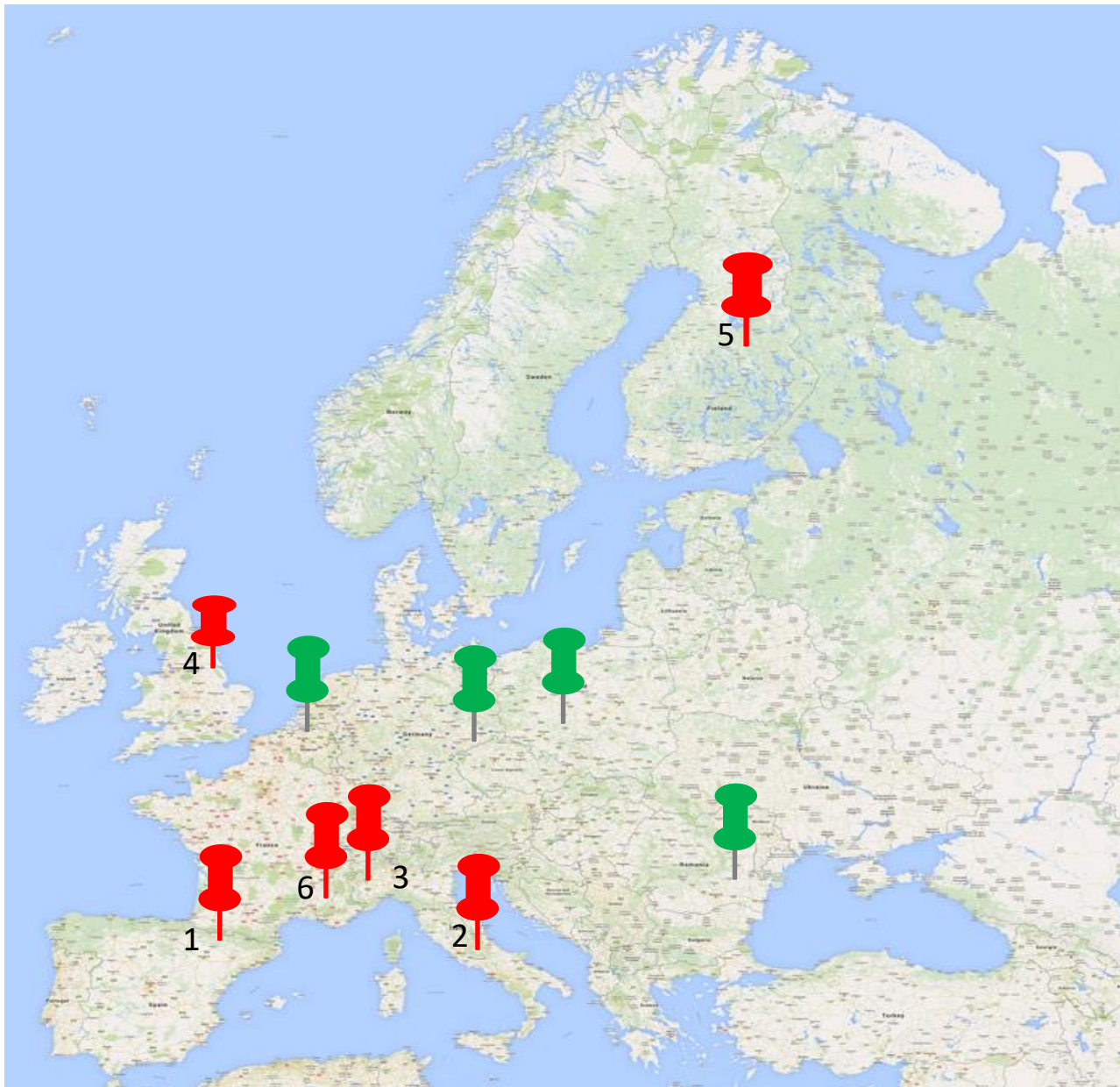


Networking and Coordination of Underground Laboratories

Aldo Ianni
APPEC GA
July 19th, 2022



- EU underground facilities
- In red are highlighted:
 1. LSC
 2. LNGS
 3. LSM
 4. Boulby
 5. CLAB
 6. LSBB

A network for ULs

- EU ULs network
 - Foster coordination to support R&Ds and future projects
 - Perform an overview of existing and planned facilities to support research
 - Define the possibility to use facilities in different labs
 - Future sharing of operations practices and work load
 - identify common interests
 - Establish a Transnational Access Agreement with contact experts to lead communication with Collaborations
 - Create a bank of screened materials for future use
 - Ensure continuation of know-how and expertise of personnel
 -

Workshop on EU Underground Laboratories

- Held at LNGS 28-29 April 2022
- Organized by EU ULs and APPEC
- Contributions from: LNGS, LSC, LSM, Boulby, LSBB, CLAB, HADES, UL Romania, ChETEC-INFRA Germany, UL Poland
- Summary of round table discussion:
 - **The Directors/Representatives of the European Underground Laboratories participating in the meeting agreed on initiating regular Lab Director's meetings, inclusive to other Underground Laboratories, to evaluate the current situation and plans on common services and activities and to identify future actions of common interest.**

APOGEIA

- Proposal submitted to HORIZON-INFRA-TECH April 2022
- Coordinator: Stavros Katsanevas
- Budget 10M€
- EU ULs have participated with a common effort in a specific Work Package named «Underground technologies», budget ~ 3M€ with main topics:
 - T1: SiPM based innovative photo-detectors
 - T2: Superconducting sensors in ultra-low background environments for quantum computing
 - T3: Innovative technology in radio-purity assay
 - T4: New technology for Rn-free environments
 - T5: New advanced technologies for cryogenic infrastructures
 - T6: Additive manufacturing for rare events searches
 - T7: Biology in ULs
 - T8: Safety and engineering in ULs
- APOGEIA is a step stone to foster collaborations between ULs

APOGEIA

WP5:

Underground Technologies

Task	T1	T2	T3	T4	T5	T6	T7	T8
Lead participant	LNGS	LSC	Boulby	LSM	LNGS	LNGS	LSC	CLAB
Other participants	LSC	LNGS	LNGS, LSC,LSM	LNGS	LSBB	LSC, Boulby	LNGS, Boulby, LSM, CLAB, LSBB	LNGS, Boulby, LSM, LSC, LSBB

COST Action 2022

- EU ULs and interested Institutions are working on submitting a COST Action proposal by Oct 2022 to foster networking on **cutting edge science and technology in underground laboratories**
- 14 participants

Participant ID	Name of Institution	Address	Country	Contact
1	LNGS	Via Giovanni Acitelli 22, 67100 Assergi	Italy	Ezio Previtali
2	Univ. MI Bicocca	Piazza della Scienza, 3, 20126, Milano	Italy	Maura Pavan (maura.pavan@mib.infn.it)
3	LSC	Paseo de los Ayerbe s/n 22880 Canfranc-Estación	Spain	Carlos Pena-Garay
4	Ikerbasque professor of physics Donostia International Physics Center (DIPC)	Paseo Manuel de Lardizabal nº 4 20018 Donostia-San Sebastián, Gipuzkoa	Spain	J. J. Gomez-Cadenas (jjgomezcadenas@dipc.org)
5	LIBPhys-UC, Department of Physics,	University of Coimbra, 3004-516 Coimbra	Portugal	Cristina Maria Bernardes Monteiro (cristinam@uc.pt)
6	LSM	1125 route de Bardonnèche 73500 MODANE	France	Jules Gascon
7	LSBB	279 Chemin de la Grande Combe 84400 Rustrel	France	Ignazio Lázaro Roche
8	Boulby	Boulby Mine Loftus, Saltburn-by-the-Sea Cleveland	UK	Sean Paling
9	CLAB	Oulu University	Finland	Julia Puputti/ Jari Joutsenvaara
10	IFIN-HH	Researcher, Astroparticle Physics Group, Horia Hulubei National Institute for Physics and Nuclear Engineering Str. Reactorului 30, 077125, Magurele	Romania	Romulus Margineanu (romulus@ifin.nipne.ro)
11	Nicolaus Copernicus Astronomical Center of the Polish Academy of Sciences	Bartycka 18, Warsaw, 00-716	Poland	Leszek Roszkowski (leszekr1@gmail.com)
12	Institute of Physics, Jagiellonian University	Stanisława Łojasiewicza 11 30-348 Krakow	Poland	Grzegorz Zuzel (grzegorz.zuzel@uj.edu.pl)
13	Czech Technical University in Prague (Institute of Experimental and Applied Physics)	Jugoslávských partyzánů 1580/3 160 00 Praha 6 Czech Republic IN - CZ68407700	Czech Republic	Ivan Stekel (Ivan.Stekel@utef.cvut.cz)
14	Institute for Nuclear Research of NAS Ukraine, 03028 Kyiv	Kiev Institute for Nuclear Research, 03680 Kiev, Ukraine	Ukraine	Fedor Danevich (fedor.danevich@lngs.infn.it)

APPEC Town meeting and ULs

- APPEC Town meeting in Berlin June 10th, 2022 for «Inventory of Central infrastructures»
- Main focus: science and technology in underground laboratories
- Questions from organizers
 - **What are the models for closer cooperation for European underground labs and RI?**
 - **What issues can best be solved by European underground labs jointly?**

APPEC Town meeting and ULs [2]

- Outcome of discussions based on questions from organizers
 - Discussions attended by ULs representatives and representatives from Collaborations (XENONnT, LEGEND, DarkSide-20k, ...)
- Reinforcing the network between ULs will improve efficiency in responding to Collaborations requests
- Need to establish a Transnational Access Agreement with contact experts in fields of interests for next generation experiments
- Support establishment of a bank of screened materials
- Establish a long term program to support know-how and expertise of personnel in specific technical topics (radio purity assay, cryogenics ...)
- Foster/facilitate collaboration between ULs for outfitting/deployment of next generation experiments
- Optimize underground space and facilities between ULs for R&D activities for next generation experiments
- Enlarge horizon: diversify, share expertise to support ET, ...
- Take under consideration a possible central EU structure for ULs

APPEC Town meeting and ULs [3]

- Suggested recommendations requested to APPEC
 - Include in the roadmap the co-operation between ULs as a key parameter to facilitate the path to the next generation experiments
 - Facilitate the use of small labs for proof-of-principle projects
 - optimization of underground space and facilities use
 - Ensure the continuation of existing personnel expertise in specific technical topics
 - Facilitate a possible EU ULs central coordination to better support a scientific program and work load for next generation experiments; face increasing manpower and funding needs
 - Coordinate strategy for future developments
 - Investments optimization