New underground laboratory in Pyhäsalmi Mine

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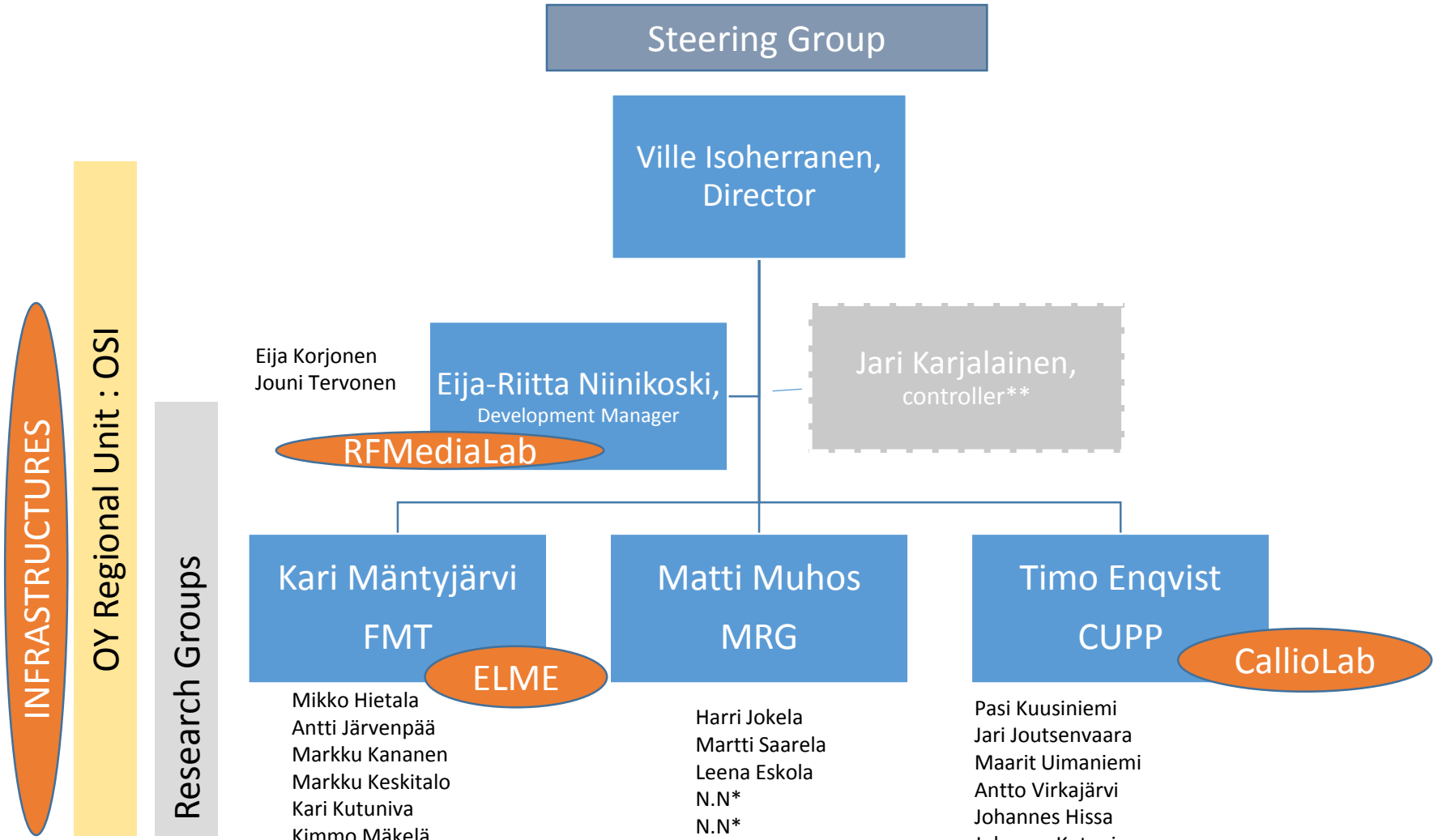
Calliolab Executive Summary

- Located in the Pyhäsalmi Mine, Finland
- Fully serviced Calliolab offers the unique facilities and opportunities.
- Wide variety of spaces already exists, and new spaces can be developed based on specific requirements.
- **We invite scientific actors to locate their operations in Callio Lab:**

  ➔**More about Open Call,** please visit www.calliolab.com

OSI organization



**Shared

OSI Profile

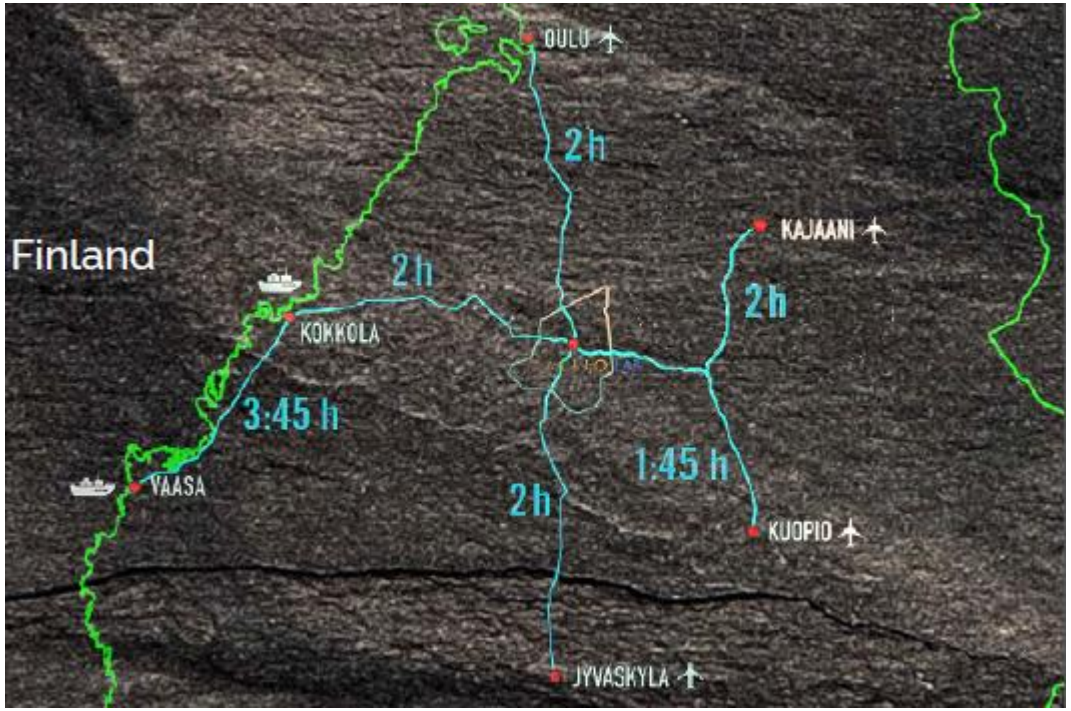
Oulu Southern Institute (OSI) research is focused on Micro Enterprises development, publication of research data of these companies, and new innovations and fast experiments advancement to support the ***Operational Excellence of Micro Enterprises***, which is the OSI research theme. Especially, the focus is to productize advanced steels and the production technology cost effective development

Research is based on outside of main campus research infrastructures, such as Engineering Workshop 'ELME-studio' (Nivala) and Underground Laboratory CallioLab (Pyhäjärvi). These collaborational research infrastructures and the **'Living Lab of Micro Enterprises' create exceptional and unique research environment in the Oulu South.** These infrastructures are systematically developed by strategic planning together with regional partners.

CallioLab Location

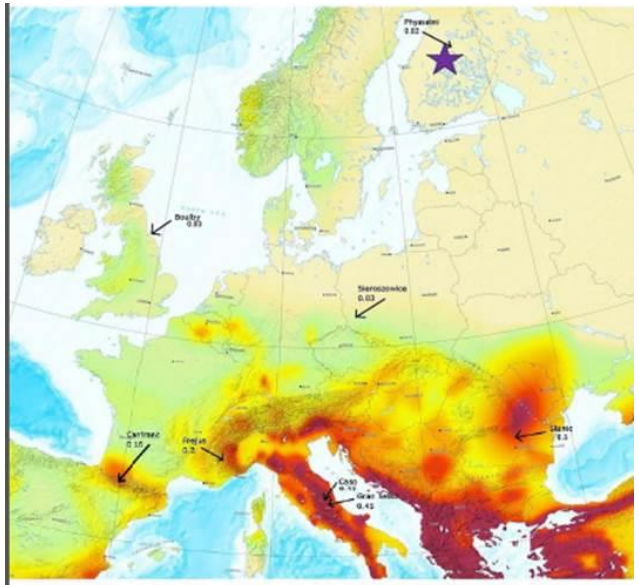
CallioLab is located in the Pyhäsalmi Mine, in the town of Pyhäjärvi, in the middle of Finland.

Easy to access to international airport (Oulu Airport) with less than 2 hours car drive!

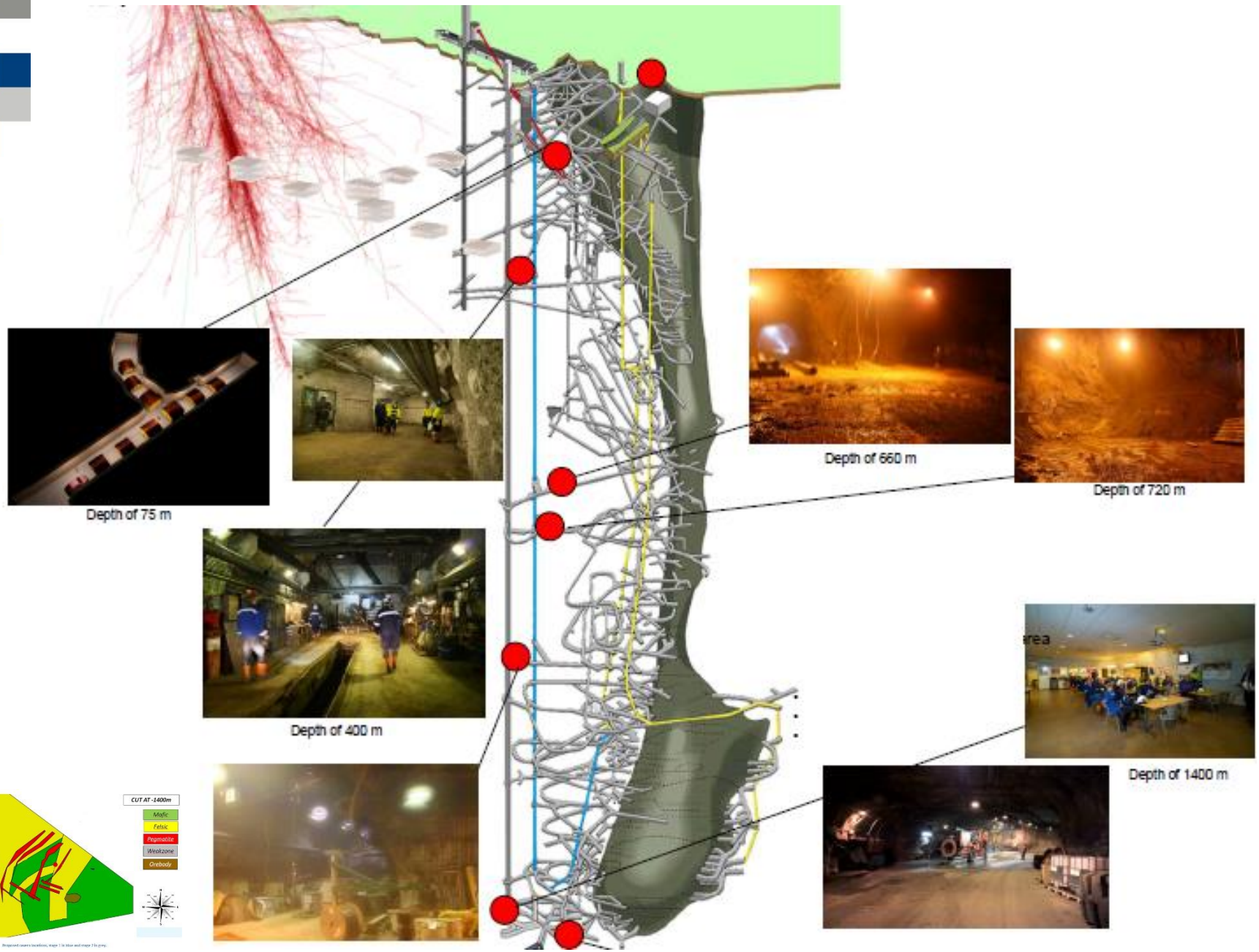


About CallioLab

- CallioLab is located in the Pyhäsalmi Mine, in central Finland. The Pyhäsalmi Mine is a copper, zinc and pyrite mine being the deepest active metal mine in Europe with the main level at 1410 meters.
- The infrastructure of the mine is excellent offering two accesses by an elevator in 3 minutes or by a 11-km long truck-sized drive-way (a decline; takes 30 minutes). There are, among others: office rooms, storage halls, machine workshops for mechanical and electrical instruments, and a lunch restaurant which also can be used for meetings.
- Stable rock conditions



Pyhäsalmi vibration accelerations at 500m from source:
0,013g (due to earthquakes)
0,020g (due to blasting activities)



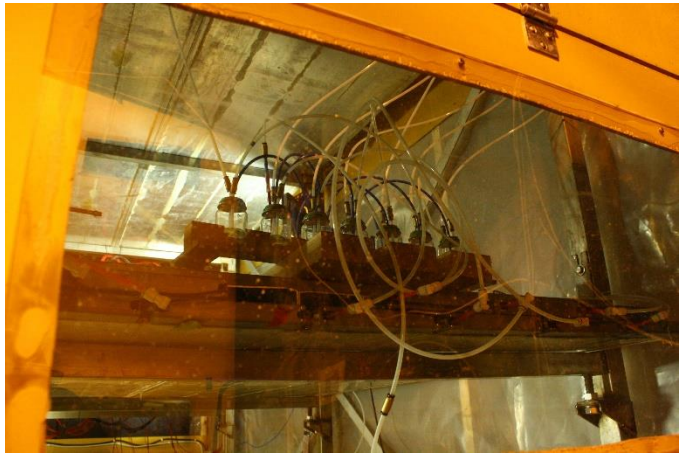
- The Pyhäsalmi Mine is 1400 meters deep modern metal mine at Pyhäjärvi

- The mine has a lot of available spaces/caverns at several depths all the way to the main level at 1400 meters.

- Underground facilities includes e.g. – parking lots – electrical repair workshop – equipment washing lane – workshops for equipments – material storages – safety area / fresh air supply area – telecommunication room – a kitchen and lunch room – washrooms – a sauna – showers
- Radon level 20 Bq/m^3

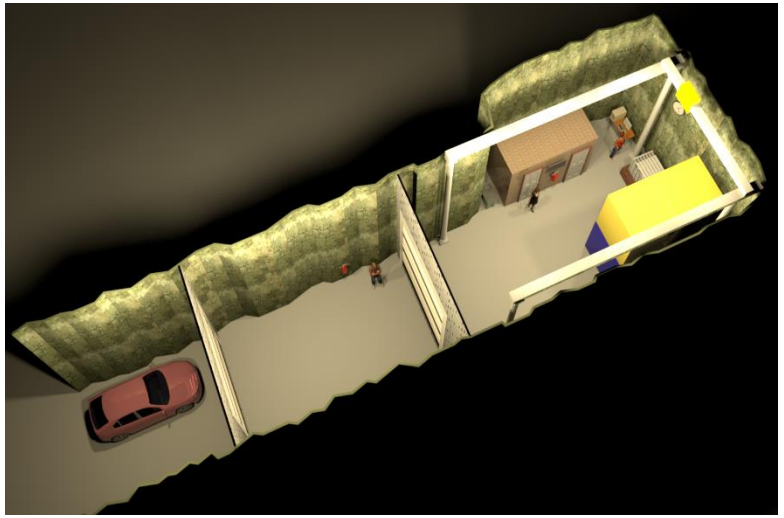
Current activities

- EMMA (Experiment with MultiMuon Array) is underground cosmic-ray experiment aiming to determine the mass composition of cosmic rays at the knee region (around 3 PeV).
- It consists of 11 detector stations of 15 m^2 each assembled at the depth of 75 meters.
- More information: www.cupp.fi

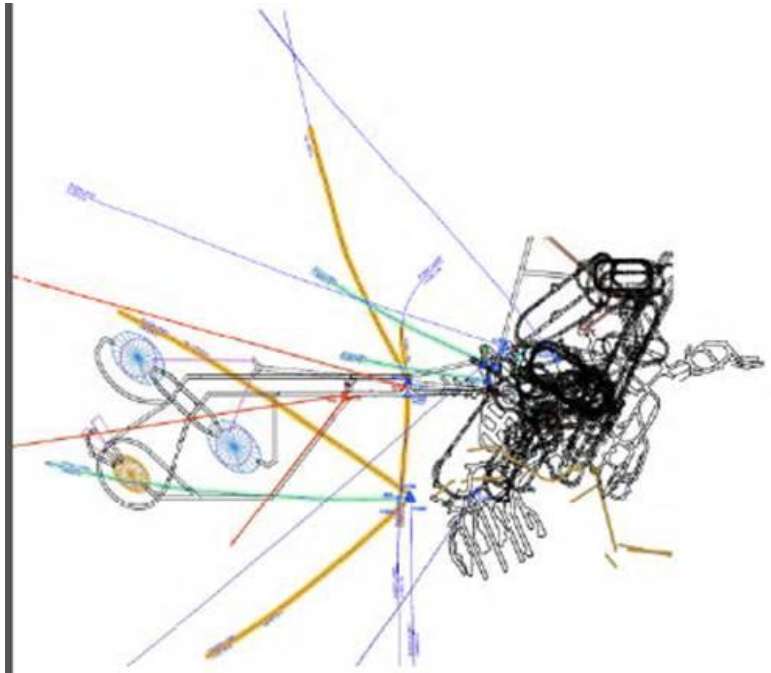


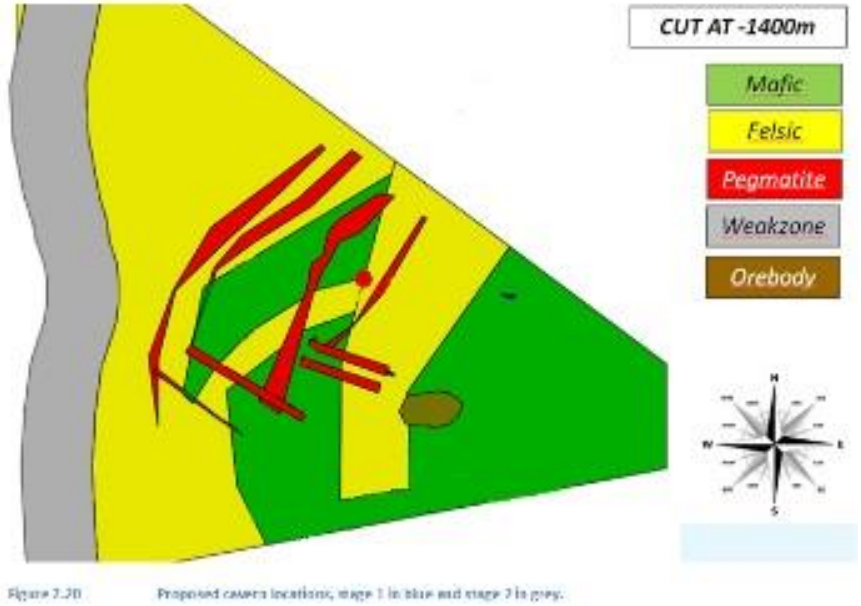
At the depth of 1430 m (4000 m.v.e.)

- The new laboratory space (~130 m^2) is being developed at the main level of the mine.
- The first experiment in the new laboratory will be the C14 experiment, which will study the C-14 content in liquid scintillator samples, requiring low background.
- The aim is to find out liquid scintillator samples with the concentration less than 10^{-18}. It consist of the liquid scintillator sample of 1.6 liters in a quartz vessel, two shaped acryllic light quides and two low-background PMTs (currently ET 3" 9302B). The external gamma background is being shielded by thick copper and lead shieldings.



Extensive site investigations

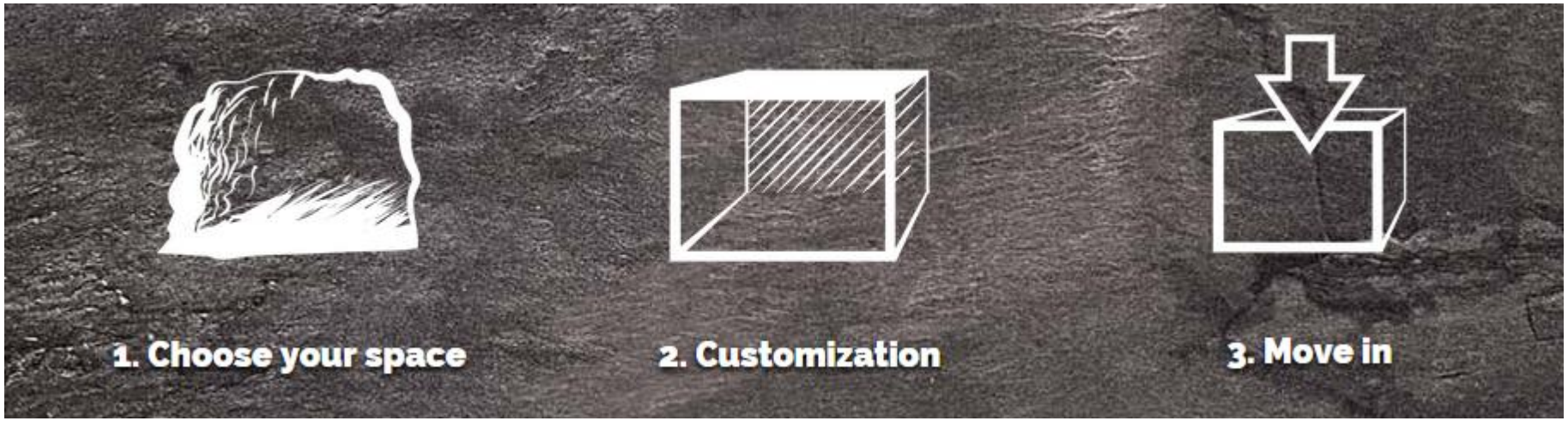




Total amount new holes drilled 3.5 km
Total existing holes core logged 2.9 km
Total amount holes core logged 6.4 km

Site investigations showed that it is easy to expand current facility as needed.

Possibilities in CallioLab



Your opportunity?

- The Open Call process has been opened on April, 2015. The dead-line of the first round ends on December 31, 2015. There will be a new round of Open Call next year.
- We are looking for collaborations in any field of science showing interest in the potential of the CallioLab and which could possibly use the existing or new halls in the CallioLab for their experiments.
- There are more information of the CallioLab and Open Call at

https://www.calliolab.com/

CALLIO LAB

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Thank You!

For more information:
info@calliolab.com

www.calliolab.com

See you in Pyhäjärvi!

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