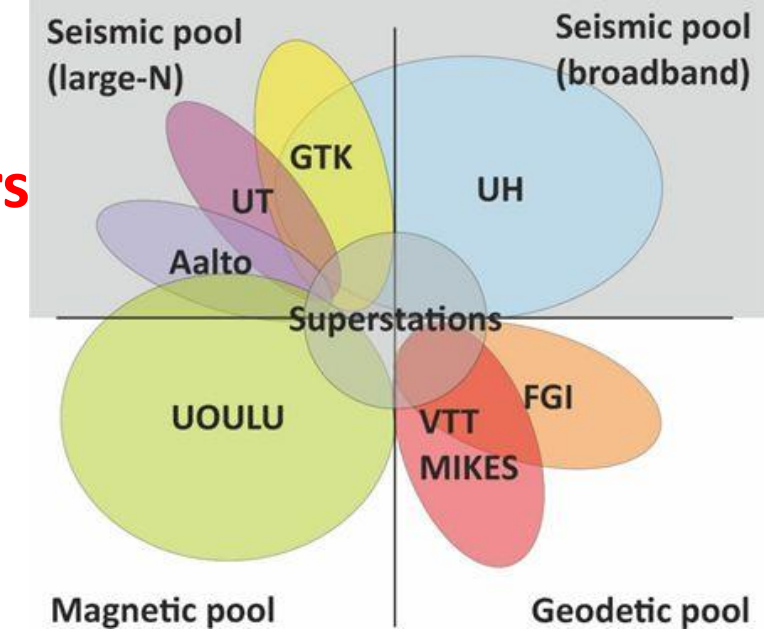
- **Funded through Academy of Finland's FIRI2019 call for 2020-2024; total funding 4,1 M€.**

FLEX-EPOS

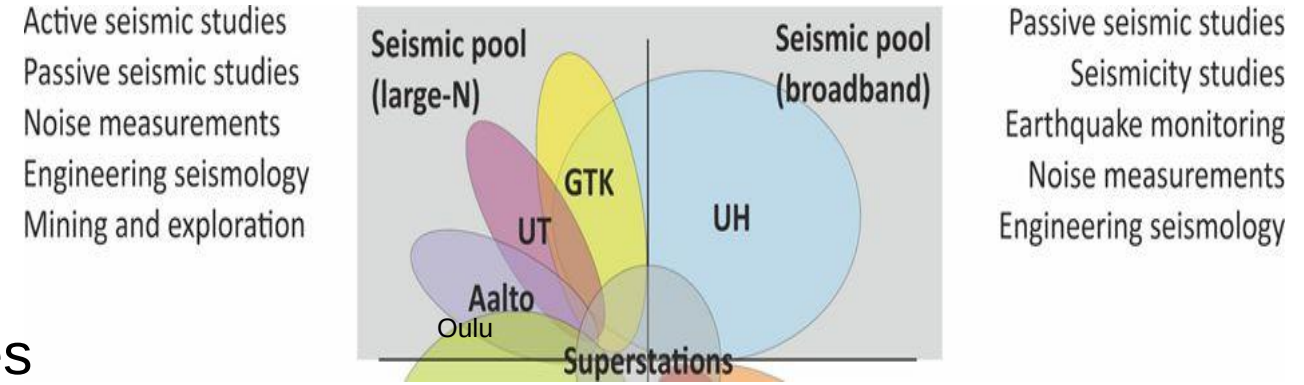
- Tackles fundamental research questions in seismology, geomagnetism and geodesy.
- Creates **a national pool of geophysical instruments** & **a network of multi-disciplinary geophysical superstations**
- Expands the geophysical and geodetical observational capability
- Provides massive new datasets, observations and results
- Strengthen and extend the role of Finland in EPOS.

The instrument pool

- Is created, maintained and operated by **FLEX-EPOS partners**
  - **Universities of Helsinki, Oulu, Turku, Aalto**
  - Governmental research institutes: **GTK, VTT, FGI**
- Comprises **seismic, magnetic and geodetic** instruments
- Available for short- and long-term data collection



Seismic pool



- A 5-year build-up period 2020-2024
- 1000-1500 Large-N 3-component nodes
- ca. 60 BB seismometers
- Currently, the tendering process is on-going.
- Available for short- and long-term data collection via an application process
- The exact rules of the instrument pool are being drafted.
- First instruments will be available for lending early next year.
- Research projects involving FLEX-EPOS Consortium partners will be prioritized.
  - Third party research cooperation with FLEX-EPOS Consortium partners is encouraged.
- The seismic instrument pool can also be used outside FLEX-EPOS Consortium.

- To contact FLEX-EPOS use email flex-epos@helsinki.fi


THANK YOU and HAVE A NICE AUTUMN !